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Human-Computer Interaction Master's Thesis

Tracking Childhoods: Intergenerational Perspectives on Parent-Child Relationships and the Ethics of Digital Academic Monitoring

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1 Preface

The inspiration for this thesis stems from a series of personal observations, from moments spent with the youngest members of my family. Watching them grow up in a world so different from mine, where digital devices are always within reach, and communication with parents is just a tap away, made me reflect on the contrasts between their childhood and mine, but also on the contrasts between my childhood and my parents'. I started noticing the little things: how rarely they play outside without supervision, how quickly they turn to technology for answers, entertainment, or help, how their daily lives are sometimes shaped by the digital presence of their parents. What stood out to me the most, however, was that even though they are growing up in a world of limitless access to the Internet and connections with other people, they might be missing something: the urge to explore, to make mistakes and learn on their own, to test boundaries without the constant pressure of a GPS tracker or social media check-in. These differences led me to compare not only how their childhoods are unfolding, but also how this experience will affect their adulthood. How will their sense of autonomy evolve? Will they trust their own judgment as much? Will their understanding of privacy, independence, and even interpersonal relationships be shaped by growing up in an environment of digital surveillance? It was this desire to understand the long-term implications of modern, digital, constantly connected and monitored childhood, that led me to the topic of this thesis. I wanted to explore not just the differences in how generations grow up, but how those differences contribute to who they become. And so I began my journey of analyzing the influence of parental control in the modern age, and the ways in which it may affect the development, independence, and future adulthood of today's children.

2 Introduction

Childhood - the commencement of life and the era of firsts; the years of discovering yourself, your abilities, your skills; the time of learning about emotions, what you like and what you don't, what you love and what you hate, the difference between right and wrong; the realization that you are surrounded by a complex world and experiencing it for the very first time, with all its laws and rules and intricate questions; the time of building the most impactful connections of life, knowing your parents, relatives and making your first friends; a period of intense and continuous learning, full of surprises, mistakes, and lessons; a stage of limitless creation, stories, dreams, and aspirations; the power of potential.

Childhood is a blank canvas that each person paints in their own way, and so it is lived in billions of unique forms. However, specific experiences are shared among children and the generation in which a person grew up plays an important role in shaping these experiences. Those who grew up in the same period often share cultural, societal, and technological influences, which can reveal many insights into how they behave in the later stages of their lives, how they build connections, or simply how they view the world. One context that can be used to differentiate a generation from another is parent-child relationships, particularly regarding the levels of trust and control. When looking at people who grew up in the 1970s-1980s and comparing them to children today, we can observe how the changes in the parent-child dynamic over the years have influenced how they develop and form interpersonal relationships.

In the past, children generally enjoyed a higher level of freedom, engaging in plenty of activities that do not require technology, such as reading, solving puzzles, playing with dolls and cars, building castles from cubes, drawing, and many others, either by themselves or with their classmates, neighbors, and friends. They would also spend significantly more time outside, playing in the park, biking, running, playing sports and coming up with their own games using objects found in nature along with toys. Growing up this way, they developed a higher degree of independence, discovering their surroundings, limits, and dangers, while also meeting new people without the impact of technology. They would not have a map in their pocket to help them navigate around the city in case they got lost, they could not search the Internet about what to do in case they got hurt in a few seconds, or call an adult for assistance if they got in trouble, and they would simply befriend others without knowing their digital background beforehand, or caring about their virtual reputation.

But to achieve such a level of independence, a lot of trust was also needed from their parents, trust that they would come home safely, respect their curfew, not engage in dangerous or illegal activities, or discuss with strangers. This kind of agreements were necessary, because for parents back then, there were not many ways of keeping tabs on their children, other than meeting their friends and their parents beforehand,

so they would know who to look for and ask of their whereabouts, or looking out the window in case their children were playing in front of the house. Just like children could not rely on technology to help them whenever they needed it, parents could also not use it to track the activities of their children, their social interactions, location, or transactions.

