To Use or Not to Use: Mediation and Limitation of Digital Screen Technologies within Nuclear Families

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ABSTRACT

Today's home environment is affected by multiple screen technologies designed for personal and home use, making family members audience of the omnipresent technologies. We investigate how the past decades' increasingly technology saturated home environment influences home practices and parents' mediation of their rules of conduct for children's access and use. We conducted a two-part interview study with parents from different nuclear families, and found parental mediation of screen technologies to have become a complex and emotional process with continuous mediation of when to use or not use screens. Despite a shared goal of decreasing the role of screen technology, the parents differentiated between rules, regulations, and limitations, which could provide tensions within the family and between different families if attitudes and/or practices were not consistent. As such, we argue internal family rules and regulations to be a continuous negotiation between parents and children, where personal principles and external expectations impact a family's code of conduct. Our study contributes to a better understanding of screen technology practices, leading to design guidelines for screenbased home technology.

CCS CONCEPTS

• **Human-centered computing → Ubiquitous and mobile devices**.

KEYWORDS

home media environment, digital screen technologies, parental mediation

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1 INTRODUCTION

Through the last decade, screen-based entertainment technologies have increased their presence, as well as their diversity, in the home. The time of one television and one computer per home, or even one television per room is long gone and in the global north, it is not uncommon that each member of a household has 1-3 interactive screen devices such as smartphones, tablets, computers and large television screens. The melting together of content and uncertainty to what actually constitutes "television" have been addressed before [3], but with the availability of social media, direct communication via both text, voice and video, as well as a broadly conceived notion of "life organization", these technologies have become tightly intertwined with all aspects of domestic life. Many studies have been looking into technology use in family settings, such as the sharing of tablets and smart phones [22], children's screen habits and how parents negotiate limits [12, 31], how multiple screens compliment particular content viewing [11] and broader communication practices within families [1, 5, 34]. Yet, partly due to this rapid development, few studies have addressed family viewing practices and the emergence of internal family rules and code of conduct, through the past decades.

To investigate emergent and current digital screen practices in a time perspective, we conducted a study of nuclear families' mediation practices, looking both at current practices and earlier decades' practices. The study was two-parted, starting with mini-interviews with a set of randomly chosen people (20); the second part consisted of in-depth interviews with 15 people where we inquired into their home technology use, particularly in terms of rules and how they perceived themselves as following these code of conduct or principles. More specifically we aimed to answer the research question: **How do adults in nuclear families mediate digital screen technologies in the home environment?** While we cannot say with certainty, how the practices are actually enacted in the home, we here describe their explained practices in an aim to investigate potential future development of digital screen technologies and the impact these practices have on the social home environment. This paper contributes to a greater understanding of practices and mediation around the multiple screen technologies available in the Western nuclear family household, as a way of gaining insights into potential future technology practices.

2 RELATED WORK

The increasing presence of digital technologies in the home environment influences daily behavior and routines, leading to several unexplored topics of research. Prior studies have investigated this field with focus on, for example, children's use [15, 19, 27, 28, 31], couples' use [10, 22, 24], cultural discourse [17], and the home environment [24, 33]. We highlight research on families' use of digital screens in the home environment and how parents have mediated the use of them.

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2.1 Digital Screen Technologies in the Home

During the past decades, the home environment has been infused by screen technologies. The televisions' entrance into the privacy of families' homes in the mid-20th century affected our leisure and blurred the lines between information and communication, a notable feature that made it distinct from other media, like books or radio [29]. Putnam referred to the television as the 'electronic heart' of the home with the ability to foster family togetherness and connect the home environment to the world outside [29]. Additionally, Putnam claimed that television decreased social capital, while others argued TV-watching to be embedded into the social context of the home if the television was placed in a common shared room, e.g. the livingroom [3, 4, 26]. As the number of television sets per household multiplied, watching together became rare [29], a concern that has only become more relevant as the number of screens at home has multiplied.

With the development of movie players, the movie rental industry, interactive games, and television on the internet, TV-watching became a more interactive, control-based, and personal experience [3, 21]. For example, Barkhuus and Brown studied how the television as a leisure technology fitted into and constructed domestic settings in the home. Through interviews, they, in contrast to Putnam, found the television to be a social activity and for example saw the functionality of the PVRs to engage the audience in a more active viewing [4]. Barkhuus found that television might be consumed alone, though this was not intrinsically a negative thing as people selectively chose the content they wanted to see and did so with joy [3]. Consequently, television on the internet met the new practices and preferences of families' television watching, as people did not have to rely on the content and time schedule in broadcast television [3]. Following this, Vanattenhoven and Geerts studied how different types of television content were perceived and used in perspective from the household and found most viewing behavior to be organized around daily household activities and routines [32]. For example, video-on-demand services imply an active and focused audience where broadcast content functions as a background activity [32].

Mobile screen technologies, such as smartphones and tablets, impacted the social practices of the home environment, and the personal devices provided a smaller screen for TV-watching, and several other entertainment and social activities. Bovill and Livingstone commented on the home to be organized into communal spaces, e.g. the living room, and personal spaces, the bedroom [6]. The context of bedrooms has become private and media-rich[25], which results in more time spent there [6]. The personal spaces allow media and identity to intersect as the person, primarily the teenager, can sustain and express who they are, leaving the living room for those times the family chooses to come together [6, 25]. However, this can create tensions for example when personal devices are used in the living rooms' social situation; the smartphone offers an opportunity to not break up the physical come together, however, breaking the social cohesion [18]. Today, it is not a simple choice of using or not, the access to a wider range of devices invites to a 'jumping' between different devices why some people assign specific roles to their devices [18].

