

FREE TIME: A Game Design To Promote Shared Expectations of Family Time

MASTER THESIS

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ABSTRACT

Smart devices are a part of everyday life and screen use is quickly becoming a ubiquitous activity. Related studies have shown that families are experiencing tensions in relation to in-home screen use and that they often fail in trying to implement strategies to address these tensions. This study explore to what extent the Self-Determination Theory and gamification can be utilized to help families reflect on tensions regarding their screen use. We studied how the Self-Determination Theory can be used to map existing feelings towards the motivation to address screen use related tensions. Using Research through Design combined with digital ethnography we have investigated how implementing our board game design called "Free Time" can help sprout motivation towards establishing shared expectations to family time and thereby alleviate tensions related to screen use. In conclusion, this study is a contribution to the field of HCI research on the topic of technological tensions emanating from use of smart devices. Our main contribution with this study lies in the finding that Free Time can influence perceptions on tensions, but also actual behaviour, surrounding screen use during family time. This study suggests that the Free Time could improve upon family time by its ability to bypass the reluctance of family members to engage in screen use related discussion by fear of conflict, found in related work on the subject.

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Chapter 1

Introduction

1.1 Motivation

Technology has a great influence on all of us and especially on family dynamics. Smartphones are increasingly influencing how to be a family in the modern world, affecting the perception of what family time is. This influence reaches into the domain of academic research, with studies like Blackwell et al. (2016) advocating for more nuance and flexibility in the very definition of the term *family time*. The notion of the family huddled around a TV in the evening is fading and yet we are still together, but on our separate screens. This allows us to be connected and attentive to someone who is not physically there to great frustration for those who are. Frustrations from this kind of individual screen use can give rise to tensions between family members by threatening the sense of togetherness which is deemed a vital component in child development as well as intra-family relationships (Offer 2013). This way, excessive screen use can disrupt family dynamics. Blackwell et al. (2016) theorized that families experiencing tensions surrounding household technologies could benefit from being influenced by realistic expectations regarding when and where screen use is acceptable during family time. Many of the tensions that occur in families derive from a lack of knowledge of, and inability to estimate, the actual screen use of family members (Oduor et al. 2016). In order to calibrate expectations between family members it would be beneficial for the quality of family time to promote the ability to make informed judgments about the activity of other family members (Blackwell et al. 2016; Oduor et al. 2016). In Hansen et al. (2020). we saw a tendency that when confronted with their actual level of screen use, most thought it was too high and ultimately something they would like to change. This desire to implement non-use of screens in one form or another is labelled by Baumer et al. (2013) as lagging resistance, from which the user would strive to transition into active resistance (Satchell and Dourish 2009). In order to actively resist undesired screen use some of the participants of Hansen et al. (2020) attempted various strategies to change their behavior, like putting their phone on silent mode or leaving it in another room so it would not be a source of disturbance or temptation. While some were able to reduce their screen use through this type of non-use, not all tensions can be influenced positively simply by reduction. Examples include the study of Baumer et al. (2013), finding that limiting or leaving Facebook use had the adverse effect of friends feeling left behind or suspecting that they had been defriended or even blocked, apparently for no reason. Looking at the context of the family Hansen et al. (2018) discovered a wide array of situations where allowing screen use was also beneficial for family time situations and alleviating tensions. Adding to this, some parents in the study of Hansen et al. (2020) explained situations where the use of screens was compared to hiring a babysitter, allowing the parents to perform necessary activities like cooking dinner without being disturbed. Because there does not seem to be a clear solution related to managing screen use, Blackwell et al. (2016) argues that what is needed in the family is shared expectations on when, how and to what extent you should participate in family time activities. Following the establishment of shared expectations in the family an effort should be put into also establishing motivation towards living up to this expectation. By introducing game elements in a non-game setting in a way that can create motivation for behavioural change, gamification could prove an effective tool in order to create awareness about screen use to alleviate tensions. These elements can be a source of engagement for the user that inspires them to explore an environment for new knowledge or practice a skill (Nicholson 2015).

1.2 Related Work

1.2.1 Tensions and Family Time

In Hansen et al. (2020), we investigated how tensions occur in families at home as a consequence of using or not using screens and we discovered a tendency towards lagging resistance in "[...] a sense of failure from not being able to comply with your own rules." (Hansen et al. 2020: 60). Family time was generally thought of as precious time to be with your children, but in a digitalized world with a growing dependency on screens both during work hours and leisure time, preserving family time in the sense of, "being co-present while attending to each other" (Blackwell et al. 2016; 10) can prove a hard task. Efforts to reduce or abstain from screen use can be understood as implementing *non-use* of technology, a term that covers a multitude of reasons for, and ways of, not using technology. We found that families were mainly utilizing the non-use form of *active resistance* (Satchell and Dourish 2009; 11) by implementing *restrictive mediation* as it is defined by Hiniker et al. (2016). Restrictive mediation includes rule-making and similar actions restricting screen use either by context, when and where screens are prohibited, or by activity, what is and what is not allowed to do on a screen. Restrictive mediation is often a reaction to unwanted screen use habits of a person as it is experienced by either herself or her peers. Hansen et al. (2020) suggested that parents feel more strongly about controlling their children's screen use than managing their own. They perceive the potential downsides like developmental deficiencies or being exposed to distressing material to be more severe in children. Some families expressed a desire to change their in-home screen use behaviour in order to alleviate some of the experienced tensions, but were lacking the right strategies to do so. Following Hansen et al. (2020, 2018) screen-related tensions in the families were caused not only by excessive use, but also by non-use in some situations where screen use would have proven a positive or effective activity. Even though a reduction of screen use did not prove to be a silver bullet in solving tensions, it was suggested that both non-use and use of screens could be used to solve their respective sets of challenges leading to tensions.

Viewed through the lens of non-use, our aim is to make visible any signs of *lagging* resistance, the "[...] sense of wanting to quit but not doing so just yet." (Baumer et al. 2013)

3264), versus loss of family time among the participant families. In-home family activities make up the majority of family time and joint activities within the family prove crucial in enhancing relationships and facilitating intra-family communication (Offer 2013). Based on this we propose a game design as a way for the families to explicitly address this lagging resistance, thereby providing a means of transitioning to actual non-use. How, where and to what extent non-use is implemented is then shaped by the family itself, based on their own actual screen use and habits concerning screens. However, when also taking into account the described situations in which non-use introduces tension, the findings from Hansen et al. (2020) and Hansen et al. (2018) points to the conclusion that the problem should not be defined purely in terms of use or non-use of screens. It is evident that the problem instead should be expressed in more general terms, as motivating families towards a state of less screen use related tension.

1.2.2 Gamification to Change Screen Use Behaviour

Gamification is highlighted by Richter et al. (2015) as an effective way of stimulating behavioural changes in players. We will be utilizing gamification as an extension to previous work on the topic of tensions relating to screen use and non-use in families. Applying the concept of gamification to the challenge of addressing tensions surrounding screen use in families could then be viewed as the act of gamifying the acquisition or understanding of new strategies to change screen use habits. Stimulating the families' work to implement change in how they use screens, we look into research on the activity of estimating screen use. Research on use estimation is largely consisting of studies of individuals estimating their own use and studies researching people's estimation of other people's use of screens remains scarce. Still, guessing on other family members' screen use data could prove a viable inspiration for activating gamification in a family context. Studies have been made to facilitate the reduction of screen use through gamification on mobile applications such as Lubans et al. (2014). A general focus for studies that investigate how to reduce screen time is typically health and physical well-being, as screen time is often associated with inactivity or sedentary behavior. Lubans et al. (2014) investigated how to reduce screen time in order to inspire other activities, such as fitness related self-monitoring and goal setting, using the Self-Determination Theory and gamification. Still, examples of an explicit application of gamification in a family context to address tensions stemming from screen use remains scarce, with traces of this seen most prominently in the study by Hansen et al. (2018). Studying tensions between family members through gamification could yield exciting results to add to the existing research, while inspiring motivation in the participants to become better at knowing each others screen use and by proxy prevent some the technological tensions that might occur on the lack thereof.

1.3 Research Question

To summarize our motivation for the work of this master's thesis, the present study aims to investigate the following research question:

To what extent can gamification be utilized to help families reflect on tensions regarding their screen use, and how can we design an artefact to stimulate changes in screen use behaviour?

1.4 Structure of the Report

In Chapter Two, *Background Literature*, we go through a range of background literature and related work addressed in Hansen et al. (2020), concerning in-home tensions from screen use during family time in families, describing different strategies for dealing with screen use in relation to the concept of non-use. Further, the Self-Determination Theory is explained and related to the concept of gamification. In Chapter Three, Game Development, we describe the design and development of the board game "Free Time" that was deployed in the families as part of this study. This is supported with various theoretical concepts as our main sources of inspiration for game mechanics and overall structure of the game. In Chapter Four, *Method Design*, we describe and reflect on our method and research design, consisting of digital ethnography in combination with Research through Design. The participant families are described in detail, followed by an account of the screen use related tensions experienced by them. Finally, we describe the exact application of the Self-Determination Theory in the context of this study. In Chapter Five, *Results*, we lay out our findings from interviews and games played relating to the Self-Determination Theory. In Chapter Six, Discussion, we discuss the application of the Self-Determination Theory in our study and the effect that Free Time has on the participant families in relation to their family time. We discuss limitations, with focus on COVID-19. In addition, we propose bias in self-reporting of screen use and applying Free Time in a different context as possible topics for further research. In Chapter Seven, *Conclusion*, we recapitulate and conclude on our study as a whole.

Chapter 2

Background Literature

2.1 Theoretical Concepts From Previous Study

In the following section we will briefly present the theoretical concepts of family time, tensions, non-use, and the active and restrictive mediation of screen use. These are the central theoretical concepts of our previous study, <u>Hansen et al.</u> (2020), central for the present study as well.

2.1.1 Family Time

The term *family time* can have several interpretations depending on the family in question as well as the topic of interest. The family is the first and most important social milieu in which children experience the world (Brown 2017). Spending time with the family is considered positive both in terms of the well-being of the individual but especially also to family functioning, with Offer (2013) stating that, "Joint activities help forge a sense of togetherness that is crucial for child development by enhancing relationships and facilitating communication between family members." (Offer 2013: 26). In both Hansen et al. (2020) and the present study, we use the definition of Blackwell et al. (2016), who propose family time as an umbrella term by defining a spectrum of situations in which the family are together. In one end of the spectrum we have co-presence while managing attention individually. This covers individual use of a device during family time, but also activities like reading a book. A second type of situations is denoted co-presence and attending to a shared activity, including situations like watching a movie together. Finally, in the other end of the spectrum we have co-presence and attending to each other, which covers situations where the family is playing a game or having a conversation. In that way co-presence is a common denominator in all situations of family time, but the variation of activities while being co-present reflects the suggestion that "(...) perceptions of "family time" should be revised to better align with evolving technology use in modern households." (Blackwell et al. 2016; 2). It is noted that this definition of family time does not take into consideration the context in which the family members are co-present. However, Offer (2013) suggested that family time mainly consists of indoor activities, as the home is the main locus of family interactions. When talking about family time we refer to this sub-category which is geographically constrained to the home of the family. The reason for this focus is that this study is concerned with family time as it plays out within the context of the home, and the tensions that occur here as part of everyday life.

2.1.2 Tensions

For this study we use the definition of *tension* presented in (Hansen et al. 2018: 1), as "[...] negative effects and feelings towards the intra-family relationships, such as guilt, frustrations, and stress.". A tension is defined as a negative emotional response in a person to a given

situation, such as stress or feelings of guilt. A tension is a conditional phenomenon in the sense that it is an individual experience dependent on the context as well as the personality and psychology of the people in question. Tensions can lead to conflict when disclosed to, or addressed by, other people.

2.1.3 Strategies to Mediate Screen Use

A widely used method for people to alleviate tensions from excessive screen use is to develop personal strategies. In their studies Oduor et al. (2016), Ko et al. (2015) and Lee et al. (2014) found a variety of strategies both social and technical in nature. Technical strategies include placing the devices physically out of reach or modifying them with functions like flight mode or silent mode. Limiting the amount of applications or using software to restrict the use of certain applications to a daily limit are also examples of technical strategies. Examples of socially driven strategies include hiding online presence to minimize the desire for both in- and outgoing communication, keeping interactions at a minimum or reducing how often devices are checked for messages, and placing the phone out of reach.

Stating Your Screen Use Loudly While Co-Present

A notable strategy found by Oduor et al. (2016), that approaches excessive screen use as a social problem, is the act of informing other family members about what a device is being used for, while it is being used in their presence. Users in the study were generally able to define both examples of necessary and unnecessary use. However, Oduor et al. (2016) found that screen use while co-present in the family was only on rare occasions regarded as important by other family members, and that verbally explaining the motivation for attending the device instead of the family helped promote understanding in the other family members. Oduor et al. (2016) also found that half of the participants in their study reported wanting to decrease not only their own screen use, but also that of their family members, concluding that, "[...] reducing usage was seen more as a group or couple activity, rather than something that was individual in nature." (Oduor et al. 2016: 1322). This proves to be a difficult task, as the participants state that they do not know where to begin in regards to implementing change. However, studies like Hiniker et al. (2016) and Blackwell et al. (2016) found examples of families discussing the establishment of shared expectations towards being present during family time. It was not reported as a problem to have family members managing their attention individually while being co-present. Instead, the issue was identified as a lack of synchronization leading some family members to attend to their own device while others expected them to engage in a shared activity. While the family members did not find it necessary for each other to be present at all times, they would like shared expectations on which type of family time was in play when, to avoid tensions leading to conflict.

Parenting Strategies of Active and Restrictive Mediation

By looking at concrete in-home rules and family discussions about screen use, numerous studies (Valkenburg and Piotrowski 2017; Hiniker et al. 2016; Blackwell et al. 2016) have investigated how mediation of screen use comes into play in the social context of parenting. In Hiniker et al. (2016), they present three of the most common parental mediation styles, namely *active mediation* involving parent-child discussions and reflections on screen use, *restrictive mediation* denoting rules and limits on permitted activities, and *co-viewing* where screen use is a shared experience between parent and child (Hiniker et al. 2016; 1378). A further division of the terms yield two types of restrictive mediation, either by context of use or by activities performed. Similarly, active mediation can either be factual in nature where additional information is used to support the discussion of certain content, or evaluative corresponding to a more subjective approach in which the parent's own opinions are displayed in the discussion. In Hansen et al. (2020), the concepts of active and restrictive mediation were key elements in talking to research participants about parental strategies already applied, but also those desired to be applied, in the family.