Being a child today often means being constantly connected to the Internet, to friends, and especially to parents. The variety of devices and applications that aid these connections have pushed children to learn how to live surrounded by technology, how to use it for entertainment, socializing, fixing inconveniences, looking for help, or keeping in contact with their families. While many of the past safety issues no longer exist now, and parents can use technology to keep in contact with their children at all times, new risks have also appeared, not just related to online safety, but also to the way children react to this change in growing up with devices, and how they develop from the psychological and social points of view.

For parents today, the line between protection and control is a very fine one. Smartphones, GPS tracking and monitoring of social media activity offer them unprecedented access to the lives of their children, and this can provide a sense of reassurance and security in the parent-child dynamic, but how are the autonomy and trust affected by this? Do children still have the same sense of freedom, the same level of independence when it comes to problem-solving, the same desire to discover the world in an unbiased way? When does monitoring cross the line between safety and control? What are the risks arising from this way of growing up, and how can they be managed? Could digital surveillance affect the parent-child dynamic long-term? Or the children's development later in life negatively? Many questions stem from the simple desire of protecting children. And rightfully so, as technology is taking over many aspects of our lives and can become truly addicting.

Understanding the balance between overprotection and guidance and knowing its potential long-term effects are essential, as the choices we make in the present can affect how the future generations interact, perceive relationships, safety and privacy limits and concerns, as well as senses of freedom and independence. The aim of this paper is to analyze the impact of digital parental control on the long-term development of children, sense of independence, emotional growth, as well as relationships with their parents. To achieve this, the study will begin with an extensive literature review to establish the theoretical framework, followed by a mixed-methods approach including semi-structured interviews with participants four generations.The analysis will focus on the key themes emerging from the data, including children's perspectives, digital tracking practices, and parental approaches, as well as the tensions around the theoretical concepts of privacy, ethics, digital self-governance, and surveillance. By integrating qualitative insights with quantitative findings, this study aims to build a foundation for addressing the research questions, and for proposing a practical

framework for developing more ethical digital academic tracking systems. Ultimately, the thesis seeks to illustrate the delicate balance between parental protection and children's growing need for autonomy in an increasingly digital world.

3 Literature review

3.1 Privacy and ethics

3.1.1 Privacy

Privacy is one of the core principles behind the act of tracking children digitally, but also a double-edged blade. Why? Because this operation involves two parties, parents and children. While privacy can objectively be defined as "someone's right to keep their personal matters and relationships secret" or "the state of being alone", according to the English dictionary, in this context it tends to become a subjective agreement between each party's understanding. Generally, parents grasp the idea of privacy from a more experienced, protective, and maybe conservative perspective, while children might see it as a form of control, freedom management, or punishment, or they could simply struggle to understand the concept.

In the era of digital childhood, parents express various concerns about their children's online activity, such as who they interact with, stranger danger, exposure to inappropriate content, or the effects of sharing personal information online, not only on their safety, but also on their reputation (Domoff et al., 2020). From a safety point of view, these concerns are well-founded, as children may not always be aware of the harm they could inflict on themselves by not being careful with their digital footprint, and parents strive to protect them from any possible danger. However, the parents of this generation, namely the ones born in the 70s-80s, did not grow up with technology, so as good as their intentions might be, it is also important to take into account how well they understand the online world, where and how information can be shared and found, and what protection methods are best for their own children. Similarly to how the concept of privacy can be seen from two opposite perspectives, the Internet is also understood differently by the two generations, parents and children, hence the discrepancies between them. "Although adults express concern about the privacy implications of modern technology [...], they may be unaware of the many ways in which private information may be shared [...] and often find it easier just to ignore possible incursions on their privacy [...]." (Choe & Sodian, 2021) The unawareness of adults online can be seen in some of their careless behaviors, such as willingly allowing their purchasing decisions to be shared across platforms, signing privacy policies without thoroughly reading them before, or revealing personal information in order to obtain a discount, or reach a desired website. When asked, they clearly reported that privacy violations were wrong, but that did not mean they truly took the time to guard themselves in real-life scenarios (Choe & Sodian, 2021). Hence, "the privacy paradox" (Norberg et al., 2007), which explains the difficulty of parents trying to protect their children from online dangers, while they are unwilling to apply the same

rules themselves.