Within IMX/TVX several studies explored many-screen interaction (for example [2, 13, 20, 30]). Holz et al. found families to gather around the television but if a member lost interest in the TV content, a secondary device was used simultaneously [20]. Rigby et al. found the television to be a secondary activity when performing other household activities similar to [32]. In contrast, Anstead et al. studied the use of second screens to complement television watching in social settings and found parallel viewing to be a way in which users enriched the experience of watching together [2]. Greer and Ferguson found television watching on the tablet to not replace television viewing on regular sets, but instead found a positive correlation between the use of these two technologies [16]. Yet they found the audience to prefer entertainment content when watching on a tablet [16].

2.2 Parental Mediation and Rule Setting

The increasing presence of digital technologies can leave families struggling with proper integration of the multiple devices and their roles in the home environment; for example, families can be in constant conflict of being connected with the world or connected with the family [21], experience disruptions on their family dynamics [7], and tensions between parents and children [5]. The notion of mediation has become prominent as a consequence of the interlinked and network-enabled technologies [9]. Previous research has repeatedly commented on three strategies for mediation, namely restrictive mediation (e.g. rules), active mediation (e.g. conversations), and co-use (e.g. co-viewing/-playing) [35]. Zaman et al. inquired into parental mediation to study the surrounding contextual factors. They found all three strategies to be represented in their study, yet with several subcategories, and argued the different choice of mediation to be related to the family constellation and age of the children [35]. Mazmanian and Lanette studied the cultural narrative that 'good' parenting involves active monitoring and found rule-setting to not be straightforward yet often perceived as a norm or goal in families [28]. Related are Hiniker et al., who argued both parents and children found it challenging to set and follow regulations [19]. Another study showed rules to create tensions between family members due to different expectations in mobile use and that parents often disobeyed rules themselves [7].

In addition to mediation strategies, technical monitoring can enable parents to control or oversee what a device is used for. Ghosh et al. studied factors that contribute to parents' use of technical monitoring apps to investigate the balance of ensuring teenagers' safety in their online mobile activities and parental control [14]. Taken a provocative approach, Bruun et al. explored the 'non-use' of mobile technology in family settings by inventing a design prototype intended to challenge established expectations and practices around mobile devices in the home [7]. To confront 'over-use', the prototype enabled a family member to start a 'lockdown' from a central application on a shared tablet, which prevented all family members from interacting with their mobile device for 30 minutes. This made all family members able to initiate 'non-use' which they found to create togetherness, feeling of intimacy, and quality time spent together.

3 METHOD

Our aim of this study was to understand how parents mediate the use and incorporation of digital screen technologies into their existing home practices. We conducted interviews with parents from different families, focusing on their experience of screen technologies' impact on the home environment, their home practices, and how they mediate the use. This provided qualitative data on how the increasing presence of digital screen technologies impacts the nuclear family household and how parents approach mediation of these technologies.

This topic has been investigated earlier, though we focused on parents' perception of restrictive mediation as the number of screen technologies is increasing and the presence of them has become intertwined and ubiquitous. To investigate the changing perception on this, we widened the focus to parents who had had children during the past three decades instead of limiting it to one age group. This allowed an analysis of how parents have experienced the impact and mediation of different screen technologies during the past three decades, instead of just providing a snapshot of the present which most studies do.

The interviews were planned and conducted in two phases with different questions and recruiting methods. The preliminary interviews and the following in-depth interviews are therefore presented and elaborated separately in the next sections. Common for both parts of the study is that all participated voluntarily, and all interviews were recorded and transcribed. The study took place in Copenhagen, Denmark, in February and early March of 2020 (the last one was in fact finalized less than a week before Denmark went into lock-down due to the Covid19 crisis). The interviews were conducted in Danish, the local native language, as was the analysis we conducted, however, quotes were translated by the interviewers for the paper.

3.1 Mini-Interviews

To capture a snapshot of parents' mediation of screen technologies and how they experienced their impact on the home environment, we initialized the study with multiple mini-interviews to investigate people's immediate thoughts in this topic. The short interviews were planned as a preliminary study laying the foundation for later in-depth interviews, though they also provided initial insights into the area in question, which means we occasionally include quotes from these in our results as well.

The interviews took place inside a mall and on the streets in front of it, in the center of Copenhagen intending to recruit arbitrarily chosen people. To create an informal atmosphere, we avoided signs or a stand, and instead wore name tags with the university's name to inform people of this being in a research context without any commercial interest. We interviewed 32 people but as they were arbitrarily chosen they represented a varied type of families in both age and number of members. As a part of the data processing we, therefore, excluded all participants not representing the focus of the study, for example, if they lived alone or the children had moved away from home. This left 20 participants who were in the age between 25-58 and parents of one child (8), two children (8), three children (3), or four children (1). The interviews lasted between 4 and 16 minutes. Only a few people declined to be interviewed but it was naturally the participants with the strongest attitudes who spent most time for the interview.