2.1.4 Non-Use

Non-use is a term covering all aspects of not using pieces of technology. The term has seen a transformation over time, as the term non-user previously described a person mainly as a potential or future user not yet using a piece of technology (Satchell and Dourish 2009). In his study, Selwyn (2003) aimed to drive forward this transformation of the non-use term, stating that, "[...] conceptualising non-users of technology as purely those who 'have not' any access to any technology is too crude an analysis." (Selwyn 2003; 100). Studies like Satchell and Dourish (2009) and Wyatt (2003) applaud this viewpoint and aim to investigate non-use as something that is multi-faceted. Wyatt (2003) defines non-use as a two-dimensional matrix of groups, with resisters versus rejecters on one dimension, and excluded versus expelled on the other dimension, while Satchell and Dourish (2009) highlights non-use as something that is, "[...] often active, meaningful, motivated, considered, structured, specific, nuanced, directed, and productive." (Satchell and Dourish 2009: 15), defining a spectrum of nonuse. In Hansen et al. (2020) we found, that the participant families were exhibiting non-use related behaviour in the form of *Lagging resistance*, the "[...] sense of wanting to guit but not doing so just yet" (Baumer et al. 2013: 3264), and Active resistance, the "[...] positive effort to resist a technology." (Satchell and Dourish 2009: 11).

2.2 The Self-Determination Theory and Gamification

What makes a game is a structured set of components that afford competition and engagement from the participants. According to Seaborn and Fels (2015), common components of a game include a set of rules that inspire an artificial conflict, a system to interact with and uncertain outcomes. In addition, they argue that game design can draw upon elements of the Self-Determination Theory.

2.2.1 The Self-Determination Theory

The Self-Determination Theory (SDT) studies the surrounding social-contextual settings that enhance intrinsic motivation, self-regulation and well-being (Ryan and Deci 2000). It conceptualizes that when humans are at their best, they strive to learn and master new skills and, in doing so, become self-motivated. To be at their best, humans need a combination of three fundamental psychological needs which is *competence, autonomy*, and *relatedness*. Together, they shape the foundation for the development of intrinsic motivation which is associated with the positive developmental human tendency of wanting to learn and be creative.

Perhaps no single phenomenon reflects the positive potential of human nature as much as intrinsic motivation, the inherent tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn.

(Ryan and Deci 2000: 70)

Ryan and Deci (2000) theorized that humans are endowed with intrinsic motivational tendencies that require correct maintenance and supportive conditions, as they are easily disrupted in non-supportive conditions. The feeling of competence is the ability to produce the desired outcome and to experience mastery and effectiveness (Nicholson 2015). Events like positive performance feedback, rewards and communication that lead towards a feeling of competence can enhance intrinsic motivation, whereas a non-supportive condition like negative performance feedback will diminish it. Competence can not stand alone in providing the conditions to enhance intrinsic motivation and must be accompanied by a sense of autonomy (Ryan and Deci 2000). Autonomy is having ownership of your own behavior, and in the Self-Determination Theory, autonomy is viewed as self-determined behavior (Nicholson 2015). Opportunities for self-direction, choice and acknowledgement of feelings are viewed as supporting a sense of autonomy. On the other hand, extrinsic tangible rewards undermine the sense of autonomy, as they influence from an external perspective. They are categorized alongside threats, deadlines, directives and imposed goals as externally undermining and diminishing intrinsic motivation. The final psychological need is relatedness, exemplified by a study of school children who were less prone to show initiative and intrinsic motivation in a class room setting if they found their teachers to be cold and uncaring (Nicholson 2015; Ryan and Deci 2000). This finding was extrapolated to SDT by acknowledging a psychological need for relatedness and security in order to have the right conditions for initiative and intrinsic motivation to flourish.

The activities humans carry out are not all inherently intrinsically motivated and between doing an activity for your own internal satisfaction and feeling of autonomy, to being amotivated and not acting at all, exists extrinsic motivation (Ryan and Deci 2000; 72). The different types of extrinsic motivation are divided by the degree to which someone chooses to engage in an activity. These reasons can be to gain an external tangible reward, to perform in order to prove your worth or avoid failure, or to valuate the outcome of performing a certain activity. When an activity has many comparisons to intrinsic motivation, like being aligned with your values and needs but the desired outcome is other than enjoyment (Ryan and Deci 2000) it is also still in the domain of extrinsic motivation. Including the SDT in the design of game elements will allow the conditions needed to promote the interest and engagement of the end-user.

Recent studies confirmed that experiences of competence, autonomy, and relatedness were major contributors to game enjoyment, regardless of the specific content, complexity, or genre of games [...].

(Richter et al. 2015: 33)

Incorporating the three needs from SDT in the design enables games to provide a higher quality learning experience, lower dropout and better performance (Richter et al. 2015).

2.2.2 Gamification

Both education, business and marketing have seen a vast increase in the application of games to aid learning and user engagement (Seaborn and Fels 2015). Gamification is a way to design for change in behaviour through playful experiences according to Richter et al. (2015). The actual definition of gamification is, however, contended by its numerous definitions through the various contexts where the term is applied. Seaborn and Fels (2015) concluded that gamification, after having performed an extensive comparative analysis on the use of the topic, is, "The intentional use of game elements for a gameful experience of non-game tasks and contexts." (Seaborn and Fels 2015) 13). Gamification is generally used to describe the featulateds of an interactive system like game mechanics, interactions and challenges that are built to engage and motivate users (Seaborn and Fels 2015). It is commonly perceived as a way to create rewards-based systems as many of its applications focuses on elements such as creating points, levels, and achievements in a gamified real-life context (Richter et al. 2015). This way of using gamification focuses on different types of extrinsic motivation as it centers around externally motivating rewards and uses these as a way to maintain user engagement and interest. Motivation is relevant in many areas as it concerns persistence, energy, and intention. Furthermore, it is generally desirable in the real world as, "[...] Motivation produces." (Ryan and Deci 2000; 69).

Designing game elements for extrinsic motivation is viewed as a way to change short-term behavior (Nicholson 2015). This type of motivation is likely to fade away if the rewards are perceived as being too far apart or not aligned with the values of the user and therefore not worth effort. It is, however, useful for quickly learning a specific skill that in itself proposes a certain recognizable reward like mastering a specific software or tool according to Nicholson (2015). Intrinsic motivation in these game elements is able to maintain user engagement, as the user's perception of the value of short-term extrinsic rewards is likely to change over a short period of time. When designing for intrinsic motivation in gamification, opposed to extrinsic motivation, an activity is to be performed without the expectancy of an external reward. That is, besides the reward of the immediate recognition of performing an activity that is aligned with your internal values while building competence and supporting a sense of autonomy. Including the aspect of intrinsic motivation in the design of game elements will allow the conditions needed to promote the interest and engagement of the end-user, which makes the game a supportive condition for intrinsic motivation. Landers et al. (2015) explain how game designers are able to adjust different game elements by contemplating how to use the three psychological needs from the Self-Determination Theory that enhance intrinsic motivation, stating that,

This suggests that the same taxonomy of motivation may apply in the context of gamification, which provides some implications for design, such as adding more autonomy to a task in order to promote different kinds of motivation in students and employees.

(Landers et al. 2015: 180)

In game related matters, a user experiences a feeling of competence when they begin to master something and their competence is met with positive feedback (Landers et al. 2015; Ryan and Deci 2000). Autonomy is portrayed as the feeling of making your own choices and volunteering to play a game in the first place (Nicholson 2015). Experiencing relatedness is through the connections with someone through their actions in a social context like competition or cooperation. Together, these three areas determine a goal for which conditions and requirements the design of the game elements need to meet. By incorporating SDT in gamification, game designers are able contemplate how to incorporate the three psychological needs to build intrinsic motivation and maintain a high level of user engagement depending on the ends to which the game should serve.

Chapter 3

Game Development

3.1 Free Time the Board Game

Before discussing our research method, this chapter brings a detailed account of the development and design of *Free Time* - a prototype board game serving as the center-piece artifact in our data collection for the study. Free Time is a board game that seeks to spark conversation about the tensions that families face in the merging of everyday screen use and family time. We found the idea of creating a board game intriguing because it could explore the apparent contradiction in making a group of people discuss tensions stemming from excessive screen use by means of an analogue artifact. In addition, designing a game could make the participant families experience their participation also as family time combining co-presence while attending a shared activity and attending to each other. This way, choosing a board game platform could promote the participant families' sense of togetherness. The name was chosen to highlight the idea that the game helps the user in freeing up time in their daily schedule that would otherwise be wasted by excessive or undesired use of screens.



Figure 3.1: The different game components in *Free Time*

3.1.1 Game Elements in Free Time

Free Time (see Figure: 3.1) is played by two teams competing to complete one of four scenarios describing four examples of everyday, real-world situations. In order to complete

a *scenario*, the team must collect objects called *trophies* by moving around on a board resembling a house seen from above. The idea behind choosing a house layout was, that it might enhance the game's relation to everyday life. Each trophy won throughout the game represents the completion of a specific part of the active scenario. To obtain one of the trophies a team must challenge the opposing team to a *duel* in which they will get a question about screen use habits and screen consumption from different perspectives. Besides picking a scenario, each team must pick one out of two cards from the *bonus*-category that contain advantages, like for instance locking a door for an entire round. A team can move around the board by the throw of a special die with numbers ranging from one to three giving a maximum of three moves per round. By including die rolls in Free Time, we introduce chance and variation in the speed of progression between the two teams. Thereby, we avoid creating a setup in which the starting team will always be one step ahead in the hunt for trophies.

Challenges

Every time a team lands in a new area of the house, they must draw a card from a pile of *challenge*-cards. Within the challenge-category are three subcategories called *write*, *range* and *guess*. When drawing a write-challenge, two players on the same team are challenged to identify the person in the game that they think fits the description best like, "Who watches the most TV?". If they both pick the same person the challenge is won. In the range-category two team members must range the entire family according to a statement on the card which could read, "Range the whole family after who uses Facebook most". If they manage to range the family in the same order, the challenge is won. In the guess-category the entire team must estimate the specific recorded screen use of a certain person like their daily use of an app or daily pick ups. This person is chosen by a pile of cards named "*who*" that contain a brief description of who the person in question is. In order to succeed the team's answer must be within the specified range of the actual use in question, which is verified by reading the screen tracking application. Upon winning any of the challenge-categories the team is allowed to draw an *event*-card. The event-cards can have either positive or negative outcomes like for example moving forwards, receiving an extra turn or going back to start.

Duels and Trophies

A trophy is won by beating the opposing team in a duel. Whenever a team can win a trophy, either by standing in or moving to a trophy room, they must pick a card from the duel-category instead of a challenge. Much like the guess-category each team must agree upon a numerical answer to the question on the card. However, in this category you also have to guess what the opposing team is going to answer. In order to win, your team's estimate of the opposing team's answer must be more accurate than their estimate of yours, and in case of a tie the challenging team will be the winner.

3.2 Creating The Conceptual Foundation for Free Time

A cornerstone in game design alongside player types is game mechanics. These serve as a main source to stimulate both intrinsic and extrinsic motivation. In order operationalize the desirable skills to master and achieve competence, the game elements and mechanics must appeal to the players. Game mechanics, "[...] "facilitate and encourage a user to explore and learn the properties of their possibility space through the use of feedback mechanisms"." (Kutun et al. 2016; 103). For the development of Free Time we considered how to include a suitable amount of game mechanics while still keeping the game fairly simple, in order to potentially include smaller children and to avoid deviating from our initial research focus.

3.2.1 Implementing Conversation as a Game Mechanic

Given that Free Time seeks to inspire conversation about tensions stemming from screen use in family time, we sought out multiple ways for the game to inspire these conversations. In order to increase the design's potential for this inspiration regardless of the specific participants, we propose three catalysts of conversation in Free Time each aiming for a unique topic of screen use. First, Free Time addresses attitudes towards restrictive mediation through the duel-cards asking the players to evaluate screen use rules and habits. Second, it highlights personal screen use behaviour through write and range-challenges asking to point at the person best fitting a given description of screen use. Third, the game presents numerical screen use data from the players' screen tracker applications through the guess-challenges. Competition and artificial conflict are some of the defining elements to what makes a game according to Seaborn and Fels (2015), in being such, they are also criteria for the design of Free Time. By dividing the family into only two teams we provide a competitive environment which also adds a layer of cooperation between the family members. In this setup we make them estimate the screen use of each other in order to provide valuable insights for our research into their perception of screen use for themselves and their family members. As they play the game it is possible that they start to recognize who in a particular family are the outliers with the maximum and minimum general screen use. It can also potentially provoke conversations into which apps someone is using and to what extent, by being confronted with certain challenges from the game elements.

We decided to utilize the gamification concept by introducing non-game everyday talks about screen use in a game setting, while promoting an engaging experience. We considered different possibilities of how to achieve this. One idea was creating a game that solely consisted of a deck of question cards revolving estimation of the other players' screen time. This solution, however, was considered too simple as it would only consist of a basic layer which possibly would not inspire great motivation to play. Instead, we decided to discover a way to include *Bartle's player types* (Bartle 1996; 3) and allowing for the game mechanics to be open for the inclusion of each of these if possible. In addition, we decided that playing the game should, to some degree, be able to facilitate a learning process regarding the estimation topic. This influenced the ideation of our game mechanics as they would need to promote intrinsic motivation to make them play the game more than once and afford them wanting to improve their skill within estimating screen use. For this reason, we included the Self-Determination Theory (Ryan and Deci 2000) and the *RECIPE for meaningful gamification* framework by Nicholson (2015).

3.2.2 Drawing Inspiration From Bartle's Player Types

Kutun et al. (2016) state that players act upon their own preferences and psychology which makes it imperative to know which type of players exist. Bartle (1996) created a framework with four types of players: killers, achievers, socializers and explorers. Achievers set personal goals in-game to complete and have a desire to win. Explorers set out to investigate the extent of the game and discover the unknown. Socializers use the game as an opportunity to socialize, cooperate and network with other players. Killers seek to disrupt and compete with other players in order to win and are most likely to heckle and cheat during a game. These four types are not mutually exclusive and a person can have traits from every player type (Zichermann and Cunningham 2011). In our study, Free Time leads socializers to experience that their interest was covered throughout the game as any move within the game either affords cooperation or dialogue in their family. To a certain degree the design of the board supports the explorers as they will be able to decide and plan a route to follow. The bonuscards make different routes more difficult as a team might fall behind upon being locked in a room, or given a sudden burst of speed through shortcuts and teleportation. Furthermore, the choice of randomizing the different card decks also serve to facilitate the explorers by stimulating curiosity. During internal testing of different game elements, we realized that including a duelling aspect between to teams would suit the killers. The duel-cards provide an opportunity for the killers to disrupt their opponents, while building their mastery in both understanding and estimating screen use in family members. The feeling of competition is supported by being able to compete for the same trophy while in the same room, which heightens the stakes for the killers. For the achievers we decided to create tangible trophy pieces that serve as rewards in a scenario with objectives that needs to be completed in order to win the game. Typical game mechanics in gamification focus on levels, points and badge systems. These mechanics allow a player's progression to be visually expressed and depending on the player type these mechanics can be powerful motivators (Zichermann and Cunningham 2011). While these types of external rewards are often thought of as undermining intrinsic motivation it is also be argued that, "gamification works better if and when we can align intrinsic motivations and extrinsic rewards, and we should strive to achieve that wherever possible." (Zichermann and Cunningham 2011: 28).