Tracking technologies were also not part of the childhoods of today's parents, and their struggle to fit these into their world and mold them with their ideals of trust, privacy, and good parenting has been studied (Gundelach & Sandvik, 2021). Naturally, rules differ from family to family, and change based on the age of their children. Some parents consider location tracking, for example, to be a temporary measure until their child grows old enough to need more privacy than surveillance. "If Rikke gets a phone in, for example, third grade, then I would probably set up tracking on the device, but when she gets 14, 15, 16 – I don't know exactly where to draw the line – then I will probably stop tracking her and say, "Okay, she also needs her privacy" (Gundelach & Sandvik, 2021). "So, it [i.e., being unable to track her daughter] will be challenging for me at least. I have become accustomed to knowing [through tracking] that everything is okay. But one should also have a private life." (Gundelach & Sandvik, 2021). Others set the norm to continuous location sharing regardless of age, but with the option to unshare whenever privacy is desired (Gundelach & Sandvik, 2021). Although these parents discuss about tracking their children's location with a positive attitude, explaining how this practice has helped them take care of their children and their homes better, they also mention that many rules and boundaries had to be established to avoid overstepping, and maintain trust and the socially accepted idea of a "good parent" (Gundelach & Sandvik, 2021). This highlights the idea that even though parents are theoretically the ones in control, it is not an easy role to adopt, as it comes along with self-control and social pressure. Social media, however, is a much more complex territory, and requires more careful parental tracking. While 85% of parents agree that monitoring children's social media usage is crucial for their safety, 67% think it is also more important than respecting their privacy (Lauricella et al., 2016). (Blum-Ross & Livingstone, 2020) This shows that not all parents are willing to take a step back and reflect on how monitoring makes their children feel when their safety is at play, but they are willing to overstep the privacy boundary in the name of protection.

Part of the reason why children are exposed to online danger is because they do not understand that disclosing personal information makes them more transparent (Mascheroni, 2017), and even more so when done unwittingly, it can make them become vulnerable to online victimization (Yang et al., 2023). But digital tracking can have plenty of other negative effects when looking aside from the outer threats and turning back to the parent-child relationship. It has been noted that surveillance can encourage the act of self-censorship in children (Nelson, 2019), can be seen as a challenge to privacy that prioritizes safety over personal boundaries (Nelson, 2019), can instill feelings of intrusion if children do not have a say in establishing monitoring rules (Siibak & Lammes, 2021), or even strengthening the idea of accepting "voyeuristic behaviour" (Gundelach & Sandvik, 2021) from parents. Some children

consider the classic location tracking to contradict their right to privacy and freedom of movement, and might leave their phone at home or give it to a friend to escape parental control in search for privacy or autonomy (Gundelach & Sandvik, 2021), while others find comfort and reassurance in knowing their parents could reach them at any time (Mascheroni, 2017). Of course, age is a very important factor in a child's understanding of privacy, but also in how they feel about being monitored. "In one of the few papers examining digital privacy concepts in young children, Gelman, Martinez, Davidson, and Noles (2018) studied children 4-10 years of age and found that they did not seem to treat digital tracking as a privacy concern." (Choe & Sodian, 2021) The way children grasp the idea of digital privacy might also be connected to their understanding of secrets. A 6-year old might think keeping a secret about a surprise party is very important, while a 16-year old might think keeping their home address a secret is crucial. It could also be tied to the concept of digital versus physical property (Choe & Sodian, 2021), as younger children might better understand why getting lost in a public space is dangerous in comparison to typing their parent's bank details into a game chat.

There is also the discussion of guidelines and rules that parents impose on their children and the privacy implications that come along. Some parents opt for certain applications, such as 1TopSpy that "secretly records and logs SMS messages, Call history, Contact list, Photo, Web visited history, Apps usage history; tracks GPS locations of the phone in real time and displays all recorded locations" (1TopSpy 2014) (Mascheroni, 2017), or Life360 that provides location-based services, including sharing and notifications, but where users can give their consent. Others will simply establish rules like not allowing children to share personal information with strangers and periodically checking their phones to see if they are obeying them, or they will demand full access to all of their passwords so they can freely check in whenever they feel the need to. Some important aspects to look at are the way children view and understand digital privacy, either depending on their ages, nationalities, or cultural backgrounds, their concerns about privacy violations and willingness to share private information online or with their parents, and whether their judgments of privacy are strictly related to digital monitoring, or are reflected in other developmental patterns that could stem from nondigital contexts.