We asked the participants about the number and type of technological devices they had in the home space, what home practices they related to technology use, how they experienced the role of these technologies, and if they did something to mediate the use. On purpose, we kept the initial question in regards to technological devices an open question to investigate peoples' immediate response to what they referred to as home technologies. However, they all answered screen technologies, one of the reasons why this became the limited focus of this study.

3.2 In-Depth Interviews

The second part of the study was partly based on findings from the preliminary interviews; we conducted in-depth interviews, teasing out the indications from the first mini-interviews, with family members of nuclear families. From the mini-interviews, we found that parents with small children had an explicit focus on rule-setting either as a goal, a necessity (in their words), or a perceived *expectation* by other parents to have. To analyze the foundation for this mediation and desire for limitations, we developed a longer interview schedule. The interviews covered five sections: the household composition and the technologies that the family used while having children (living at home); the experience of the impact and role of these technologies on the family life and household practices; how they incorporated, modified, and mediated the use, including rules; the experienced boundaries and consequences; and lastly what they wished for in terms of the future role of technology based on the past decades' changes. As the participants were asked about the experiences from the decade they had children and until today, the interviews were based on the participants' memories for which

Table 1: Information on interviewees for mini-interviews

Interviewee, gender	Year of birth	Children
I-1 (F)	1986	1
I-2 (F)	1990	2
I-3 (M)	1962	2
I-4 (M)	1975	3
I-5 (M)	1985	2
I-6 (Couple, F/M)	1982, 1978	2
I-7 (F)	1970	3
I-8 (F)	1988	1
I-9 (F)	1978	3
I-10 (M)	1982	1
I-11 (F)	1968	1
I-12 (F)	1980	2
I-13 (F)	1984	1
I-14 (F)	1989	1
I-15 (F)	1992	2
I-16 (M)	1977	4
I-17 (F)	1980	2
I-18 (M)	1977	1
I-19 (F)	1981	2
I-20 (F)	1994	1

Table 2: Information on participants for in-depth interviews

Anonymized names and gender	Year of birth	Children
Andrew (M)	1966	Daughter (1993), sons (1996, 2001)
Bea (F), Brian (M)	1966, 1963	Daughter (1992), sons (1995, 1999)
Carla (F), Casper (M)	1969, 1971	Daughters (1993, 1995)
Debra (F), Daniel (M)	1963, 1961	Sons (1985, 1986), daughters (1988, 1992)
Elliot (M)	1965	Daughter (1995)
Fiona (F)	1973	Son (1999), daughter (2002)
Gabriel (F)	1966	Daughter (1995), sons (1999, 2005)
Helen (F)	1978	Daughters (2001, 2004)
Ivan (M)	1973	Daughter (2004), son (2007)
Jessica (F)	1977	Son (2005), daughter (2007)
Karin (F)	1986	Daughter (2012), son (2015
Lina (F)	1986	Daughter (2015), son (2019)
Marc (M)	1987	Sons (2014, 2017)
Nadia (F)	1983	Daughter (2008)
Olivia (F)	1977	Sons (2010, twins)

reason a timeline of technological events supported the conversation to increase the chances of valid accounts. This also propose a limitation in our analysis that we address further down.

To recruit participants we tried to contact the same parents who participated in the preliminary interviews though this did not succeed. Instead, we used snowball sampling to ensure an even distribution of participants with children from the past three decades and recruited 15 new participants all from different families. The participants' ages were between 33 and 54 and were parents of one child (2), two children (8), three children (3), or four children (1). They represented a diverse set of careers, including farmers, pre-school teachers, bank tellers, administrative workers, etc. All participants were middle-class which meant that technology in the home was not limited by financial means. We limited our recruitment to participants in nuclear families; while it would be interesting to look at different types of families (two-household families, three-parent families, inter-generational families or same-sex parent families), as well, this was a conscious decision in our methodology. As such our results should be viewed with limitations to this type of family construction. The participants were not limited to the capital region but were living in different parts of the country. However, due to this, 7 of the 15 interviews were conducted through video calls, the remaining 8 were conducted face-to-face. The length of the interviews was around 45 to 60 minutes. When reporting the results, we refer to the mini-interview participants as 'interviewees' and the participants from the in-depth interviews as 'participants', in order to distinguish them.

3.3 Data Analysis

Upon completion of the preliminary interviews, the data was analyzed using broad scale categorization, to let these findings guide the focus of the following in-depth interviews. The detailed analysis of the in-depth interviews was inspired by elements from grounded theory [8]. Two researchers individually labelled quotes from the interviews with open codes to hereafter compare and axially code these into categories (e.g. 'rules', 'absence', 'interrupting'). When the separated analyses were completed, all collected data were compared. Through axial coding of all the collected data, we developed a number of themes related to parents' experience and mediation of digital screen technologies, which we will present in our findings.

4 FINDINGS

4.1 Home Practices Related to Technology Use

When the interviewees in the pre-study were asked what technologies they had and which practices they related to technology use, their immediate answers included smartphones, tablets, and laptops, which they used for communication (11), entertainment (18), work (7), and practical stuff (6). These findings should be viewed with caution as it merely indicates what practices the participants immediately related to technology use and not what they actually use it for. But it is interesting that none of the participants, in their immediate responses, mentioned e.g. domestic technologies, and that the majority commented on entertainment to be the main practice related to the use of technology. This indicates the prevalent understanding today that the notion of 'technology' comprises digital screen technology and not older mechanical technology such as dishwashers and washing machines, despite their indisputable prevalence and usefulness.