3.2.3 Meaningful Gamification

Meaningful qamification is an area within gamification that shares the same view on intrinsic motivation as the Self-Determination Theory. It theorizes that when motivation is internally driven the individual will have a more positive outlook on performing an activity than if only driven by extrinsic motivation (Nicholson 2015). The term meaningful in this regard derives from the concept of designing game elements that provide a variety of choices and possibilities for learning and mastering a concept in different ways. In this way, the individual performing the activities will be able to explore and benefit from the system in what Nicholson (2015) describe as the "ludic learning space". Designing and creating meaningful gamification can be broken into six elements called the RECIPE; reflection, exposition, choice, information, play and engagement (Nicholson 2015; 5). Each of these elements support building intrinsic motivation, as they are encountered in a game. For example, the information element focuses on displaying real-life concepts for the participants. It builds their competence because they understand the underlying structure of the game elements portraying information which allows them to improve their skills. The engagement element, is connected to relatedness from the Self-Determination Theory, as it builds on the understanding that people are more inclined to be engaged in something if it has a social aspect which makes them feel connected to the other participants. The RECIPE provides a useful tool that supports game design from different perspectives when trying to achieve internalized motivation.

The Application of RECIPE in the Development of Free Time

By challenging the families to assess screen time estimation from different angles Free Time is providing a variety of choices and possibilities that could potentially generate intrinsic motivation. The RECIPE framework provides elements that can support intrinsic motivation by allowing choices and possibilities within the game (Nicholson 2015). In the context of Free Time as a board game we incorporated the *play* element by creating a gameful experience with an uncertain outcome, where the roll of a die could potentially affect how well you fare within the constraints of the game and where you have the freedom to answer and cooperate in solving the questions and challenges proposed by the game. *Exposition* deals with creating stories for the players that relates to real-world settings. This element was incorporated by creating scenarios that feature relatable stories for instance incorporating the ongoing COVID-19 crisis in a scenario with objectives to solve. *Choice* relates to play, as it in it's nature contain an element of freedom. In Free Time it is supported by being able to shape the outcome of your success within the game. As the players progress and solve questions they are actively deciding a route and thereby a strategy. They can also choose to use an acquired bonus-card at any given time they see fit, for instance to interrupt the opposing team. The aspect of involving choice in Free Time is related to the Self-Determination Theory as it promotes the sense of autonomy in the players, abling them to make meaningful choices within a system (Nicholson 2015). Information is an important element in terms of research purposes. This element is used to portray information about real-life contexts for the players. Free Time is incorporating this element by including the players' screen trackers to put actual screen use up for debate. The circumstances regarding the extent of their screen use exist outside explicit in-game situations, but are laid bare and presented as information within the game. *Engagement* is concerned with the social context in which players will seek to discover and learn from each other which is connected to the relatedness aspect of the Self-Determination Theory. When played by a family the board game provides a strong social incentive for them to discuss and talk along the duration of the game, hopefully without shying away from difficult topics. Furthermore, the game is based on cooperating to find the best route and solve questions, which provides meaningful social engagement. The final element in the RECIPE is *reflection*. This element seeks to extend the experience of the game outside explicit in-game situations by having the players continue to reflect upon what happened in the game and how it relates to other parts of their life. As Free Time uses screen trackers from the participants' personal device(s) to support in-game elements, it could potentially inspire reflection as they recognize the behavior and consumption of someone in the family. When this consumption becomes quantified, or someone might assume that a specific family member has a high or low consumption it could spark reflection beyond the constraints of the game.

3.2.4 Inspiration From the Mobile Phone Problem Use Scale

In order to address the notion of screen use sometimes being problematic, we have drawn inspiration from the *Mobile Phone Problem Use Scale* (MPPUS) designed by Bianchi and Phillips (2005). The MPPUS was developed as a self-reporting tool used to measure problematic use of mobile phones, and consists of 27 items formulated as questions covering "(...)the issues of tolerance, escape from other problems, withdrawal, craving, and negative life consequences in the areas of social, familial, work, and financial difficulties." (Bianchi and Phillips 2005: 43). The respondent is asked to answer these questions on a 10-point Likertscale ranging from "not true at all", to "extremely true". Item 5 (concerned with hiding from others the time spent on the phone) has been part of the conceptualization of the board game itself, introducing the idea of forcing the players towards full disclosure regarding screen use. Examples of more concrete applications of these items include, "I have attempted to spend less time on my mobile phone but am unable to", "My friends and family complain about my use of the mobile phone", "I find myself engaged on the mobile phone for longer periods of time than intended", and "I have been told that I spend too much time on my mobile phone" (Bianchi and Phillips 2005; 43). While none of them have been directly applied in a single challenge, the different challenges are designed to probe the players for investigating these.

Avoiding a Golden Standard of Screen Use

The choice of turning parts of a questionnaire like MPPUS into a set of challenges for a board game is not made without reservation. A very imminent risk of doing so is inadvertently defining a "golden standard" of screen use. With this, the players might experience a certain level of instruction or even condemnation from the game, for instance that their own screen use is deemed too high or even problematic compared to societal norms, even if that is not in line with the screen use rules and standards within the family. Defining what is right and wrong within the boundaries of the game could negatively affect the participants' creation of intrinsic motivation. Therefore, many of the challenges in Free Time are based on consensus between players as the success criterion, and not finding a factually correct answer. This is to make these challenges adapt to the screen use rules and habits of any group of people partaking in a game. This way, the participants of a game will themselves define if a certain challenge is understood as being judgemental or not.

3.2.5 Use Estimation

Use estimation is an exercise found in Free Time both explicitly as numerical estimations of specific use, but also less obvious in the process of comparing the screen use of several people in order to assess who has the highest or lowest use of a given application. Estimation of screen use has been a topic of interest for numerous quantitative studies in recent years. Papers like Sewall et al. (2019), Andrews et al. (2015), Boase and Ling (2013), and Abeele et al. (2013) are concerned with studying the validity of self-reported screen use as a meaningful source of data, looking at discrepancies between estimated use and actual use of screens and how this can (or cannot) be used as a data gathering method. Other studies attempt to explain such discrepancies in more detail by investigating systematic errors in use estimation as a consequence of a person's well-being (Sewall et al. 2019; Araujo et al. 2017) or even as an indicator of addictive screen use behaviour reminiscent of substance use disorders (Lee et al. 2017). By looking at people's own estimated use of screens compared to their actual use, these studies have concluded that systematic errors in a person's selfreporting of smartphone use can be a symptom of underlying issues regarding his or her well-being. In this study, however, we are looking at the social context of family life. Here, the estimation of other people's screen use could prove a catalyst for visualizing when and where the family members hold different expectations on screen use during family time. In that sense, getting to know each other's screen use through estimation, be it use habits, use motivation or specific use history, could serve as a meaningful game mechanism. Given that current research have not touched very much on the social application of such use estimation, we find it intriguing to introduce it as an exercise in Free Time.

Chapter 4

Method Design

4.1 The Research Methodology

In this section we present *Research through Design* and *digital ethnography*, the combination serving as the research methodology for this study. The ethnographic data consists of interviews and recorded game sessions from three Danish middle-class families. A presentation of the families can be found in Section 4.4. In combination, the game sessions and interviews serve to map the families and probe for thoughts and reactions to the game and its impact on their family time.

4.1.1 Research Through Design

As the center-piece in this study is a board game designed to elicit reflections on tensions rising from screen use in families, therefore, the study is balancing between the research practice, being oriented towards the past and the present, and the future-oriented practice of designing. The union of these practices, *Research through Design* (RtD), is defined as "(...) an approach to conducting scholarly research that employs the methods, practices, and processes of design practice with the intention of generating new knowledge." (Zimmerman and Forlizzi 2014: 167). They define three sub-categories of RtD, Lab, Field and Showroom, with our application of the term falling largely in the latter of the three. The Showroom practice utilizes methods from art, fashion and design to provoke and challenge the status quo. The aim is not specifically to arrive at a design solving a problem. Instead, the participant's attention is drawn to the underlying issue by means of a design, and thereby forces people to look for a solution through reconsidering their world (Zimmerman and Forlizzi 2014). In the case of our study, the underlying issue is identified as the tensions experienced by family members as a consequence of screen use during family time. Furthermore, the design artefact should work as a catalyst for viewing the underlying issue and its context in a new light, providing the participants with a means to arrive at a concrete framing of the problem on their own. For these reasons, the Showroom parctice was deemed the most fitting for this study.

4.1.2 Digital Ethnography

The ethnographic nature of our research comes into play in the sense that we are studying through observation the families' reactions to the game and the behavioural changes, if any, elicited by this. This study was conducted during the COVID-19 pandemic and was therefore affected by the following nation-wide lock down. As a consequence, all gathering of empirical data for this research has been performed utilizing various digital alternatives to physical interview meetings and in-situ observations. This sub-category of ethnographic research is named digital ethnography and is defined as utilizing "(...) wired and wireless technologies to extend classic ethnographic methods, like participant observation, beyond geographic, as well

as temporal, boundaries." (Masten and Plowman 2003: 77). This way, the data produced by participants (words, images, audio/video files or other) can be captured in the relevant situation and at the relevant time in regards to what is being studied. Digital ethnographers can then determine their significance as they are played out in the context of participants' lives (Masten and Plowman 2003).

4.2 Pilot Testing and Data Gathering

In order to evaluate the quality of the game experience playing Free Time, we arranged a few exploratory pilot test sessions with friends and family. Pilot testing was performed while still developing the game meaning that everything was still subject to change. The pilot test sessions yielded a number of ideas and changes. Some comments were connected to the physical elements of the game such as the actual board and how to move your piece around, while others concerned the general experience of playing through the game. The excessive duration of the game was commented on by several test subjects, stating that they experienced a gradually diminishing level of engagement towards the end. We introduced die rolls as a replacement of the original one-move-per-turn setup, with further adjustments leading to the customized die in the final version. Another detail that was added as a direct consequence of these pilot testing sessions was the who-cards. The attributes of these cards used to pick the target player were originally written directly into the challenges, which proved to be a bad idea since a number of these attributes are not likely to change from game to game. This ultimately meant that the same people in the family would get the same questions whenever it was drawn, greatly decreasing the variance between games. While this could be resolved by letting the players take turns being the target of the challenges, the introduction of who-cards could potentially increase the playfulness of the game by incorporating real-life elements not specifically related to screen use.

The empirical data obtained is a mix of video conference interviews, video recordings of game sessions and supportive quantitative data on individual screen use in the form of screen dumps from the in-built screen tracker. Every interview and game video were transcribed and subsequently coded, a process explained in greater detail in Section 4.3 Our research began with a preliminary semi-structured interview with each of the three families during which we aimed to stimulate relevant topics for our research. The purpose was to obtain a status-quo understanding of our families in regards to their screen use level and screen use habits prior to playing Free Time. Screen dumps from the in-built screen trackers provided insights used in the preparation for later interviews with the families. After the preliminary interview the families received a copy of Free Time. This marked the beginning of the research period spanning roughly one month. The families were instructed to play the game at least once a week. Beyond this they were invited to play as many voluntary games as they wanted. Data from the game sessions was supported by status interviews probing for

thoughts about the game as well as elaborations on details that we found intriguing. At the end of the research period we conducted a final, open-ended interview probing the families for further comments while asking about the impact of the game, if any has been noticed.

Deviations from the planned procedure can be observed in the missing transcription of the first game played in the Jensen family, the Midway Interview and subsequent Game 3 and Game 4 in the Poulsen family, and the missing fourth game in the Larsen family. Halfway through their attendance period the Poulsen family found themselves too busy to be able to manage their participation, resulting in their premature exit. In the Jensen and Larsen families, the deviations was caused by technical difficulties leading to loss of data.

4.3 Our Data Coding

In keeping with qualitative data analysis, we conducted all initial analysis of our gathered data using coding. The coding process is a thematic indexing of raw data by topics decided by the context and focus of the study. Coding is an iterative process, requiring multiple readthrough while simultaneously adding new layers of code as needed (Bryman 2012). Coding was done in multiple iterations using the Nvivo 12 software. We defined 14 top-level codes: active mediation, restrictive mediation, family time, perception of use, talk about use, hiding use, negative screen use, positive screen use, strategies, non-use, discussion, tension, gamelike behaviour and SDT (Self-Determination Theory). Some were used to index interview data, some on data from game sessions and some on both. Many of the codes had child codes, an example being the SDT code containing child code like autonomy, competence and relatedness. The 14 top-level codes have been the point of departure for analysing our data, including theoretical elements and concepts addressed in this study. We used the interviews with the families to explore and verify parts of our coding that we felt the need to investigate in greater detail. All data and coding tasks were distributed in our team. After the first initial coding we did a rotation, making sure that everyone had analyzed all transcripts and that we achieved a nuanced and complete coding of our data. In between each rotation we did an evaluation on what codes we had noticed to be more interesting, both new and existing ones, and made agreements on how to compile our individual work.

4.4 Participant Families

The following sections present the families participating in the study. These families represent a convenience sample as they were found through an primary school teacher forum. Even though they are evenly spread across all age specializations within their profession, there is a clear over-representation of primary school teachers in our research demography. However, when looking at the families as a whole it is clear that they represent three very different family types and very different attitudes and practices regarding screen use and habits. This is elaborated in the following presentations, based on the preliminary interview conducted with the families prior to them receiving and playing Free Time.

4.4.1 The Jensen Family

The Jensen family consists of the two parents Andreas and Maria, and their three children Steffen, Frederik and Felix. The presentation of the Jensen family is based on the Preliminary Interview (Appendix A).

The mother, Maria, works as a teacher in an primary school. She owns an iPhone as well as a laptop that she uses exclusively for work-related activities. She mentioned using her iPhone for updating herself on the news and weather reports, as well as for social media applications. She also uses it as a radio and an alarm clock, and generally sees herself as the heaviest user of screens in the family. Before she realized that Free Time requires that the screen tracker is turned on, she admitted that she turned off this functionality, comparing it to having a bathroom scale constantly available and stating that she falls into the category of people opting not to own such instruments. Conversely, she stated that she started checking the in-built "Health" application regularly, because she had been taking many long walks while the nationwide COVID-19 lockdown was in effect and was curious about her daily walking distance and amount of steps taken. Her husband, Andreas, works as a professional musician and teacher of music and instrument playing. He has an iPhone and a laptop. Being self-employed, he uses both his devices for a mix of leisure and work-related activities. Especially the iPhone is used for work where he uses a variety of applications for rehearing and improving his musical skills. Andreas highlighted, as a personal bad habit, that he checks his phone too frequently, often even without explicitly noticing that he received a notification. Their oldest son, Steffen, is a student in his second year of high school. Besides for studying, he uses his laptop for writing and creating music as well. He has an iPhone that is used primarily for social media applications like Snapchat, Facebook, Instagram and TikTok. When we asked the family what they think about their own screen use, Steffen explained that his view of excessive screen use was based on activities performed rather than time spent, mentioning entertainment things, social media and unimportant stuff as examples of excessive screen use. Their middle son, Frederik, was halfway through his year in 9th grade boarding school when the COVID-19 lockdown came into effect. This means that he is currently living at home, while attending as many online school-related activities as possible. He uses his both his laptop and iPhone educationally and socially online. Because of this, his screen use has increased dramatically since the lockdown, and school-related activities rendered him unable to partake in the Preliminary Interview. All information about his screen use habits is obtained through his family members. In his spare time he likes to use the laptop for creating and writing music. Their youngest son, Felix, is an primary school student in 4th grade. He has an iPhone and laptop like the rest of the family members. Like his two brothers, Felix enjoys creating and writing music on his laptop. He is the primary user of the only PlayStation and television in the house, even though he insists that it is the family's shared PlayStation, and not his own. The TV is not really used for anything other than gaming on the PlayStation. He told us that he likes to spend more time outside playing football, compared to many of his friends who according to himself spend more time on their screens.