3.1.2 Ethical concerns

The digital tracking of children has sparked a multitude of ethical debates, ranging from concerns about erosion of trust and privacy, moral pressure and power imbalance, to emotional and cognitive development risks, the ethical use of data, and even fear-driven technology. Although parents are often well-intended in their use of tracking technologies, and aim towards extending their care and responsibility over distance,

it should be noted that such technologies are not innocuous, and could easily lead parents to mistake control for care (Mascheroni, 2017). Some parents, for example, have found in tools like "Circle" an ally that enacts forms of restrictive, but morally informed, mediation, supporting a sense of respectful connection while maintaining parental guidance in both online and offline environments. (Blum-Ross & Livingstone, 2020). Others expressed a desire for "expressive empowerment", supporting children's media use while respecting their independence and privacy (Blum-Ross & Livingstone, 2020).

Excessive control can raise questions regarding the levels of trust and respect in the parent-child dynamic (Nelson, 2019), so one of the most important ethical responsibilities would be establishing a balance between parents ensuring their children are safe, and allowing them personal space. This exaggerated control from the parental side might stem from a place of fear, which can instill the idea of "stranger danger" (Mascheroni, 2017) in children when it is not the case, therefore hindering their ability to trust others, but also the quality of being seen as trustworthy. Tracking technologies might also interfere with other important qualities that a child needs to develop into a conscientious adult, such as autonomy and self-reliance (Mascheroni, 2017). With parents having access to numerous insights about their children, those applications have the potential to become "moralizing machines" (Mascheroni, 2017) that not only discipline children, but also restrict their development. There is also the debate about exposure to digital devices at an early age, with some parents believing digital literacy is necessary, while others fear cognitive and emotional growth might be affected (Domoff et al., 2020). In social work, child care and protection with the help of tracking technologies has been criticized for acting as a Trojan horse (Gundelach & Sandvik, 2021), showing a hidden desire to control and discipline, reinforcing a power imbalance between parents and children. Therefore, control might also arise from the parental need to feel in power.

Besides control versus care, another ethical concern is the idea of "over-proximity" (Mascheroni, 2017). Despite monitoring, control and involvement being natural tasks of parents, it has been argued that the use of digital tracking applications might create irrational anxiety or even wrong presuppositions about what being an involved parent means (Mascheroni, 2017), therefore violating the children's trust and overstepping. For instance, parents who are divorced could use those applications to check if their partner is doing their parental duties. It should also be noted, however, that a world full of cameras and sensors can only be problematic for respecting distance between each other. This over-involvement challenges the ethical space necessary for healthy relationships. In a Levinasian understanding, there must be a minimal distance between self and other in order to create meaning and a sincere ethical relation (Mascheroni, 2017), so a framework that would emphasize respecting the other's heterogeneity, autonomy, and privacy could help in understanding why some

distance is necessary.

Marketers do not hesitate to respond to the parents' fear, and continue developing devices and applications designed to protect, or control, children. However, the variety of options might foster even more anxiety in parents, as where there is supply, there is also demand. The overly-saturated media with dramatic stories related to predators, abductions, or pedophiles, is also magnifying the moral panic (Mascheroni, 2017). More concerns arise with the existence of tracking applications, such as quantified otherness, continuous connectivity, or algorithmic culture. "In the context of parenting practices, "caring" can take on a moral tone and be instrumentalized by marketers of surveillance technologies to sell their devices [...], or stigmatize the choice to not monitor one's child as an irresponsible attitude [...]." (Gundelach & Sandvik, 2021) Additionally, tracking technologies raise fascinating questions regarding logged data, as there are several known cases of selling it to third-parties (Mascheroni, 2017). For example, if a toy store receives information about a child approaching, based on GPS-tracking, marketers might send out personalized advertisements, and these practices may end up compromising the very rights they are meant to protect. While the purpose of digital surveillance is to ensure children's safety, it can actually put their privacy, protection at risk (Blum-Ross & Livingstone, 2020). An important discussion could address the potential of technological advancements to enable unethical marketing practices, specifically knowing minors are involved.