Using the same device for practicalities, communication, entertainment, and de-stressing had the potential to create conflict and promoted a love-hate experience of the digital technologies. The smartphone's mobility and smart-features enable several different activities, such as social connections, music, alarm, job notifications, etc. which some of the participants commented to conveniently have gathered different activities into one device. This could assist an effective accomplishment of everyday tasks, as well as an experience of intimacy and joy. Simultaneously, it could give a feeling of stress, dependency, addiction, and impotency. One of the participants described the conflicting perception of melting together of different contexts on the same devices: "I think that it's positive that [digital technology] provides all these possibilities but the negative thing is that you always have it on you. The [challenge of] just

living in the moment" (Helen). Several of the participants described using screen technology for relaxing, for example saying: "When we're tired, we'll sit down in front of the television to unwind." (Carla) and "When I've had to cuddle or needed a little peace to breastfeed, it has been a pretty easy tool to use" (Lina). A father expressed: "I can see that my son, when he comes home from day-care, he needs to relax and prefers to sit with the iPad and watch something" (Marc), similar to Ivan's point of view: "[My son] can sit and look at the iPad and play on the PlayStation, but I think it's okay, because it seems like they relax when sitting with their own stuff. So I actually don't have any rules about how long they can do that, because I think they manage it very well. Well, just as we need to relax, so do they need to relax. So I don't mind them watching a movie or playing on their iPad." (Ivan).

However, at the same time digital screen devices were commented on as stressful and with the ability to create anxiety, a challenge that was described by a mother of two children: "both the possibilities but also the stress factor, all these things about being 'online' and figure out when you want to be available and when you don't want to be available" (Helen). This comment indicates an awareness of being required to continuously consider potential availability and use of digital technologies. Several of the participants argued that the blurring boundaries and complexity were due to one device being used for several purposes, insights that will be elaborated as a part of the following findings.

4.2 Technology Steals Intimacy

We found parents to be concerned about digital screen technologies' increasing presence and use in the home space. All participants and the majority of the interviewees reported concern about the social consequences related to the role and use of technology use. One of the interviewees for example described:

> "I think it takes an incredible amount of socializing. I know that you are social on social media and smartphone and whatever else it may be instead, but it's not the same. I think you can feel the difference and I think you [on digital media] can feel that you are socializing in a way where you are not really present, at least not always, and then it quickly becomes very superficial." (I-5, 1985)

Especially a concern of the effect on intimacy is mentioned: in total, across all interviews, 12 of the parents directly mentioned screen technologies to either 'steal intimacy' or 'result in absence'.

Participants also mentioned different social consequences depending on which device was used. For example, the television was referred to as a social activity as opposed to the smartphone; five of the participants said they would gather around the television to spend qualitative time as a family (Daniel, Helen, Ivan, Karin, Nadia). Yet, several of the participants described this activity as being disrupted by the personal use of smartphones; one of them reflected on the past decades' changes and said: "when [my daughter] was younger we agreed on which movie to watch. Now everyone is sitting in their own corner of the couch, with their own phone, watching on their own screen" (Elliot).

Similar stories were shared by other participants; Karin described: "It's me and my husband's phones that interfere [with] our intimacy in relation to the children. If we get caught on the phone instead of being present with the children, that can be a challenge sometimes" (Karin). She shared a situation where, during family time, she wanted to share the moment on social media but instead the action ended up interrupting the social moment with her family:

> "I caught myself doing it yesterday when we watched [junior version of National Song Contest]. We were sitting on the couch, enjoying family time with all that goes with this, and watched television. But still, I just had to record my daughter's reaction, when the group she voted for made it to the next round, instead of just putting the damn phone away and enjoy the evening with her and the rest of the family. It's in situations like this I get conscious about it but still want to, yeah, record it and save the memory" (Karin)

The story illustrates a moment where the television facilitated family togetherness but the mother's use of the smartphone at the same time, disrupted this when she wanted to use social media to engage with people outside the home. In another example, Marc described a situation where he was playing with his child:

> "When you're sitting on the floor playing with the children, it can get a bit boring sometimes, so you just grab your phone. When you have run the toy car back and forth for the 20th time, then it just gets, well, a bit boring" (Marc)

In this example, Marc recounted intentionally interacting with the smartphone due to boredom, despite describing his actions as interrupting the play with his child. In both examples, the participants, after using the smartphone during family time, reflected on their actions and expressed a feeling of guilt.

Several of the participants presented the disruptions as being the cause of the blurring boundaries when having one device that is used for different activities; when a family used technology to relax or socialize, the practical and communication-related functions were still available, which could result in disruptions as other people were still able to, at least virtually, step into their home environment. For example, "We talk a lot about remembering to put it away. You're able to sit and play on the floor with your child while you also make the shopping list on your phone, but then it results in absence." (I-19, 1981) However, the experiences of especially participants who had children around the turn of the century, were that technology had provided fewer disruptions in earlier decades. This reminiscence contrasted the prevalence of the technology convergence that had colored the last decades and as such, the finding should be viewed with caution; the new communication technologies had not just brought something negative into family life. For example, some of the participants commented on the *increasing* intimacy related to easier communication when the children had a phone themselves. A participant described how technology could enable intimacy, "[my daughter] can text 'hey, I'm sad today' or 'I love you' or something like that, I couldn't do that with my mom in this way" (Nadia). The feeling of closeness was facilitated by the increased prevalence of digital screen technology.