In general, the Jensen family stated that they see themselves as light screen users, when asked to assess the extent of their screen use. They do not believe that the COVID-19 lockdown has had any significant impact on their recreational screen use. They stated that that the lockdown drastically increased in work and study related activities happening online naturally has caused a higher level of total use of screens. The exception here is of course Frederik, who is basically experiencing half a year's worth of boarding school through his laptop and his smartphone.

4.4.2 The Larsen Family

The Larsen family consists of the two parents Alfred and Nora, and their two children William and Olivia. The presentation of the Larsen family is based on the Preliminary Interview (Appendix G).

The father, Alfred, is 48 years old and works as a teacher. He owns a stationary PC and an iPhone, as well as a laptop provided by his workplace used solely for this purpose. He uses Facebook mainly for communicative purposes as he is a voluntary administrative member in a handball club. He separates different activities between his devices, stating for instance that he does not use sites like Facebook on the work-related laptop. Instead he uses his stationary computer for both work-related activities, managing his duties in the handball club's Facebook society and also streaming soccer games or occasionally, "to go in and kill somebody in Call of Duty." (Alfred, Appendix G: 4). Alfred's phone is kept on mute, which he thinks has an impact how much he checks it, adding that his wife perhaps feels it difficult to reach him sometimes. The mother, Nora, is 45 years old and also works as a teacher. She owns an iPhone and a laptop used for working. Furthermore, she has a very old iPad that she hardly ever uses, stating that it has become a leisure time gaming device for Alfred and that she effectively sees it as belonging to him. He later admitted, with the family agreeing in unison, that the iPad is frequently used by him as a concurrent activity while the family are spending time together, stating that, "|...| it's just that those TV-shows about gardening are not always that interesting" (Alfred, Appendix G: 2). Nora does not find that she needs anything other than her phone and laptop, stating that she uses the phone for everything except work. The oldest child, William, is 13 years old and attends 7th grade primary school. He has a PlayStation, iPhone, and a Chromebook provided by his school, for doing homework and recently also for online school activities. He does not use his phone very much but instead highlights the PlayStation and iPad as big, time consuming platforms for him. These are used to stream movies and play online games with his friends. Their youngest, Olivia, is ten years old and attends 3rd grade primary school. Her devices include an iPad and an iPhone. She estimates that her screen use has seen a significant increase while being at home due to the COVID-19 lockdown, stating that, "My screen use has probably doubled it self four times!" (Olivia, Appendix \underline{G} : 2). Nora agreed, explaining that this use is largely due to many FaceTime calls with her friends while she is unable to meet with them for play dates. Like her brother, on ordinary days outside the lockdown, she does not use her phone that much, estimating that she uses her iPad around two hours daily.

The Larsen family explain their screen use level as being fairly high, especially with some peaks when it comes to gaming. They also address simultaneous use of multiple devices as an activity occurring too often, especially in the case of the two children.

4.4.3 The Poulsen Family

The Poulsen family consists of the two parents, Vibeke and Rasmus, and their two children, Laura and Esben. The presentation of the Poulsen family is based on the Preliminary Interview (Appendix \overline{O}).

The mother Vibeke is 42 years old and works as a school teacher. Besides her own laptop and a smartphone she also has a work laptop. During the COVID-19 lockdown she has been using her work computer for teaching her classes online and for work meetings. Vibeke thinks that she is good at multitasking when using her devices and while attending meetings on her computer, she will often use the Messenger application on her phone to send notes to her colleagues. Her personal screen time consists of using Facebook, Messenger, Instagram and the game Wordfeud. She believe to be aware of her own screen consumption, which she estimates is around 5-6 hours a day, and thinks that she sometimes becomes too drawn into something she sees online, which steals her time. Rasmus, the father of the family, is 38 years old and also works as a school teacher. Besides his own laptop and a smartphone he also has a work laptop. He uses his devices for learning things online and likes the never-ending possibilities of procuring new information. His personal screen time consists of reading various media outlets like the NY Times and besides this the NFL application and YouTube. He thinks that his screen consumption is slightly high, but does not see any point in changing it unless it interferes with their family time or starts to cause any tensions in the house. The oldest child, Laura, is 16 years and in the 9th grade in primary school. Her screen use consists of communicating with her friends on Snapchat and Messenger and besides that she uses her laptop to watch Netflix. Laura states that even while she is alone she does not deem screen use an isolating activity, because she uses it to communicate with her friends.

She estimates that she, on average, spends six hours on her devices and thinks that it is a lot. Nevertheless, she does not see any issues in this level of screen consumption because she spends this time being social with her friends through various applications. Esben is ten years old and attends 3rd grade in primary school. Besides a laptop and a smartphone he also has his own TV and an iPad. The parents stated that his screen consumption is somewhat regulated, but is on average two hours a day. It consists mostly of playing games on his devices, which he does while talking to some of his friends from school online.

Besides their own devices they have a TV in their living room, in the parent's bedroom and in Esben's bedroom. They have two shared iPads that they also use to watch streaming services like Netflix, in case whatever is on the shared TV is not of their interest. Vibeke, Rasmus and Esben will regularly watch movies on the TV in the living room together. Laura is, according to her mother, at an age where she is more inclined to stay in her room and watch shows on her own on Netflix. The parents do not attempt to regulate her screen consumption, as they do with Esben, as they have agreed that it is not worth the fight and that they trust her to manage it by herself.

4.5 Screen Use Tensions Experienced by the Families

In this section we highlight the tensions that the participants experience in relation to their own screen use and that of their family members while the family is co-present. These tensions are reported by the family members and often address how screen use has a negative impact on family time.

4.5.1 Simultaneously Attending Screens and the Family

In the Larsen family, they report how tensions can occur when one party is distracted using their screen during shared family time activities. In the Initial Interview (Appendix \bigcirc), both Nora, Olivia and Alfred explained how their devices have become pastimes. They do not necessarily perceive this as being negative screen time use, but it should not take away time or interfere with shared family activities or family time, "So, it is negative when it draws attention from what we as a couple or family are doing". (Alfred Larsen, Appendix \bigcirc 4). When taking away attention from shared activities, it becomes a source of tensions. Even though Alfred states that devices should not draw attention from what they are doing as a family, both Nora and Olivia express frustration towards his use of iPad or iPhone when the family is watching TV together, often when they are watching a weekly gardening show. Here, Alfred's use of devices during shared family activities. During the Initial Interview (Appendix \bigcirc Alfred Larsen did not express the use of his iPad to be excessive. He was later "exposed" by other family members during both interviews and while playing Free Time, and later

acknowledged that he is compelled to use his devices during some shared family activities. Alfred's sometimes compulsive iPad use caused tensions amongst the family members and was recorded as a recurrent topic of discussion. In the Midway Interview (Appendix J) Alfred elaborated on his use of devices during family TV-time, saying that because the phone is already serving as a remote control he feels more tempted to use it, compared to what he might have done in the past. Vibeke Poulsen explained that she feels fairly competent in multitasking but also admits that she often looses track of time. Sometimes this bears the consequence that Esben gets to sit and play computer longer than allowed, because it delays Vibeke in telling him to stop. The Jensen family likewise report examples of screen use resulting in distractions, most notably for Maria. During Game 2 (Appendix C) the children expressed how they find it annoying that their mother has a hard time multitasking while using her phone, which often leads to her not being very responsive. The Jensen family expressed situations like this more than once during their game play and interviews. They often revolve around Maria being distracted and not responding quickly enough or with the expected engagement, sometimes leading to Maria feeling the need to defend herself by stating that some of her screen use is work-related, or that the family's lack of a TV forces her to watch the news on other devices, which in turn causes her use metrics to go up on these devices.

4.5.2 Using Screens as Pastime or Spending Time With Friends

In the Poulsen family, Laura would often rather spend time online with her friends than go on a car trip with her parents. This causes a dilemma for the mother Vibeke, who struggles to find the right balance between letting her children be social online and not being hunched over their screens day and night. During game sessions in the Jensen family, they exhibit a similar struggle towards differentiating between types of screen use. While they do not explicitly label this a tension, they still express that time spent online to communicate with friends is perceived as being "more okay" than using screens as individual pastime. Vibeke Poulsen sometimes feel guilty when pulling her son from online games as he also uses gaming as way to maintain relationships and socialize with his friends. In the Final Interview with the Poulsen family (Appendix R), Vibeke elaborates how she has been struggling with feelings of guilt related to setting up boundaries for the screen use of Laura and Esben. This is due to the fact that the different types of screen use are getting more and more intertwined, and as such it can be hard to categorize an app distinctly as an online game, a communication platform, or a social media. In acknowledgement that this distinction does not make sense in the children's way of using screens, the guilt comes into play in the realization that restrictive mediation on screen use has the side effect of setting unwanted boundaries on social interactions.

4.5.3 Tensions Stemming From Silent Mode

The members of the Jensen family express irritation towards notification noises disturbing shared family activities. As a consequence they practice putting their phones on silent mode to avoid tensions. In the Preliminary Interview A Maria and Felix even argue who is more frequently pointing out when someone has forgotten to silence their phone. Silencing one's phone is a strategy used by members of all families but doing so sometimes bring forth a different set of challenges. In trying to avoid distraction from constant device noise, it has the opposite effect and instead of taking away attention from using the device, Steffen experiences a need to check his phone more frequently, as he do not want to miss out on incoming activities. Andreas Jensen reported having the same compulsion and explained how he, as a consequence from silencing his phone, experienced checking it more often and in doing so the strategy had an adverse effect. Alfred Larsen likewise uses silence mode on his phone, adding that he often also places his phone in his home office during the day, and consequently does not check it as regularly as Nora would like. Not all participants experienced greater levels of compulsive checking as a consequence of using silence mode on their phone. Rasmus Poulsen expressed that even though he hear or feel buzzing from his phone, he does not necessarily feel the need to check it right away. This causes some tensions in Vibeke, who gets almost anxious on his behalf when he does not check his buzzing phone.

4.5.4 Tensions From Parents Restricting Applications

In all three families, the parents have performed some restrictive mediation like age-restricting certain applications from their children. This has caused tensions between parents and children across the three families. In the Jensen family they had some discussion during their game play about appropriate age for social media applications like Snapchat and Facebook, in which it became clear that the youngest son and the parents do not always share the same opinion on what is age appropriate. In the Poulsen family the oldest daughter feels that her parents have been more strict with her compared to her younger brother, sometimes causing tension between her and her parents. This has caused some tension between her and her parents, who acknowledge that they made stricter rules when she was younger, as compared to her brother. Laura being the first child was the reason for this strict rule-making, according to Rasmus and Vibeke, as they at that time had a greater need to control, for instance, her use of social media as this was still unexplored territory. The parents in the Poulsen family expressed concerns towards allowing applications like Snapchat, because of the risk of unpleasant experiences while using this platform. Later in the interview the parents in the Poulsen family also mention reluctance to allow YouTube, as well as a clean ban on all the various anonymous social media applications. A similar concern is present for the parents in the Larsen family, who sometimes feel pressured to allow applications prematurely, because they do not want to exclude their children from social activities with their friends. Some-
times Olivia feels a social pressure to get certain applications, forcing the parents to rethink rules concerning these applications. In situations like these, Alfred and Nora sometimes utilize parent groups to find out whether or not certain applications are installed on the other children's phones or if it's just a spin of their children's minds. They have more than once experienced misunderstandings where Olivia and William would state that everyone else in their classes have specific applications, when in fact that is not case, and especially Olivia expressed a concern towards missing out.

4.6 The Application of SDT

In this study the Self-Determination Theory (Ryan and Deci 2000) is applied in an attempt to understand how the participants perceive the screen use of their family and how this ultimately effects their motivation to address and change undesired aspects of screen use in the family. In our application of SDT, extrinsic motivation is viewed as temporary and rewarddriven behavioural changes due to a desire to live up to extra-personal or even extra-familial ideals of acceptable screen use. Similarly, intrinsic motivation is viewed as a motivation towards establishing shared expectations through the externalization of own expectations towards family time, as well as wanting to learn about the expectations of others. Extrinsic and especially intrinsic motivation require different compositions of autonomy, competence and relatedness, so in order to discuss signs of motivation these three basic psychological needs must also be contextualized within the research setup. Our participants are all active parts of familial social settings and exhibit some level of security in terms of disclosing personal screen use. Therefore, a feeling of relatedness is assumed to be present to some extent in all participants. Still, there seems to be some variation in the level of relatedness observed in the families. As we did not expect their relatedness to be affected by the study and our findings did not suggest otherwise, we here assess the extent of relatedness in the three families as it is observed. In general, the Jensen family showed a very high level of feelings of security and trust, for instance in the two oldest sons who are very active participants in the creation and evaluation of the restrictive mediation on screen use for Felix, the youngest son. The Larsen family are also willing to disclose to each other personal screen use and their feelings of lagging resistance towards changing screen use behaviour. In the interviews, however, they show examples of reluctance to talk about certain aspects of screen use, interpreted as signs of lower relatedness. This could of course be attributed to the unfamiliar and perhaps uncomfortable situation of sitting in an interview with us. We perceive the feelings of relatedness as being extensively present in the Poulsen family. In the interviews they express a large degree of trust in the children's abilities to evaluate good and bad online content and to behave properly in social contexts online. This plays a part in the parents opting for a very low amount of explicit restrictive mediation, and provides a strong sense of security in discussing screen use in the family in general. In this study autonomy is perceived as factors leading to the willingness to try out new strategies to regulate screen use, and the effort to partake in relevant discussions about screen use outside explicit in-game tasks. Conversely, an example of situations indicating low autonomy could be family members exhibiting an effort to maintain a distinction between game sessions and familial/parental discussions about screen use, insisting on seeing them as two separate domains. Competence is interpreted as an increased ability to establish shared expectations about screen use in the family, as well as an increased ability to regulate screen use behaviour. The sense of competence is a cornerstone for effectively learning and exploring new skills. Creating a sense of awareness towards your own and family member's screen use could be a potential step towards adjusting for realistic screen use expectations and thereby minimizing tensions (Blackwell et al. 2016). When discussing the terms used in the game and applying them to their own lives, the participants would become better at knowing which types of, and how much, screen use their family members had.

Chapter 5

Results

5.1 How the Families Interact With Free Time

The families showcase very different levels of wanting to change something in relation to their screen use, even though some kinds of screen use is leading quite directly to tensions or discussions in the family. In general, the families have reacted to this choice of design in different ways, where the Larsen family expressed that they sometimes felt a desire for challenges directed more towards actual use and objective levels to measure against, instead of the consensus-based estimations. The Jensen family on the other hand did not express that they felt this game mechanic was missing, even though they also did not perform these guess-challenges right, meaning that they never had a real reason to check actual screen use. This can of course be attributed to the fact that Free Time was still a beta-version. Nevertheless, it could be that these different evaluations of the game mechanics is a reflection of how the individual families perceive the purpose of the game in general. This is an expected consequence of the Showroom practice as it aims to investigate how people can arrive at a meaningful framing of the issue in their own context, through re-considerations catalyzed by the design. On a technical level, this reflects our concrete efforts to make the game generally adaptable to the individual families without dictating a "golden standard" of screen use to live up to. Variations in the participation of the three families are displayed in Table 5.1.

	#Days	#Interviews	#Games	Avg. Game Length
Jensen	39	3	4	33:34
Larsen	39	3	7	19.51
Poulsen	30	2	2	33.24

 Table 5.1: Participation Overview

5.1.1 Free Time Inspiring Discussions

Our data reveal numerous examples of open discussions allowing everyone to put forth their attitudes and beliefs. However, this tendency is skewed somewhat towards the Jensen family. It could be argued that in terms of discussing screen use while playing Free Time, the older children are more keen to engage in these, whereas the younger children are more reserved. Looking towards Felix Jensen and Olivia Larsen who are both ten years old, their everyday screen use is still very much influenced by rules and restrictions. This is reflected by how they tend to refer to their own rules in discussions, more than general ideas about how things could or should be. While Esben Poulsen is also ten years old, he does not seem to refer to rules and restrictions to the same degree. This is due to the fact that these are not a part of his everyday life to the same degree, because the mediation of screen use in the Poulsen family is much less concerned with setting up boundaries.

5.1.2 Errors in Gameplay

Of the three families, the Jensen family is the one playing Free Time with the highest amount of errors. This was unexpected because they presented themselves as a family who loves playing board games and spend a significant amount of their family time doing so. These errors are reflected in the average game time being the highest of the three families, likely due to technical rule-related discussions. Because the Jensen family were the first family to partake in a preliminary interview and play their first game, we quickly recognised a potential need for correction in the families. For the two subsequent families we therefore adjusted the introduction to include a short, very thorough live play-through session of a few rounds to let the families ask if anything was not clear in the rules.

5.1.3 Seeing Free Time as a Leisure Time Activity

We defined the minimum requirement of games as one game per week, and the Larsen family is the only one to exceed this by playing additional voluntary games. The Larsen Family participated in the study for 39 days, and by the end of the research period they had played a total of seven games, filming four of them. Looking at the game sessions, it is evident that the Larsen family understands Free Time primarily as a leisure time family board game. This is supported in the Midway Interview (Appendix J), where Alfred stated that they had not seen surprises in each other's screen use, because they also rarely allow for discussions on attitudes towards each other's screen use to flourish. Their argument for this is, that they are just sticking to the rules, which is also reflected in the average game time of the family, being the lowest of the three. In addition, the family exhibit a tendency to sometimes discard their actual opinions, instead choosing the answer that they expect from their teammate. This play style is likely to have a diminishing effect on the number of situations where a discussion on screen use could take flight, thus also feeding into the game being somewhat alienated from their everyday lives.

5.2 Free Time Inspiring a Sense of Autonomy

All families did to some extend engage in in-game discussions, most of which concerned the rules of the game. During the game sessions, some individuals were eager to continue the discussion beyond the immediate game situation while some were more inclined to quickly wind up the discussions and focus on completing the game tasks. The interviews revealed that some of these discussions had repercussions on how and how much the families talk about their screen use, and some of the participants mentioned experiencing smaller and temporary behavioural changes.

5.2.1 Signs of Behavioural Changes

In the Jensen Family there were a few reports from family members noticing that their participation in the study made them think about their screen use more frequent. For instance, they expressed that excessive time spent on scrolling through feeds on social media resulted in a deeper sense of "missing out" on other activities compared to the time before having played Free Time. Steffen explained,

If all of a sudden I am sitting there and have scrolled for half an hour, or, I don't know, but just scrolling somewhere, then I sometimes get a sense of guilt, or like, I really could have used that time for something better.

Steffen Jensen (Appendix \mathbf{F} 9)

He adds that though experiencing this kind of guilt before the beginning of the research period, he felt that it became more intense as a consequence of the participation and that he sometimes deliberately turned off the phone to disrupt undesired use. After playing Free Time for the first time Andreas began evaluating personal screen use more often by checking his screen tracker data. The sense of guilt from situations of undesired screen use made both Andreas and Steffen contemplate how to avoid undesired screen use or at least minimize it introducing a sense of autonomy by the willingness to change their behaviour. The Larsen family reported a few examples of implementing restrictive mediation to control or even limit screen use in the family, the most notable being the introduction of a two-hour temporal constraint on the allowed screen use of the daughter, Olivia. When asked to elaborate on this, they reported that both the idea for this rule and the intent to implement it was present before the family participated in the study. Still, this general increase in awareness of screen use in the family provided a window of opportunity to actually implement the rule.

Snarky Comments to Each Other's Screen Use

Perhaps one of the most significant signs of participants exhibiting behavioural changes is the introduction of snarky comments between family members. In the Midway Interview (Appendix J) the Larsen family had noticed such a change in the way they address each others' screen use, involving snarky comments when someone is using a device while copresent with the family. Alfred stated that after having played the game a few times,

I don't know if we have thought more about it [screen use], but perhaps there are more comments. Like, not that it causes any deeper conversations, but more like, snarky comments, "Oops. Are you sitting with that again?" or, "Why are you using.. something?"

Alfred Larsen (Appendix \overline{J} : 9)

Alfred defines two possible strategies to address other family members' undesired screen use by either inviting to discussion or throwing a comment and probe for an immediate behavioural change. The Larsen family finds that they might benefit from in-depth conversations following these comments, but at the same time they acknowledge that their motivation for winning the game stands in the way. Resorting to snarky comments constitutes a new strategy in the context of the Larsen family and as such it is a sign of autonomy in itself. However, Alfred's observation of more frequent snarky comments in the family was not echoed by the rest of the family, with Nora stating that Alfred is of course entitled to have his opinion on the matter. The Jensen family experiences a similar development and reports situations where they make snarky comments to each other's screen use while together at home. They explained how these comments were connected to them playing Free Time,

MARIA: It [*Free Time*] has definitely had a spillover effect on our conversation between games also. Just this morning, for instance.

[...]

STEFFEN: Well... Mom talked on her phone again at the dinner table and, yeah..

FELIX: That's true.

STEFFEN: Yes, then we poke at each other, like, "you got caught in the act sitting with the screen out while we were together all of us".

INTERVIEWER: Yes. Do you think that it is a step on the way or merely a bad side effect of this game that will pass in time, or what do you think?

MARIA: Well, I do think that it is sort of a nice awareness.

ANDREAS: So do I. In general it has, well, I have, and I think we all have, felt a bit more awareness about how much and when you use your...

Jensen Family (Appendix F: 2)

There seems to be a difference between the Jensen and Larsen families in how these small comments come into play in their everyday life. Where the Larsen family explain their snarky comments as closing down conversation and prompting the "sinner" to take action and stop the screen use, the Jensen family see these comments on each other's screen use as a way of increasing awareness about attitudes towards screen use, and not so much as a call to action. There are examples of these comments finding their way into the everyday jargon, like the statement from Andreas saying that he did not think you should put limits on phone calls with friends. The family explained how they turned this into a standard reply when asked for favors, in the form of, "Sorry, I'm infinity-talking with my friend so unfortunately I am not able to do the dishes".

5.2.2 Striving for a Shared Understanding of Screen Use

In the Larsen family it was a recurring event during gameplay that they would find the need to discuss the meaning of different terms. In their first game, it came up in the final duel, asking, "What is the maximum number of devices which is okay for an adult to own?". This led to a discussion on what exactly constitutes a device, with the main driver for this discussion being that they feel quite strongly about reaching a common understanding in order for the teams to have equal chances of winning. They end up defining a device as an item that can be used to access the internet. This discussion is repeated to more or less the same conclusion in the subsequent games as well, indicating that it is not a simple task for the family to reach a satisfying definition of a device.

What Is Fair to Include When Counting Screen Use

During an interview we asked the Larsen family to elaborate on their thoughts about these exercises of defining various terms. This turned into a discussion on what kind of screen use is included when evaluating the children's temporal constraint on daily screen use. They point at several grey zones including positive or necessary use of the phone like answering a call versus unnecessary activities like playing a game. They discuss the use of the PlayStation, as it can be used both for putting on a Blu-Ray disc but also streaming the same movie on Netflix or presenting short YouTube-videos in an endless stream. This serves to prove, that the Larsen family shows both potential and willingness towards engaging in discussions inspired by in-game events, but that their tenacious focus on winning Free Time removes the potential for experiencing a sense of autonomy in-game. Nora and Alfred explained how they could see the potential for such discussions about exact definitions of terms in relation to Olivia's sense of justice about restrictions on screen use between herself and William. Nora adds to this, saying that they have these talks in the family about why the use of a specific piece of hardware is dependent on context, and why some in the family are allowed to use a piece of hardware more than others. This viewpoint is supported by the older brother William, who at one point during the discussion initiates a shift in the terminology of the family, from "screen time" to "online time", underlining that the important assertion in the Larsen family really is whether the activity performed is online-based or not, and not so much the specific piece of hardware you are interacting with. From the parent's point of view, screen time seemed to be perceived as time spent on enjoyment and games rather than useful activities. The children do not think that listening to music should count as equal to other screen use activities, if used while performing productive activities. For instance, when William is delivering papers on his paper route while using his phone to listen to music. The parents are conflicted as they are interested in maintaining the boundaries and rules they have set for their children's screen time but acknowledge their point of view. The Poulsen family had a short in-game argument about what is meant by "social media", originating from Vibeke asking, "Don't we agree that this includes games?" (Vibeke Poulsen, Appendix $\overline{\mathbb{Q}}$: 1). The family quickly turns down this view, agreeing that these are of course two different things and that social media instead should be thought of as applications serving to communicate with other people. Still, there is justification to be found in this viewpoint of Vibeke, because Esben's time spent gaming is simultaneously spent talking to friends, either by typed chat or voice chat. In fact, in the Final Interview (Appendix \mathbb{R}) Esben stated that he would often resort to one of these various games as a means of communication whenever he wanted to get in contact with his friends and his phone was out of power.

It Is Always a Matter of Definition

During their first game the Poulsen family had a discussion about phone calls, originating from the duel, "What is the maximum daily amount of time you should spend talking on your phone?". Here, they argue back and forth about several aspects of calling someone, like whether or not it is work-related, and if it happens concurrent with other activities like when the youngest child Esben is talking with his friends while also gaming with them. The discussion ends with Rasmus concluding on the matter,

RASMUS: But it is actually a bit difficult with this question, because, it is always a matter of definition exactly what is meant by these explanations.

[...]

RASMUS: I also just think that it is a matter of agreeing on the foundation for interpreting the term. There are not at lot of people talking on their phone just to talk. I mean, it happens on another media instead. You don't talk on the phone that often anymore.

LAURA: No but that's why we agreed that it was just talk.

 $\mathbf{V}\mathbf{IBEKE}:$ When I'm talking to grandmother and craftsmen.

LAURA: When I'm talking with Mie and you are talking with the boys. Who's rolling the die?

The Poulsen Family (Appendix \mathbf{P} : 5)

Rasmus deems the alignment of terminology a necessary first step in being able to have a meaningful conversation about the topic. He acknowledges that establishing a space where everybody is able to partake in the definition of terms covering aspects of screen use can be provide a means to be able to attain shared expectations. In the Larsen family there are numerous examples relating to differing interpretations of the same challenge. For instance in Game 3 (Appendix \mathbf{K}), Nora would estimate a daily phone call time of Olivia to be two hours while the screen tracking software revealed a daily use of 13 seconds, leading her to explain that she thought FaceTime calls were included in that metric, thus reminding the family to contemplate phone calls on more general terms. On the other hand, The Jensen family provides an example that shows the consequence of discussing an aspect of screen use

without first having aligned the understanding of it. In Game 4 (Appendix \underline{E}), a discussion emerges from the duel, "How much time out of a one-hour recess are you allowed to spend using your smartphone?". It turns into an intensified argument between the teams,

FREDERIK: What did you write?
ANDREAS: A fraction. We wrote zero minutes.
STEFFEN: You actually wrote that?
FREDERIK: You don't think that's allowed... you are not allowed to film a TikTok?
STEFFEN: To give yourself a break?
FELIX: No, because I am not allowed to do that in my school.
FREDERIK: But, is this what you mean?
ANDREAS: Well, yes.
MARIA: Yes, and we do mean that.
STEFFEN: No you don't.
MARIA: Yes we do!

Jensen Family (Appendix E: 5)

The discussion continues with Frederik and Steffen presenting a variety of counter-examples in an effort to convince their parents and little brother that a zero-tolerance approach to phone use is simply not compatible with their situation, especially with the oldest being a high school student. The parents end up agreeing on this viewpoint, and justify their proposal saying that they were only taking Felix' current situation into consideration. Later, Maria adds that their answer of zero minutes should be taken as an ideal of not using smartphones during recess, with the two older sons agreeing, explaining that their proposed 10 minutes is meant as a maximum and not a goal that should be reached. The discussion ends with the father underlining that such a constraint should be activity dependent, not a temporal restriction. Andreas ultimately ends up corroborating the statements from Rasmus mentioned above, that it is all a matter of definition. In addition to these larger and more focused discussions, there are many examples of family members making small isolated corrections of each other's screen use while talking or doing other activities together, which can also be seen as a sign of willingness to try out new strategies to manage screen use.

5.2.3 Perceiving Other Family Members' Screen Use Behaviour

Discussions would often derive from concerning specific game elements and evolve into discussions revealing how the family members perceive each other's screen use in general. The Jensen family's reflections and in-game discussions about screen use behaviour appeared more intense when departing from range-challenges, which coincidentally are also their favorite type of challenge in Free Time. These challenges require the longest and most complex answer, as the players are asked to assess and compare the specified subcategory of screen use from all family members. This contrasts the other challenges which often just require a single name or an estimate of amount of time spent in an app. This often leaves the family members in the Jensen family to reconsider their choice several times during the evaluation of the presented answer, thereby sparking plenary discussion about the question of the challenge,

STEFFEN: Andreas? Do you use your screen that much in your spare time?

FELIX: Yes.

STEFFEN: You watch a lot of movies.

ANDREAS: Yeah, I watch a lot of movies. I actually would not have written myself first. **FREDERIK**: That's the dumbest thing you can say, but fine.. we have written mama, and then we have written Steffen...