4.3 Developing a Code of Conduct

4.3.1 Mediation of Limitations. Interestingly, 15 of the 20 pre-study interviewees and 12 of the participants said that they had a conscious and restrictive use of technology, and presented it to be an everyday topic of concern in their household. They strived for limitations of technology use, yet, they also expressed uncertainty about what it was that should be limited. This resulted in an emotional and doubtful process of mediation, among parents as well as within the whole family. An interviewee said: "We try to limit it as much as we can. Or not limit it, but just limit the stuff that is not good for anything or anyone. We just try to sort away the bad stuff and say no to things we don't want the children to use. We definitely have some guidelines that are sort of followed" (I-4, 1975). As a consequence of the worry about what should be limited or what is a 'good' use, three of the participants expressed an increased use of experts' knowledge (Lina, Nadia, Olivia). Olivia said it could be helpful to have recommendations from a governmental institution, although, Lina described the use of experts' advice as a challenge too, due to the continuous addition of new technologies:

> "But when you don't know the consequences, that's what makes it difficult to navigate. We have talked to some friends about it. [...] Because I feel that new devices are entering all the time, and I have to catch up on it. And because it is new for all of us. No one can say 'listen to me, I've tried this before, in my 50-year-old life, so you can just listen to me, grandkids'. It is new for all of us and no one has the experience. I know that someone is studying how it affects children, but we don't really know the truth yet, because no one has tried all of this before" (Lina).

The mediation process was mostly described as an ongoing negotiation between the parents which resulted in a code of conduct for the family members. Carla, who had kids around the turn of the century, commented on mediation as rules that just had to be tried out,

> "I think that after [screen] technology came into our world, suddenly someone had to set some boundaries. If I had kids today I would probably set boundaries. But we, like everyone else, had to figure out how much time it was healthy to spend on it, so it took some time before these limitations had to be there. We all circulated around in how it was supposed to be and what was right or wrong" (Carla)

Others presented the mediation of rules as a meeting where they agreed on which rules they wanted to set for them and the children. A participant described "When we had this talk, we sat down and started with ourselves. Because we wanted to think of ourselves as role models, so if this had to succeed, then we had to be the role models in this. Therefore, we started with rules we wanted to set for ourselves. We sat down and said, now we have to sit down and make some rules for how it is we want it to be with this screen. So we have taken a stand." (Lina). For this family, the talk was motivated by how they had experienced other people interacting with the screens in social gatherings; "We were to some events where I noticed how present these screens are. The children sat and glared down at their own screen and I thought, this is just slavery why didn't they play with each other." (Lina)

When presenting their code of conduct, the participants distinguished between different terms, e.g., rules, guidelines, regulations. Despite nearly all interviewees and participants arguing that they had principles of limiting the use of screen technology, only 5 of the interviewees and 7 of the participants said they had actual rules. An interviewee said that they had "mostly limitations. No regulations, but we try to limit it each of us. Especially due to intimacy." (I-17). This was supported by Ivan, who said he did not have any rules, yet, during the interview, he recognized to have principles of when his children were not allowed to use screens,

> "Though, if I have any rules, then it's if we go out to something they shouldn't sit with their phones. Because I think that's really annoying. If you're sitting with your mobile phones, you could just as well have stayed home, because you're not mentally present anyway. But you can also see this with adults, and I even have some friends too who are almost addicted to their smartphones, and they have to answer right away." (Ivan)

By some, rules were seen as a necessity despite they did not want to conduct a specific ruleset. However, the consequences of not having any rules of conduct for when technology use was not allowed, were experienced as worse than setting rules. One said, "You quickly become more absent [with mobile screens]. We don't want any guidelines, but it's worse when we're sitting with a phone each, as opposed to if we watch something together on television." (I-20, 1994)

The participants who became parents around the turn of the century argued rules to be an arising need as a consequence of the increasing presence of personal networked screens. They reminisced how it had been easy to manage how much time the children used on the computer or watching television, as it had a natural ending to the content. For example, "when the VHS was finished, they were satisfied" (Carla) and "[t]hey got satisfied with it" (Karin). Similar answers were seen with computer gaming where "they were satisfied when the game was over" (Gabriel). In this relation, another participant said,"if I turned off the game when I didn't want to play anymore, no one was sitting there waiting for me to keep playing." (Andrew). At this time, before multiple personal networked screens, screen technologies did not seem to need limitations and there was no recollection of mediated rules in terms of access, which was organically limited.

4.3.2 Restrictive mediation. Despite the participants' varied terminology when describing their code of conduct, several restrictive rules were mentioned, which we will present here. Restrictive measures covered principles of limitation in both content and access and varied from thoroughly defined rule-setting for different devices and applications, to code of conduct covering screen technologies in general.

Broadly, people explained different types of rules: Content rules and access rules. Content rules were restrictions in what type of app or media the children were allowed to play or download. 4 participants preferred their children to engage in 'educational apps', for example, they said:"the tablet, we've spent a little money on

it and bought some good games where there are some learning in it, both fun and educating" (Lina), and "it's more that it is not just used as a 'no-brainer' but hopefully also is a bit educational for the children to engage with" (Karin). The participant Marc distinguished the rules for 'non-educational apps', which was only allowed before 5 pm, and 'educational apps' which was allowed until 8 pm.