MARIA: What, no. Well it's not me.

 $\ensuremath{\mathbf{STEFFEN}}$: Yes it is.

Frederik: Yes.

MARIA: I'm sitting ... often it's also work

STEFFEN: But you get the feeling it's you.

FREDERIK: You're hard to get in touch with, nevertheless.

STEFFEN: Frankly, when I think about it, we often sit in the morning where we don't see you [Andreas] and you just sit at your screen.

FREDERIK: *[imitating]* "What are you working with, dad?"

The Jensen family (Appendix $\overline{\mathbb{C}}$: 7)

Here, it is noted that Steffen and Frederik clearly express how they perceive their parents' screen use behaviour. They feel like it often makes them absent in the mornings and shy away from family time situations where attention is expected to be directed at each other. These verbal expressions of perceptions and expectations towards each other are not very frequent across our findings. However, the willingness to articulate and externalize such expectations towards each other's screen use behaviour is deemed a clear sign of autonomy in the sense of engaging in relevant discussion outside explicit in-game tasks.

In the Poulsen family, they show a very precise perception of the other family members' screen use in terms of which devices are used the most, and what they are being used for. Surprisingly, in the game challenges they do not prove to have a very good sense of exactly how much time is spent by others on for instance a specific application. From this it is clear that their perception on each other's screen use is directed towards activities performed, and not time spent. The same choice of focus is found in the parents' way of restricting screen use of the children, and in the way the family members talk about screen use in general.

5.3 Free Time Inspiring a Sense of Competence

The initial game sessions influenced the participants' perception of intrinsic as well as extrinsic rewards, which in turn affected their individual perception of the purpose of Free Time for the subsequent games. By discussing different screen use topics until either agreeing or finding a compromise, the families would build a foundation for the skill of estimating screen use. This would then add to their sense of competence as Free Time players. Exercising their discussions derived, for instance, from pointing out participant's actual screen use and gaining knowledge about their own and other's perception of screen use in general, could potentially also build a sense of competence are displayed in the following sections.

5.3.1 Gaining Competence Towards Game Play

Across the participating families there were a tendency that most of the parents were confident about approximately knowing or being able to estimate the extent of their family members' overall screen consumption. They were, however, usually not aware of how their children would define their own everyday bouts with technology. There was surprise, as to how simple everyday uses of technology proved a hard tasks to define making the creation of specific rules in order to regulate their use harder. Alfred Larsen exuded a sense of competence in game play by tweaking his answers depending on who his teammate was. He would answer differently if he was on the same team as his daughter, which he thought sparked some interesting in-game discussions between adults and children,

I have a feeling, when I am on the same team as Olivia for example, that I have started to think about, that I should turn down the amount on my guesses, when I am guessing about what I thought she answered, in comparison to what I think I would say.

Alfred Larsen (Appendix \overline{J} : 5)

By playing Free Time, Alfred became increasingly aware that his daughter had a different view on how much screen time she thought was necessary, and also which in contexts she would find screen use acceptable. With this knowledge he was able to anticipate how she would think about a given challenge. Combined with an aspiration to win the game, he changed his answers so they would fit hers more. In this way, the game implicitly gave Alfred more knowledge about the probable answer from his teammate as well as the one he was trying to estimate.

In the first two games in the Jensen family Felix was teaming up with his two older brothers in a "parents versus children" setup, before switching to play with his parents instead. This was addressed by Felix himself during the final interview, saying "Yes... I did not think that I got to decide that much. It was pretty much only the others" (Felix Jensen, Appendix \mathbf{F} : 8). This revealed that Felix' sense of competence was thwarted by his brothers as a result of a clear absence of positive performance feedback. The psychological need for developing and exploring skills were disrupted, hence making him wanting to change to another setting where he could be allowed to explore these. Nevertheless it revealed a desire to acquire the perceived game play related skills provided by Free Time. This desire was amplified after their second game, where we intervened with a number of corrections to their way of playing Free Time. The Jensen family had the experience that Free Time became more like their perception of a real game with well-defined rules, goals and rewards, after they had been made aware of this.

In Section 5.2.2 we presented how the families would initially need to define various aspects of screen use when engaging with the challenges in Free Time. The various perceptions of how to understand a subject provided a new task altogether in the form of discussing what is meant by different terms, to which most families showed competence in learning. After the first games they were largely able to acquire knowledge about other family members' definition of different terms like "device" or "social media". Even though this is not explicitly an in-game task, the alignment of the exact meaning of these terms across teams have primarily been driven by the pursuit of fairness in the in-game tasks. As such, acquiring knowledge about individual definitions serve to promote competence in relation to game play. However, while this knowledge may or may not have had an effect on their way of thinking about family time, it has exposed differences between how an application is defined and therefore it is commonly agreed acceptable to use while in the company of family members. The alignment of definitions could therefore also be promoting feelings of competence towards attaining shared expectations within the family.

5.3.2 Free Time Influencing Behavior Outside Games

We used the interviews to investigate how Free Time might affect the families outside game sessions, by asking about the families' experience of whether the game had influenced their actions between game sessions. Steffen from the Jensen family remarked, that he had been observing his screen time more frequently during this period,

Well, I have kind of become more attentive to it all the time, I think. Not like, not so much when we are playing the game or anything. I looked at it during the week prior to the next game.

Steffen Jensen (Appendix \overline{J} : 5)

He continued to contemplate this experience and explained that he feels like he has been more conscious about his screen use, to which statement his father agreeingly joins in and says, "Yes definitely. I have felt like that too [...]" (Andreas, Appendix \overline{J} ; 5). Their actions of becoming more attentive towards their own screen use, prior to playing a round of Free Time, shows signs of valuing the game as a shared family activity while contemplating their own role in the family setting. This creates the setting for promoting a sense of competence as it allows them to actively improve their ability to produce a desired outcome in the game by becoming better at solving challenges. These are signs of the alignment of both intrinsic and extrinsic motivation as their perceived sense of autonomy and competence is influenced by both intrinsic and extrinsic motivators.

Sometimes the Influence Is Not Noticed

The Larsen family's approach to playing Free Time was game and goal oriented and driven by the desire to win, as opposed to being primarily a way to engage in conversations about screen use. Upon being asked if they had discussed or thought more about some of their answers in the game in other contexts they noted that,

NORA: But it is not something we have taken with us to discuss afterwards. **ALFRED**: No. It becomes... I think that it is more the surprise while you are playing the game. Where the disagreement is a bit funny. Yes.

The Larsen family (Appendix \overline{J} : 4)

They did not point at a connection between Free Time and their everyday life, as they perceived their thoughts and answers to be restricted to the context of playing a game. However, after learning about Free Time, they would on occasions apply the strategy of making snarky comments towards each other and hold each other accountable towards expectations of family time, like the Jensen family. Both families reported that they were often meant in good fun. Their acquired insights towards the opinions on different perspectives of screen use and their ability to comment on transgressions towards family time shows signs of applying their new found knowledge within the family. Both giving and receiving snarky comments provides positive/negative performance feedback, which is necessary to establish a sense of competence. Alfred and Nora were, however, much aware about how their children used their devices. The parents in the Larsen family use restrictive mediation as a way to construct the children's rules for screen use in their house. This does not leave a lot of room for discussions like the ones they could experience in the game when defining different topics or estimating whose consumption was larger as the clear limits for the screen use of the children is set by the parents. This knowledge could affect their perceived need for obtaining more knowledge about their children's screen use as they already felt competently able to evaluate it. This could be a probable answer as to why they did not perceive the game as influencing their life outside the game, for instance, in relation to the snarky comments, as they would not usually go into discussions and had not started to either.

Looking for the Scapegoat in the Family

As an explanation for the introduction of snarky comments it could be argued that our design of Free Time stimulates a search for the "scapegoat" within the family. The writechallenges and estimate-challenges ask the players to compare family members on their screen use habits, most of them asking for the highest or most inappropriate use which serves as a mapping of the family members by severity of use. In addition, we noticed that Game 1 and Game 2 in the Larsen family were completely devoid of the guess-challenges and that they later misunderstood these as being also consensus-based. This meant that they had almost no events in their games directly probing for comparison with numerical data from their screen trackers. Especially for the Larsen family, the game is allowing the family members to point fingers at individuals responsible for undesired screen use, which could be what we see outside explicit game situations as implementing the strategy of snarky comments. The parents in the Poulsen family felt they had a good idea towards how their children used their respective devices and sources of entertainment like social media and games. Their approach to governing and regulating screen use is, as opposed to the Larsen family, not restrictive mediation. Instead, they expect their children to make educated choices towards their own consumption, leaving the parents to rely on their ability to notice whenever something is getting out of hand. This led to the experience of gaining knowledge about their own screen use through Free Time merely as a an exercise providing them with specific numerical values. While they perceived it as an interesting and useful exercise, the outcome did not supply them with a specifically increased sense of competence as they were already to some degree aware of the extent of their screen use. This could explain why the Poulsen family did not report any signs of implementing a strategy like snarky comments.

5.3.3 Using Screen Use Knowledge Competently

The Jensen family's reports on Free Time creating more attention to their screen use was elaborated by Andreas, stating that, "I don't think it will be just here and now when we are playing the game. I think it will continue. We might get some new habits from it." (Andreas Jensen, Appendix F 2). Andreas had noticed how they were slowly changing some of their habits already, albeit temporary as the experiments with silent mode mentioned in Section 4.5.3, but also from Steffen who had been thinking about his screen use outside the game as well. The parents from the Jensen family had also noticed how some of their answers would siphon into their everyday lives because their sons would make make goodhearted fun of their them, like in Section 5.2.1, whenever their actions would violate these. In this way, they were sure that participating in this study had had some kind of effect on how they thought about their devices, how they used them, and that perhaps it had started make them think more about it in general. After playing with a more correct set of rules, the oldest sons had become more tactical in their answers, resembling the play style of Alfred explained in

Section (Appendix 5.3.1). Their experience with the game had made them think about the built-in margins of error as potential ways to gain an advantage, which was not based upon their own conception or opinion of a topic. Andreas noticed that

Its the thing about, when you get to game four you kind of get the idea, you know how much the other's have used their screens, so the margin doesn't really make any sense because it is too easy to correctly hit somewhere within it.

Andreas (Appendix F: 2)

Their experience from playing Free Time multiple times had made them aware of how to adjust their answers to produce more correct ones. Combined with their experience from talking about their screen use it had rendered the game too easy for them too play. This was also commented on by Alfred and Nora who thought that the questions had become very similar and, because of their similarity, too easy to answer. Rasmus from the Poulsen family thought that the game had value in making awareness about screen use especially when facing topics like social media. The Poulsen had to end their participation halfway through and therefore it is difficult to say whether the game would have proven to be as easy for them. They were, however, not very far apart when answering challenges, making their journey towards reaching higher levels of perceived competence in this regard potentially shorter. The Poulsen family reported having earlier discussions on the value of screen use versus temporal and contextual restrictions of screen use with Laura when she became a teenager. They had learned to address screen use rules more like expectations by using evaluative mediation in place of restrictive mediation. This is a sign of competently using their screen use knowledge to better family time situations. Their youngest son is benefiting from these already established norms as the parents have learned that showing faith in the children's behaviour while monitoring for signs of excessive use has been a better formula to avoid tensions for them. That being said, they would still probe Esben for new additions to installing applications. The parents in the Poulsen family are aware of how their children feel about using their devices and Vibeke explained that,

I also think that we've become aware or at least I have become aware that this is why I do not set boundaries because I can't maintain the boundaries, for instance, I can't say two hours because I can not comply. [...] If I try to set such boundaries, they have good excuses as to why they shouldn't stop, that I can't abide by them myself, so I feel like this, why set them? I only think that I tried it right at the start, and then it fell through [...]

Vibeke Poulsen (Appendix R: 2)

Through Laura they obtained a new perspective on their own understanding of role of personal devices, becoming aware that cutting their children off from certain social media and restricting their time could potentially mean restricting them from being social with their friends. They are also self-aware in their own screen use and do not think that they have any specific rights to harshly restrict their children's screen use as they themselves tend to use their devices a lot.

5.4 Free Time Sprouting Motivation

In the following section the findings on relatedness, autonomy, and competence are further analyzed to describe findings of motivation of various kinds.

Motivation Towards Changing Screen Use Behaviour

Our findings point towards a high level of autonomy present in the Jensen family, both in terms of partaking in discussions and trying to implement new strategies to manage screen use. Conversely, In line with the definition of autonomy in Section 4.6, the game sessions showing the most examples of low or non-existent autonomy are found in the games played by the Larsen and Poulsen families. Taking into account the observations of relatedness in the families explained in Section 4.6, the theoretical framework of Self-Determination Theory would not predict the existence of intrinsic motivation in abundance regarding the Larsen and Poulsen families. However, when we look at the interviews with the Larsen family they show willingness to reflect on in-game situations where potential discussions were shut down. This suggests that extrinsic motivation might be present in the sense of improving on skills related to game play. In Section 4.6 we argue that the highest levels of perceived relatedness are found in the Jensen family. Their implementation of snarky comments is understood as a strategy to elevate both their sense of autonomy and competence. While the foundation for intrinsic motivation towards addressing screen use seems to be in place in the Jensen family, they do not believe that they experience any level of excessive screen use, "|...| it is just that it has never been an issue. There hasn't been anyone misusing or excessively using... so we haven't thought that there should be rules about that." (Maria Jensen, Appendix F: 10). The combination of their sense of autonomy, competence and relatedness makes their specific social setting a place where new strategies, like making snarky commenting, is easily implemented. From this we find that they are intrinsically motivated towards improving their family time even though in the specific case of changing screen use behavior they do not perceive this as an issue that affords a strategy. Through playing the game the family found that there might still be some improvements to make in how they address screen use as a family, as Maria states,

MARIA: But, then there have also been some areas where we have been challenged, and that we had to modify. So there has definitely been more talk about screens and screen use in general.

INTERVIEWER: Do you think that's a bad or a good thing?STEFFEN: I mean, that's a good...ANDREAS: Yeah, I also think that's a good thing.MARIA: Yes, it brings a certain awareness [...]

Maria Jensen (Appendix F 11)

Even though the Jensen family do not perceive their screen use behavior as problematic, they acknowledge that Free Time has challenged some areas that they could benefit from delving into, in order to further their awareness towards screen use. This points at the Jensen family being intrinsically motivated towards topics they perceive as helpful towards improving their family time.

Motivation Towards Playing Free Time

Even though the Jensen family apparently does not see any issues regarding their screen use behavior, they seem to be extrinsically motivated by the game itself. Steffen remarked,

Well, I think that if you should, like, say something as a critique, then it should be that, like, you can only play it a certain amount of times before it turns into, well, that it is the same questions over and over... so that it takes a bit off of the experience, in that we we know each other's answers and stuff.

Steffen Jensen (Appendix F: 11)

From this statement it is clear that the motivation of Steffen in regards to the game is tied closely together with the feeling of experiencing new aspects of the game, and new challenges to win. Consequently, when this exploration reaches its end and the players start to see the suggestions for discussion topics repeating themselves, the goal ultimately becomes winning the game. Though Free Time has made the family contemplate their screen use more often and in more detail, the individual game elements function as extrinsic rewards persuading them to take another game, maintaining only short-term engagement. In the Larsen family, feelings of elevated competence are almost uniquely found in their experience of getting better at playing a board game. Alfred discussed their views on screen use related problems, saying that, "I don't think that we have been worried about the screen use in our home. And I don't think that we have found a reason to be, now that we have played it." (Appendix N: 5). Earlier in the interview a discussion about the two-hour rule imposed on Olivia resulted in her finding her iPad in order to check her actual daily average. This was found to be 3 hours and 18 minutes, to which Alfred replies, "that is way too much". This situation reflects

a general tendency in the parents' focus on mainly addressing tensions from screen use in situations of immediate rule violations, while only loosely keeping track of the everyday use, a finding corroborated by the snarky comments invoked in the family. Alfred's statement above, explaining the family's lack of worries about screen use, shows that the Larsen family in general is not clearly motivated to actually change screen use behaviour, in that they state being widely content with their current use habits. Alfred mentioned how he recently learned from a news broadcast that the average screen use of the average Danish teenager was more than 3.5 hours. From this he concluded that the family is evidently also within the boundaries of general average values. This suggests that the Larsen family show neither significant intrinsic or extrinsic motivation for changing screen use behaviour, and also not an imminent need for such changes. Motivation is therefore mainly present in the fight to win a game of Free Time. The Poulsen family expressed that they did not see how Free Time could be a useful tool for them in managing screen use behaviour. They are content with the current state of screen use in the family and they mainly expect that any kind of screen use regulation would cause tensions. However, in the Final Interview they revealed that they were scheduling to play Free Time some days later, outside the research period, as they were genuinely intrigued by trying out the scenarios that they had not yet tried. As such, there appears to be some driver of extrinsic motivation present towards wanting to play Free Time.

Seeing Potential in Playing Free Time

As a side note to the accounts of motivation in the families, there are several examples of parents showing curiosity towards alternative ways to use Free Time during the research period. As a reaction to being presented to the game, Alfred from the Larsen family mentioned that

It seems like a very fun game by the way. It could be nice to also try it in a school class setting. And find out how much screen time they really have and how much they have used, when we talk with them about mobile phone habits.

Alfred Larsen (Appendix G: 9)

This idea of transferring Free Time to other contexts is supported by Rasmus from the Poulsen family, discussing the idea of playing the game with his social science teacher colleagues. He imagines that it could prove useful for the exchange of ideas and attitudes in relation to screen use habits, as a preparation for teaching about the impact that screen use has on society and everyday life. In both cases, the families have opted to keep the game to be able to try out these alternative applications of Free Time. We see this as a sign of being extrinsically motivated towards exploring the potential of Free Time as an interactive tool in teaching on subjects related to screen use.

Chapter 6

Discussion

6.1 Inspiring Solutions with Research Through Design

In this study, we have used Research through Design to investigate how a specific design can inspires reflection on the issue of in-home screen use related tensions experienced by families. In Hansen et al. (2020), we found that families with children would experience tensions in relation to in-home screen use and family time, and that some parents would apply different strategies in an attempt to resolve some of these screen use related tensions. In addition, we called on the possibility that a provocative approach might prove useful in fostering reflection on these tensions. We likewise discussed how a provocative design possibly could be insightful in further explorations of the topic and serve as a means to solve some of the screen time related issues we uncovered. The present study uses the practice of RtD to address the issues found in Hansen et al. (2020) by designing and utilizing the artefact Free Time to promote reflection about screen use behaviour in the social context of the family. By choosing the Showroom practice within RtD, we adjusted our design to draw the participant's attention towards underlying issues leading them to look for a specific framing of problems they face regarding screen use through their reconsideration of the issues. In our design we strived to define these underlying issues as the tensions found not only in Hansen et al. (2020) but also in studies by Blackwell et al. (2016) and by Oduor et al. (2016). Our design choices to achieve this, as well as the implications of the chosen design, will be topic of the subsequent discussion.

6.2 Competent Free Time-Player or Competent Non-User

SDT is applied two-fold in this study. On a technical level, gamification utilizes the relatedness, autonomy, and competence of SDT to create a compelling, game-like experience. From a psychological perspective, we have applied SDT to provide Free Time as a means of excavating problematic screen use of family members and subsequently sprout motivation to change this undesired screen use behaviour. This way, we aim to promote behavioural change in screen use that would otherwise be more difficult for the person to implement in a family context. In the Final Interview (Appendix N) Nora Larsen explained how our design choice of focusing on consensus-based challenges were a source of irritation for them. This had a negative impact on their experience of the game play, rendering factually correct answers useless for them in the context of Free Time and, by extension, also their actual use. They explained how they thought this was part of the reason that they usually would not engage in discussion during the game. However, we argue that this was a problem mainly because they almost never drew any guess-challenges. A different view on the same topic was articulated by Steffen in the Final Interview (Appendix F) with the Jensen family, That is perhaps something that you should make clear in the rule book, that it is not necessarily a game about winning. That the point is to spark some conversation, because automatically when it's a game, then I'm just thinking about that [winning].

Steffen Jensen (Appendix F: 11)

According to (Nicholson 2015) and (Ryan and Deci 2000), extrinsic tangible rewards seem to undermine the sense of autonomy as they influence from an external perspective. They are categorized alongside threats, deadlines, directives and imposed goals as externally undermining and diminishing intrinsic motivation. In the Jensen family we saw how our design had a tendency to enforce this undermining, when looking specifically at the dynamics of the two perspectives on autonomy. They deal with issues stemming from their errors in game play through a display of autonomy towards the game itself, discussing the conditions of challenges as well as the conditions under which the winner of a given challenge is found. At one point they end up deciding the winner of a duel based on the fact that the losing team decided to agree with the presented arguments. In addition, the Jensen family reported that the clarification of the rules made them focus more purely on playing the game, as it suddenly felt like a "real" game. From this point and on, Steffen and Frederik sees an increase in their display of autonomy, by figuring out more and more new creative ways to beat the opposing team. This, in turn, leads to a greater sense of competence towards game play in that they give positive performance feedback to each other on these creative inputs. However, as they show increasing levels of autonomy and competence towards playing the game, at the same time we started to see fewer examples of them engaging in the derived discussions between family members regarding their expectations toward screen use, which is something that we would regard as a sign of diminished autonomy in the context of addressing problematic screen use. Interactions like this serves to suggest that we cannot exclusively focus on one of these two applications of SDT, as our findings about autonomy in both cases seem to affect each other either positively or negatively and as such not completely independent of each other. This is true also for competence. Instead, we try to look for examples of both applications and probe for reactions from the family members to which kind of situations they are experiencing autonomy or competence most prevalent. We elaborate on this in Section 6.3 with a discussion of how this research has affected the expectations towards family time in the three families. In addition, looking for examples of both perspectives of SDT implies that we are dealing with multiple kinds of motivation in our participants.

6.2.1 Intrinsic Motivation Through Extrinsic Motivation

In the design of Free Time there are elements both aiming to promote intrinsic and extrinsic motivation. Designing for intrinsic motivation revolves around designing activities so that they are performed by the players without an expectancy of external rewards. The challenges and duels in Free Time are examples of such activities. When looking at the game as a whole, it could therefore be argued that some level of contradiction or confusion in what kind of motivation is aimed for in the design of Free Time. Evidently, some of the game elements surrounding these challenges and duels seem to be designed with a clear intention of defining external rewards like trophies to collect, bonus-cards to obtain and use, as well as scenarios to win. With our application of SDT in the field of screen use behaviour and related tensions designing for extrinsic motivation could be a precursor to fully exploiting elements promoting intrinsic motivation. The reason for introducing extrinsic motivation in the form of a welldefined system of rewards is that a reward-based design has an advantage in relation to shortterm behavioural changes. According to Nicholson (2015) this kind of game design is useful for players to quickly learn about and obtain new skills. Because none of the participant families have an explicit and pre-defined goal about changing their screen use behaviour going into this study, intrinsic motivation for changing screen use behaviour is not necessarily something that the participants see as being present. This is despite our interviews revealing that all families stated numerous examples of such internalized desires to change screen use behaviour. In addition, they presented tensions clearly stemming from situations involving screen use deemed as undesirable either by the user, other family members or both. In order to promote intrinsic motivation we have designed the game as a whole to aim for extrinsic motivation, while inspiring intrinsic motivation through the specific challenges and duels. This way, Free Time defines the trainable skill as the excavation of intrinsic motivation to change screen use behaviour.

The Context Decides the Motivation

When looking at SDT in general, it is important to underline the fact that there is not a clear hierarchy promoting one type of motivation over the other, and that, "The only implication of SDT is that extrinsic rewards are driven by the environment, and intrinsic rewards are driven by need satisfaction." (Landers et al. 2015: 179). Our choice to focus on screen use within a social context, like the family, therefore has an effect on what kind of motivation the design should inspire. Within a social context a certain degree of variance in how the individual person is motivated and to what extent they experience motivation towards the same goal could be expected. Therefore, when taking the context of social relationships into consideration, there could possibly be a higher value in aiming for extrinsic motivation in the sense of aligning your behaviour with the expectations of your peers to a certain degree. Consequently, it is evident that there is value to be found also in combination of extrinsic and intrinsic motivation. Following the RECIPE framework, designing for engagement considers the social context of the players which in itself promotes relatedness. Similarly, playing Free Time provides a social experience for the family which in itself could be adding to the family members' feeling of relatedness in this context. The social aspect of feeling competent lies in the performance feedback from other family members, where positive performance feedback heightens the feeling of competence, while negative performance feedback serves to diminish this. Free Time offers an abundance of situations allowing for such performance feedback to take place, every time the players reveal their answers to a challenge or duel. However, in opposition to the feeling of relatedness being present by itself, it is entirely optional whether the players want to give such positive/negative performance feedback to each other, or if they abstain from doing so completely.

6.3 Family Time

Looking at the participants in both Hansen et al. (2020) and this study it is clear that family time is perceived in very different ways depending on the family. As such, formulating a recipe to achieve a design that suits every family member is a difficult task as the expectations towards family time, which level and type of screen use is agreeable, is equally varied.

6.3.1 How Free Time Creates Awareness Towards Screen Use

Studies like Oduor et al. (2016) and Hansen et al. (2020) discovered different strategies found by families to be effective in avoiding conflicts related to screen use while co-present with other family members. Oduor et al. (2016) found a significant source of tension in frustrations from not knowing what other family members are doing on their devices. It was discovered that several participants raised awareness by stating these activities out loud for the rest of the family as a strategy to avoid conflict. We saw similar findings in the present study, notably in the Poulsen family. Here, the parents would sometimes notice changes in Esben's way of engaging with his devices and feel frustrated from not knowing the reason for these changes. Situations like this led to the parents asking Esben for instance if he had started using any new applications. In addition, we have seen examples of participant families implementing strategies evidently inspired from playing Free Time. Both Steffen and Andreas reported actively contemplating their screen use, suddenly experiencing feelings of guilt after scrolling aimlessly through a feed in various application, sometimes deliberately turning off their phones after realizing that such aimless scrolling had taken place. Also, early in the research period Andreas experimented with keeping their phone constantly on silent mode to combat notification noises annoying the family. These examples of new strategies were implemented as consequences of the awareness about actual use of various applications and devices, provided mainly by the guess-challenges. While later in the study they reported that this had somewhat normalized, they still assessed that they might continue considering their own screen use in the future. The Larsen family, thought it possible to use Free Time to discuss differences in rule sets between the two children and this way creating awareness in an effort to satisfy Olivia's sense of justice regarding screen use allowance between her and her brother. On a technical level the game sessions made them become more aware of how other family members are thinking about different aspects of screen use. Examples showing how a lack of awareness notably affected the participants in this study were most prominent in the Larsen family, with, for instance, situations described in Section 5.2.1. Here, Alfred would often use an old iPad to disengage by playing games by himself often on the back end of a hard day. This corroborates the study by Hansen et al. (2018), where it was discovered that screen use is used as a way to de-stress and not respecting this activity by interruptions, can manifest tensions between family members. His family is aware of his screen use activities in this context, but not the underlying de-stressing purpose. Because of a lack of data from this particular device he was asked, during an interview, to estimate how much he would use it on average. His own estimate was half of what his wife said, which further adds to the idea that the perception of the appropriate time spent on a device is highly individual and even though family members might respect the activity, they might have issues adjusting their expectation towards an ideal amount of time spent of activities like that, ultimately leading to tensions to which they might benefit from becoming more aware about.

6.3.2 Adjusting Shared Expectations Through Shared Terminology

As one of their main findings, Blackwell et al. (2016) saw a tendency that families do not necessarily want more attention from each other. Rather, the actual problem was found in the lack of shared expectations towards the merits of using screen in different family time situations. Initiating discussion and conversation to further the shared understanding of different aspects of screen use could provide a tool for building towards shared expectations. This is supported by the design of Free Time in the lack of specification in the different topics of screen use, provided by the questions in the challenges. For instance, we have chosen not to define terms like "social media", "TV" and "device" in the questions as to avoid imposing how they should be understood in the individual families. This, however, had the effect that all families put some effort in actually creating their own definitions. In Free Time, by changing teams every game session between children and parents, they would also be able to test their opinions on in-game subjects with different family members, potentially establishing new shared information. The opportunity to have a say in how to define a specific topic can provide the participant with a sense of autonomy in defining their own opinions on screen use. With this, the participant can build towards becoming intrinsically motivated to promote further change and voice opinions. This effort is most prevalent in the Jensen family who also stated that these definition exercises bring a certain awareness that is deemed a good thing in terms of understanding each other and improving how they talk about screen use in the family. We noticed that there were some implications between how family members would review and estimate their own screen use on specific platforms and how much time they would generally deem acceptable, also in family time situations. Laura from the Poulsen family was specific about her opinion on her generation being more reliant on technology for communication and therefore it is acceptable for her to spend more time on social media as this is how she socializes. Furthermore, after recognizing this view on social media her parents had also stopped trying to resort to restrictive mediation as a way to limit her screen use. The Poulsens generally had great insights towards the individual screen use in the family, but examples of them defining shared terminology exposed some gaps remaining in their common understanding. Even though they had a good perception of how their family members interacted with their devices, they could benefit from a shared terminology as it would further improve understanding between them and minimize potential tensions from misinterpretation. In their specific case, however, it could be argued that the game is more suited towards families who might be further apart towards having an idea of family members screen use as different terminology is not as important a factor in their specific setting, as they count on each other to make informed choices based on their shared expectations and trust. The activities provided by Free Time and their further implications on family time behavior could be regarded as a first step towards creating awareness about differences and promote shared expectations towards screen use, as this knowledge could promote understanding in family relations where tensions may occur.