Access rules were represented in two subcategories, time and physical access. Many of the participants had time restricting rules for both their children and themselves on specific content or the device in general. All participants had different time preferences; Nadia for example, allowed her daughter to use the iPad for 30 minutes, where Marc made use of the technical built-in possibility on the tablet to set time limitations on all the apps, e.g. 2 hours on Netflix. Additional, he used the technical constraints on his own smartphone, to regulate his own use. Rules regarding the physical access to technology were, for example, which rooms the devices were allowed to be used in or where in the room they were allowed to use them. The participant Lina shared some of their rule settings in their home:

> "No smartphones are allowed in the bedroom and, for the future, not in the children's rooms either. The devices belong on the desk we have in the kitchen where we place them when the children are awake. Then we don't have it in our pockets where, if you get a message and it vibrates, it can interrupt. If it calls, you are allowed to answer and you can also text or something like that but you just have to stand at that desk. Then it's visible for the kids that when we stand over there it's because we're doing something with our phones. In the evening when the children are asleep we are allowed to bring it to the couch or something" (Lina).

Only one of the participants preferred co-use to watch over what content the child was engaging with, "We feel better if, when the children are using the iPad, we want to be close to them so we can see what they are watching because they want to use YouTube and search for a lot of different things there" (Karin).

An interviewee focused on the context of use and described their limitations as the following,

> "We have a lot of focus on limiting the children's use. Especially games. They only use tablets when we're on the go. Games we can register on them. Television is more like, it's fair enough to watch two times half an hour a day." (I-19, 1981)

Relating to the context 'on the go', one participant had rules outside the home; her daughter traveled by train every day, and they wanted her to look at the people around her and build narratives instead of looking down at her phone to enhance her creativity and imagination, "every day when she comes home, we make little games with 'today, there was a ...', so you can build such little stories around the people she meets, for example, '... a man, he is on his way to this place and he comes from there...' stories like that, so you can maintain your imagination." (Nadia)

Across the two parts of the study, we only found one parent who was self-declared 'screen-free': "Our children are screen-free. So they don't interact with any screens. They watch television, but otherwise not. It's just because we're scared of technology and don't know enough about it, I think. We have a few regulations, that are something you have to get started on at some point." (I-9, 1978) Interestingly, the interviewee distinguished between the mobile screen technologies and the non-portable, as the television, since she did not include this in her principle of being 'screen-free'. Additionally, the interviewee used social media, digital newspapers, etc., which indicated that the family was not opposed to communication technology, despite her saying that they were 'scared of technology'. Her comment on rules to be something they have to get started on at some point, reflects her declaration of being 'screen-free' to be a principle and not a rule.

Setting rules or principles were motivated by the aim of solving challenges related to the omnipresent access to screen technologies. However, the variation between different families' different rules of conduct, or, if participants' own principles did not fit into actual practices of their everyday life, also posed challenges. Lina, who had a well-defined ruleset for her children, experienced challenges when meeting with other families;

> "But I also think we take some conflicts. Then we have to go down and play with [our daughter]. If we have told her that she can only sit with the screen for 30 minutes and the other children are sitting with their phones or tablets, and there are no rules for them, and we say to her 'you can only use for this amount of time', well, then we must also bid in and be there for her if no other adults or children play with her." (Lina)

Similar challenges were the reason why Carla did not want to define specific rules and explained her belief and principles as the following: "I had the conviction, that if I couldn't find something that was more exciting then I couldn't say no to them. But that requires something of us. If I didn't have time, I couldn't say, 'now you're not allowed to watch that anymore'. Also, I don't like the parents who say that 'you must not sit with the iPad for more than half an hour'. If they are in the middle of a game, and sometimes a game may well be educating, and I feel like I can't say half an hour if it actually is a little more fun and educating to sit with this game, that could just as well be 40 minutes. I think one should be careful about setting limitations." (Carla)

4.4 Idealistic use of Technology

Several of the participants shared interesting thoughts on how they saw the idealistic or future use of technology to be; we now present some findings on this.

The increased individual use of technology was perceived to contribute to the experience of absence and some of the participants described a fear of the future role of technology: 9 of them hoped people will take a critical approach to technology use, and of these, 3 expressed hope for a completely offline future where people will abandon technology (Andrew, Helen, Lina). Andrew for example said: "It's not going to disappear, but it may be so, that one will choose to deselect something. That counterpoint will arise. That there will be someone who says that 'now we don't want to have anything to do with this.' Simply choose to deselect technologies" (Andrew). Yet, the majority of the participants still expected the

future to be infused by technology, digital technologies that are incorporated into the objects of the home and a natural part of everyday practices, what three of the participants described as a "robotized" future (Daniel, Karin, Nadia).

Two participants, Helen and Marc, expressed strong opinions that some companies design products with the purpose of making their users addicted to their products, for the companies' economic interests, "I would hope that they were not driven by making money. It probably won't happen but the games they develop, that they try to create an addiction, I don't think it's fair." (Marc) They saw some people as 'victims' of the way technologies are designed and argued for companies to take responsibility for the social consequences. Similarly, Bea mentioned that she hoped schools will take on greater responsibility to teach children how to treat each other on social media.

Two other participants expected the society to be divided into a reflective and non-reflective group (Helen, Lina), "I hope people will consider their approach to [technology]. And I think there is someone who will do it, but I also think there will be someone who will just get carried away. So, I hope people will take a stand so we will be able to control the technology and not let the technology control our lives." (Lina). This relates to the counterpoints that some of the other participants expected to arise: a society that will be divided into being either for or against technology.