6.3.3 Applying Restrictive Mediation Through Snarky Comments

The Jensen family implemented a way of being vocal about violations of shared expectations in family time situations through snarky comments, which they stated was a direct consequence of them partaking in our research. When explaining how they felt about this new strategy to address each other's screen use the parents highlighted that there was a nice awareness to be found in someone being explicit about noticing screen use deemed to be undesirable or "not okay" in the family. The main part of the examples of comments used by the family, were as established references to previous events and discussions during game sessions, as the example presented in Section 5.2.1. Here, it could be argued that the children in the Jensen family use snarky comments to alert their mother that she is currently violating some previous postulate about her own screen use. By pointing to their mother's transgression, they are informing her that she is about to violate her own expectations towards family time. This is corroborated by Valkenburg and Piotrowski (2017) who sees falling into the habit of excessive screen use as an issue to self-regulation, or "[...] the ability to resist impulses and temptations that keep us from achieving our long-term goals."

(Valkenburg and Piotrowski 2017: 246). They continue by stating that people struggling with self-regulation are at greater risk of succumbing to behaviour that lead to various problems. In the case mentioned above where Maria is accused of struggling with self-regulation of screen use behaviour, the children hint at this problem as inadvertently doing harm to the quality of family time. However, as this strategy matures over time it could serve as an effective way of articulating a participant's own expectations on when and where he expects other family members to be present. This way, snarky comments could serve the family well, as small frequent micro-adjustments of behaviour to match shared expectations established in the family. It could be argued that this way of implementing restrictive mediation through snarky comments is a way of prolonging the lifespan of this strategy towards regulating screen use whenever restrictive mediation in itself becomes less efficient. This application of restrictive mediation is not bound by the social structures of the parent and child relation, and would also be applied towards the parents themselves. In their study, Hiniker et al. (2016) found that a majority of the participating children were able to express screen use related rules and expectations which they would like their parents to adhere to. Looking at Alfred compared to his children, he is not suffering any restrictive mediation on using his iPad, and devices in general. Therefore, in situations where the other family members would feel the need to articulate that his use is undesired, they can never support this by pointing at a transgression, as there is no clear rules for Alfred to transgress. This could explain why they would turn to a strategy like snarky comments. Abling the children with a set a shared expectations towards regulating screen use in family time situations could provide them with the means to express dissatisfaction with the screen use behaviour of their parents whilst providing a strong sense of autonomy without having to fear specific consequences like deep discussions.

6.3.4 Externalizing Own Expectations of Screen Use to the Family

Creating awareness of different perspectives and opinions on screen use through Free Time could be viewed as a type of extrinsic motivation. The participant families were exposed to different kinds of conversations about screen use. These conversations could be seen as extrinsically motivating, as the participants have not brought the topics up themselves and have to find a solution through either cooperating with the team members or winning a duel against the opposing team, in order to be able to progress in the game. This kind of rewardbased structure is explained by Nicholson (2015) as both being expected and accepted in many life situations, like monetary rewards for a job. As a note on the limits of extrinsic motivation, he adds that, "When the rewards stop, however, the behavior will likely stop also unless the subject has found some other reason to continue the behavior. (Nicholson 2015) 1). We see an example of this development in the Jensen family. Through having multiple conversations and learning the opinions of their partners across different game sessions, they were exceedingly better at both estimating screen use in general and presuming their partners answers to the extent that various participants claimed that the game had become too easy to play.

The family's externalization and subsequent internalization of individual opinions on screen use, and acting accordingly upon them in their everyday life, represent signs of behavioural change within the participants. In the Jensen family some of their answers had manifested themselves into their everyday dialogues and they would hold each other accountable as to their answers as per Section 6.3.3. The Poulsen family members had already externalized their opinions prior to being introduced to Free Time. By doing this they were able to understand why a specific activity involving a screen was not necessarily an infringement towards a shared family time situation. Laura's opinion on having a busy social life through her phone was understood by her parents, who thought of it as being equivalent to socializing with her friends. Through their level of internalization of other family members opinions, they had seemingly phased out the need for restrictive mediation and their shared expectations towards how to interact with their screens hence avoiding tensions. This corroborates the findings of Hansen et al. (2018) where differing individual expectations towards family time were a cause of many tensions between family members. The Larsen family did not notice Free Time changing their behavior significantly, but they had noticed becoming very skillful at knowing each others answers in the game, even with different partners. In their case, becoming skillful at playing Free Time may correspond to family members trying to internalize opinions on screen use only stated implicitly by teammates through their answers. The age difference between the children in the Jensen and the Larsen family might have an influence on how they view screen time as well, in that the externalization of one's own expectations requires a certain display of autonomy and reflection on screen use. Such autonomy and reflection is hard to obtain as a child while being subject of restrictive mediation on screen use, effectively not being able to legally implement screen use behaviour other than what is allowed. The parents of the older children were very forward about not being able to restrict their use beyond a certain age. Having older children chime in their opinions during their game sessions would provide a more nuanced perspective on specific situations as Steffen for instance would be more vocal than his little brother Felix, who still had restrictions on his screen use.

The internalization of articulated expectations across parents and children could be viewed as a progress towards becoming intrinsically motivated. Ryan and Deci (2000) concluded that whenever it is attempted to foster a certain behavior in someone it requires that the value and regulation of the behavior becomes integrated and internalized. By adjusting expectations to various aspects of screen use derived from externalizing opinions they are choosing to positively influence their family time. This relates to what (Ryan and Deci 2000: 71) describes as "[...] "taking in" a value" which is a step towards changing the way a behavior or a value is perceived. Given that they have established realistic shared expectations,

they are able to improve their sense of competence by being a positive influence towards improving family time, providing the foundation for becoming intrinsically motivated to implement long-term behavioral change.

6.4 Limitations

There is an overarching limitation of the present study in the national lock-down due to COVID-19 being in effect from late march. This naturally had some impact on the process of conducting our research as well as our communication both internally in the group and externally with the participant families. Upon lock down the design of our study and also Free Time itself was beyond infancy, meaning that we decided not to abandon our work and consider versions of this study more compatible with the national guidelines for social distancing et cetera. This decision meant that we had to solve a number of issues, the major one being the fact that suddenly we were not able to physically meet with our participants for interviews and observations. In place of this we chose to conduct our research as digital ethnography. While interviews could easily be done online via video chat, we abandoned the idea of observing the families playing Free time, instead asking the families to record themselves while playing and then send us the recordings. These were mainly used for transcription purposes as we were focused on the dialogue and not so much the non-verbal aspects of communication between family members. If our study were to include these kinds of transactions between participants, a significant effort should have been put into considerations like setting up multiple cameras to capture the whole family and also to assure a higher standard of quality in both audio and video. There is a positive effect to be found in pivoting to digital ethnography, in the sense that we are able to re-experience games and interviews thanks to video documentation that we otherwise might not have considered. The lock down has had huge implications on family life and their every day routines, perhaps explaining some of the participants' difficulties during interviews in remembering what had transpired even in the most recent game. In general, this was deemed as the main explanation for the many rejections on participation that we experienced while recruiting participant families, and as such also the reason for studying only three families. This lock down also had an impact on the three participant families, introducing major changes to the everyday routine in the family. The effect of this is most evident in the Poulsen family, feeling the need to shorten their participation in the study because they were unable to find the time and energy to go beyond the second round of interview. The extra amount of work put into reconsidering the study and recruiting participants as a consequence of COVID-19 resulted in a more limited time scale of the actual research period. This naturally defines a maximum latency of any measurable or elicitable impact of Free Time on the players in this regard. We therefore ended up with a distinct skew towards considerations on short-term behavioural changes in our study, in the sense of promoting extrinsic motivation. Further studies involving designs like Free Time could benefit from a significantly longer research period or multiple iterations, paving the way for the participants to develop intrinsic motivation. This would allow for more healthy conclusions on the differences and preferences between these kinds of motivation in the context of screen use behaviour in a family setting.

6.5 Further Work

The is still work to be found in extending the present study, in that the Showroom practice demands that the participants' problem framing exercise should be performed in tandem with design-adjustments to promote this framing of the problem in their own context specifically. In the case of the Larsen family, the promotion of their contextualization of the problem could benefit from design-adjustments like specific calls for discussion, perhaps in the form of game-pausing cards demanding a verification of some extravagant statement in the actual screen tracker data. Completing the work demanded by the Showroom practice could potentially benefit also from delving more into the psychology of the individuals within the social context, in order to add nuance and perspective to the underlying issue as it is understood by the families. Biased self-reporting, social desirability, and cognitive dissonance could be important factors explaining the behaviour of the individual in addressing tensions from screen use during family time.

6.5.1 Bias in Self-Reporting of Screen Use

The notion on biased self-reporting has not been given much attention in this study, as our aim has been to spark conversation about ideals and attitudes towards screen use, more than to measure actual screen use. Yet, we have noticed some of our participants under-reporting certain types of screen use, like when using gaming as a pastime activity. In Kahn et al. (2014), they seek to explain the systematic under-reporting occurring in relation to online gaming, by looking at factors like personal social categorization, enjoyment of a game, and the sense of community experienced with others online. We saw a clear example pointing at such systematic under-reporting activity, while the other family members viewed it as wasted family time. They exhibit very different opinions ultimately leading to very different estimations of the daily average use of the iPad and subsequent discussion about this.

The Impact of Cognitive Dissonance

Social desirability can affect how people estimate their own screen use which is potentially influenced by how they wish to be perceived by others and can as a consequence spawn biased

self-reporting. In their work, Kahn et al. (2014) explain how Cognitive Dissonance and Balance Theory can "... influence an individual's attempt to estimate the difficult-to-recall behaviour of video game playing time, resulting in systematic inaccuracies." (Kahn et al. 2014: 1013). The state of cognitive dissonance occurs when people perceive that cognitive elements are inconsistent with one another. A mental conflict occurs, when one's attitudes, ideas, beliefs, or behaviours contradict each other, which can cause discomfort. Kahn et al. (2014), posits that the attempt to resolve these dissonance tensions, may influence selfreports about behaviour, maintaining consonance with one's idea of one self. The Balance Theory describes the structure of one's opinions about other individuals and objects as well as how one perceive the relation between them, and conceptualize the cognitive consistency motive as a means to achieve psychological balance. Heider posited that if people see a set of cognitive elements as being a system, then people will prefer to maintain a balanced state among these, as imbalanced structures are associated with discomfort and negative feelings (Insko 2012). In further research on this topic, it could be investigated to what extent the perception of one's own use of screen use during family time is influenced by cognitive dissonance. Furthermore, it could also be investigated to what extent designing for the Balance Theory could affect motivation towards changing screen use behaviour in order to achieve psychological balance. Investigating how the concept of externalizing own expectations towards screen use relates to the aspects of cognitive dissonance and balance theory could provide new insights towards the process of adjusting expectations to family time.

The Negative Impact of Social Desirability on Participation

While searching for participant families for this study we received a number of rejections. Beyond rejections due to COVID-19, they were mainly in the form of parents being unable to persuade their teenage children to partake in such a study fully disclosing to others their own actual screen use in such detail. Something that we have not addressed as an immediate consequence of the chosen design of Free Time is the aspect of social desirability bias. Social desirability can according to Paulhus (1991) be seen as a tendency to response in a way that makes the interviewee "look good" in regards to the topic or perceived agenda of the questions. There is an overlap to be found in the study by Blackwell et al. (2016), reporting various visibility-obscuring techniques performed by teens in relation to their screen use. They also report several cases of parents worrying that their children might take advantage of such obscuring of activities, by claiming to do homework while actually doing something else and less productive. One of the consequences of utilizing actual measured data on screen use as a central element in Free Time is that it removes a lot of the flexibility that a player has to frame his or her screen use habits as being more socially desirable. This leaves the player with two options: either to change screen use behaviour leading up to every game

of Free Time, or to refuse to partake in game sessions or the study altogether. For further research on this topic, social desirability concerns of an individual regarding screen use could be investigated as a potential explanation of behaviour shrouding parts of the total screen use. Turning off screen use tracking or preferring to rather use the phone in seclusion than while co-present with family or friends could ultimately pave the way for tensions related to others not knowing about the reasons and nature of this screen use.

6.5.2 Applying Free Time in a Different Context

As a more immediate suggestion for research extending this present study, it could prove an interesting exercise to apply the Free Time design in other social contexts. This was a suggestion proposed by several of the parents among our participants, as stated in Section 5.4. Alfred Larsen stated that he found it intriguing to think about possible outcomes of bringing Free Time into a primary school class room. While Alfred's angle is to see Free Time as a tool aiding in situations where the class would discuss mobile phone habits, the immediate effect would be that parents are removed from the game. This could provide the children with a greater sense of freedom in discussing their screen use and ideas of what is deemed as excessive or undesired use. Such changes of the context of application might be supported by the current design that aims for flexibility and adaptation to the players partaking in a game session.

Chapter 7

Conclusion

7.1 Conclusion

In this study we sought to investigate to what extent gamification can be utilized to help families reflect on tensions regarding their screen use, and how we can design an artefact to stimulate changes in screen use behaviour. Using Research through Design combined with digital ethnography we have investigated how Free Time as a design can help three families concretize a general problem by understanding and defining their own set of experiences of tensions related to screen use during family time. We studied how SDT through gamification can be used to map existing feelings of relatedness, autonomy, and competence, towards the creation of motivation to address tensions. In the analysis of our data we sought to take an empirical approach to this application of the Self-Determination Theory. We found that Free Time provided a social experience for the family which in itself served to add to our participant families' pre-existing feeling of relatedness. Signs of autonomy and competence were found in the families, towards both playing the game, but also towards obtaining shared expectations towards screen use behaviour. Our findings with this application of SDT corroborate related work by suggesting that combining conductors of extrinsic and intrinsic motivation is ideal in a social context, as opposed to maintaining a focus on either one. Extrinsic motivation from a rewards-based system like Free Time proved useful in terms of raising awareness and clarifying tensions experienced by the individual family members.

We sought to investigate how to find ways to inspire the creation and inflation of motivation for obtaining shared expectations of each other's screen use behaviour during family time. We found that stimulating the externalization of individual expectations by means of Free Time provided an adequate space for everyone to internalize values of the other family members. As such, Free Time proved helpful in establishing shared expectations of screen use during family time. Free Time proved to spark discussion about screen use in-game and between games, but we also saw examples of changed behaviour in the implementation of new strategies as a consequence of Free Time being played in the families. The strategy of using snarky comments, that was implemented by two of the three participant families, proved the most explicit example of behavioural change. The proposed explanation is that our design of Free Time stimulates a search for the "scapegoat" within the family, while providing both parents and children with an opportunity to articulate rules and expectations which they would like each other to adhere to in a risk-free environment.

In conclusion, this study is a contribution to the field of HCI research on the topic of technological tensions emanating from the ubiquitous use of smart devices. Our main contribution of this study is findings showing that Free Time as a research artefact can influence perceptions on tensions, but also actual behaviour, surrounding screen use during family time. This way, Free Time could hold the ability to bypass the reluctance of family members to engage in screen use related discussion by fear of conflict, found in related work on the subject.

Chapter 8

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