5 DISCUSSION

Our study focused on parents' approach and experience of mediating code of conduct in relation to digital screen technologies; it provided insights into not only what rules parents have for a single device, but also how the increasing presence of screen technologies in the home environment influences parental mediation. Through inquiries into these practices among parents in nuclear families, our study highlighted mediation of technology rules to not be a simple choice of *when* to use them, but also where, how and in what context, with what content. We found that parents experienced both positive and negative outcomes of the increasing possibilities and wide availability of digital technologies, and they felt torn between how technology should ideally be used. Thereby mediation of rules and limitations became a continuous negotiation between parents and children. We discuss these factors in more detail.

5.1 To Use or Not to Use

The study confirmed the experience of different screen technologies to have become melted together and tightly intertwined with home life, leaving a family torn between where to be mentally present, as also provided out in previous research [21]. In our study, it was for example seen in the participants' statements of technology to interrupt social settings and steal intimacy. To explore these changes from a time perspective, we recruited different generations of parents. As the number of (personal) screen technologies in the home environment increased, especially during the past decade, we found parents' to experience an increasing need for developing a code of conduct and mediate rules and principles of how they wished the role of technology to take out in their home. The analysis showed parents' experience of mediation in the past decades has gone from a more simple approach of using or not using a screen technology (an on/off television analogy), to have become a complicated negotiation where non-use is not an option. Though, this might be a more simplified finding than what represents the whole truth. However, the participants reminisced the early years of the 21st century as simpler times where it was easier to turn off the technology.

Despite the parents who had children in the earlier decades did not remember setting time limiting rules, they still remembered a discussion of which consequences watching 'too much' television or computer gaming would have. We do therefore not argue the focus on children's use of screen technologies to be new, however, we found the multiple screen technologies, the melting together of content, and the ubiquitous access to this, to have increased focus on restrictive mediation regarding screen-use. The parents who had children around the turn of the century did not present a focus on rules back then, yet, they described this focus to be relevant today. Our study did therefore not indicate any correlation between the generation and today's focus on technology use, as the participants with older children still commented on their own, their children, in a few cases their grandchildren's, or other families' technology behavior. Naturally, the latest generation of parents had more defined rules as they, in present, lived as a nuclear family with parents, young children, multiple devices, and everyday family practices. However, the presented experience and attitudes towards parental mediation and limitations of use were expressed by all participants. Though, this finding should still be viewed with caution due to the limited number of participants and would require further research to conclude.

Building on previous research on the notion of television [3, 4, 26, 29, 32], we found that this particular category of screen technology still enables a social activity, as the participants described gathering the family around the television to watch together. While we did not focus on the context of watching television content as previous research [2, 30], we did find evidence that the social environment of TV-watching was challenged by the family members' simultaneous use of their personal device, similar to what Hess et al. and Holz et al. found [18, 20]. Additionally, we found the television to differentiate from other screen technologies in terms of mediation of rules. None of the participants or interviewees mentioned rules regarding television-watching on regular sets, yet they had rules about television-watching on the tablet, a device that essentially enabled the same content. For example, this was seen with the interviewee who claimed her children to be 'screen-free' despite them being allowed to watch television on the TV.

Including participants' experiences of the past decades' technological evolvement in the home, also invited a conversation about what the future might look like. It seemed that broadly, screen technology practices were frustrating and complicated for the participants to control. Similar to other studies highlighting how the families are aware that technology compromises their attention [19], our study also found an acute awareness of the control that the screen devices seemed to have over their home life. In some cases, the participants went as far as to contribute this lack of control and 'taking over', to the inherent design of the devices. They followed a common narrative in current media discussion, that the applications on our devices today are designed for continuous use, with a never-ending news stream and never-ending videos [23]. As such, they brushed their responsibility away and sometimes 'gave

up' on trying to control screens in the home through specific rules. Nonetheless, they described a romanticized notion of the role of technology when they talked about their hope for the future. This matches Blackwell et al.'s comment on the notion of the ideal family time to be a romanticized and unrealistic expectation which then differs from what is actually experienced by families [5].

5.2 Mediating Code of Conduct Within the Family

Prior work showed how the use of personal devices introduced challenges to expectations of constant connectivity, and overly-romanticized notions of family times [5]. We extend these arguments into the complex issue of parental mediation of screen technologies and argue that this becomes an emotional ongoing negotiation challenged by personal principles, internal family disagreements of what is 'right', as well as a perceived judgment from other parents. Mazmanian and Lanette commented on rule-setting to be assumed as a norm or goal in families, yet they found it to be more complex than just deciding on which rules to choose [28]. In comparison, our analysis showed that some of the parents perceived rules as a matter of course, if not for themselves then for other families. While the vast majority of our participants had the perception that there "needed" to be a set of rules present in relation to the screen technologies, they were also not very clear on exactly which rules they themselves enforced. They expressed having expectations to other families having *more* rules than themselves. When they did express specific principles, the parents surprisingly mostly enforced broad limitations, cutting off screens completely in relation to either a time or a setting ("no screens at the dinner table"). This contrasts findings from previous research that showed how clear limitations were easier to enforce by the children ("No snapchat allowed"), compared to contextual rules ("no phones at the dinner table") [19], however, just because the rules were found to be easier to enforce, does not necessarily mean they are more used.

Despite that all the parents expressed limitations of technology use to be an everyday topic of concern, the study illustrated different recounts of how the mediation of rules unfolds. Some explained this to be an activity where the family had a meeting and decided on their code of conduct, while others just made rules depending on day and context. This might be a reason for why some found it challenging to recite their code of conduct. Relating, we also found some parents to distinguish between rules and regulations. Where the majority of the parents said to have regulations of use, less than half said that they had hard fast rules. Additionally, we saw some parents who dissociated with rule-setting and made an active decision not to set any rules as they did not perceive themselves to operate that type of parental values.

Previous research has found that one of the possible consequences of rule-setting could for example be tensions between family members as well as the disobeying of rules when they did not fit into the home practices in a hectic everyday life [5, 7]. We found the same issues, however, presented from different perspectives. Some participants used these arguments as a reason for why they did *not* decide on specifically defined rules of conduct; they did not want to define rules that they knew they eventually would have to disobey and in this way compromise their own principles. Therefore, they did not see fixed rule-setting to be possible to enact in modern hectic family life.

While we in this study cannot say if the parents with defined rulesets actually follow these in everyday life, we still found their frustrations of not feeling in control, which is their reason behind their imposed rules, to be an indicating factor that it might be challenging to follow an actual set of rules. To make this easier, several of the participants make use of technical monitoring when they set time limitations on, e.g., the tablet, specific apps, their own smartphone. In contrast to the findings of Gosh et al. [14], we did not perceive this to be an aspect of controlling parenting, but instead it was an additional helpful tool for creating awareness of how much time the family engaged with screen technologies.

Based on the findings, we suggest the negotiation of a code of conduct to be a continuous type of mediation between the parents, which results in rules or regulations for the children and possibly the parents as well. The mediation is influenced by the parents' principles and possible internal disagreements, the society's and other parents' judgment, and the actual home practices in a hectic everyday life.

5.3 Implications for Design

While we do not consider the findings leading to specific design suggestions, our study yielded insights with implications for general design considerations in family and home contexts. We described different mediation strategies that occurred in the participants' household, and how this helped and challenged their use of screen technologies in the home. If they, in their words, should 'take a stand' to technology, this was often described as strong principles of 'all of nothing', something that did not fit into realistic everyday life. Taking this into account, we suggest the findings of parents' varied attitudes to technology use and approach to rules and constraints to imply the need for smooth and personalized 'non-use' settings. Where Bruun et al. explored 'non-use' from a provocative approach where one family member decided when the whole family had to stop their use [7], we suggest this to be further explored in a way where this can become an incorporated part of the screen technology. This does already exist on tablets and smartphones, for example, we found broad use of technical monitoring on tablets and smartphones, varying from time constraints on all applications to constraints in content or the device in general. However, parents' own principles do not necessarily fit the actual practices in the everyday life at home, whereas easily adjustable or dynamically changing settings, for example, depending on context can be helpful. Such settings could consider other factors than time at day, e.g. location. The challenge of obeying rules of conduct was illustrated in this study, as well as in previous research [19, 28]; for example, we found some parents to strive for complete non-use and going offline, despite this not being possible to do in real life, and we found parents with technical monitoring define broad limitations or override their own constraints. More complex, personal, or dynamic non-use settings can potentially support parents in their mediation of rules of conduct to provide limitations in situations where technology interrupts or 'steals' the intimacy, however without having to aim for complete non-use and still provide common convenient features.

6 LIMITATIONS

The findings of this study are solely based on parents' statements regarding their experience of mediation and practices, as observational work has not been a part of this study. We can therefore conclude on findings in regard to parents' experience and approach to mediation, however, we are not able to conclude if they actually realize the rules and code of conduct that they have set for themselves. It is therefore possible, that some of the statements presenting restrictive mediation are not followed in the everyday life.

We only inquired into practices in two-parent households, which meant that we heard about experiences of parent-to-parent negotiation, but we were not able to say anything about screen technology use or limitations in for example single-parent families, where negotiation likely looks different.

7 CONCLUSION

Investigating the emergent and current digital screen practices from a time perspective contributes to the understanding of the increasing presence of screen technologies and their impact on families' mediation around rules of conduct. In the context of our interview data, the analysis showed parents' aiming for limitations in technology use, and some even saw non-use as a romanticized goal, which in return led to an increased focus on restrictive mediation. While some parents embraced principles and rules by considering themselves to 'take a stand to technology', others dissociated from being parents with restrictive mediation by considering screen technologies a natural component of the home practices, albeit still having principles and regulations. Yet the multiple screens, the melting together of content, and the omnipresent convenient access led the parents' to doubt what content and in what context they should limit use. This we found left parents with frustrations around the continuous negotiation they have to do and a feeling of not being in control, something that could lead to challenges both internal and external the family home. Some parents with strong principles would come into conflict with parents who, for them were perceived as, non-reflective users of technology, and, maybe even more importantly, it could create tensions within the family as this romanticized notion of what the idealistic role of technology is, did not fit into their actual home practices. As such, we argue that the negotiation of the role and use of technology is a continuous mediation of using or not using technologies, impacted by personal principles internal the family and perceived external judgment from other parents. Our study contributes to a better understanding of screen technologies' role and effect in family home contexts; findings that imply factors that should be considered in future design of such technologies.

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