3.1.3 Consent

Oftentimes, parents express their concerns regarding the online privacy and safety of their children. They worry about the possibility of their children meeting and interacting with strangers, but also about how the content they decide to share online might affect their digital footprint in the future (Domoff et al., 2020). Their concerns are intensified by the pervasive nature of the Internet, which makes the likelihood of children being exposed to inappropriate content very high (Domoff et al., 2020). In response to this, many parents embrace restrictive digital practices, often deciding how, when and where their children can use devices. However, this raises important questions regarding children truly being given power in experimenting in the digital world (Domoff et al., 2020), and this lack of power poses a problem when parents express uncertainty regarding how to grant their children more digital autonomy (Domoff et al., 2020).

While these monitoring practices aim to protect, they can have unforeseen consequences on children's personal growth. Parental monitoring, even if it is well-intentioned, can hinder the development of self-reliance and independence, and this is especially true for children who identify themselves as "autonomous" and "privacy-sensitive". They express a stronger desire to be in control of their privacy and set

boundaries, and are concerned about their autonomy and their rights to consent (Siibak & Lammes, 2021). Often, children are not fully in control of the boundaries of monitoring, and in many households parental surveillance is one-sided while children view it as the norm (Nelson, 2019). There are cases where families engage in open discussions regarding this topic, allowing children to share their views, and even contribute to how they are being tracked (Nelson, 2019).

Including children in the defining process of boundaries and limits for parental monitoring aligns with the expanding scholarly emphasis on the importance of child agency in monitoring relationships. According to Stattin and Kerr, parental monitoring should be a reciprocal process, and the child's willingness to share information must be backed up by a sense of attachment to their parent (Mascheroni, 2017). Therefore, space for dialogue and negotiation must be made. Otherwise, if digital monitoring is enforced without discussion or consent, children may not accept this practice (Mascheroni, 2017). Moreover, by giving minors the ability to participate in surveillance practices, the feeling of being controlled is overpowered by the sense of agency (Mascheroni, 2017). This also requires accepting that the child would have an active role In choosing how they are being monitored and approached through digital devices.

The spectrum of monitoring practices is further illustrated by real world examples. In Denmark, a country known for its culture of supporting parenting, secretly tracking children is not considered appropriate (Gundelach & Sandvik, 2021). Applications like "Find My Friends" require consent from the user and also give users the option to stop sharing their location at any point (Gundelach & Sandvik, 2021). Additionally, Danish parents are of the opinion that tracking should be discussed and renegotiated continuously as the child grows (Gundelach & Sandvik, 2021). One parent suggests that imposing digital monitoring on a child without their consent is completely different from when they willingly share their whereabouts (Gundelach & Sandvik, 2021), and this distinction highlights how the nature and impact of digital surveillance is shaped by the act of giving consent.

There are also cases where the concept of "quantified otherness" is embraced, with individuals, oftentimes children, are tracked digitally without meaningful consent and are "reduced to data points" (Mascheroni, 2017). This type of digital monitoring raises substantial ethical questions, particularly when children are not aware they are being tracked, such as: "Do children have to give consent to be GPS-tracked?" or "How can such consent be meaningfully obtained, particularly from very young children?" (Lupton & Williamson, 2017).

The influence of parents also reaches beyond the home, and into educational settings. They have significant influence on technology related decisions at the school level, so parents should be meaningfully engaged in the planning and implementation processes of educational technology (Gleason, 2023). On the other hand, as scholars

have suggested, in academic and policy discussions the digital rights of children are only now beginning to be included (Gleason, 2023). This highlights the urgent need of educational institutions to recognize both the parental safety concerns, and the growing digital rights of children.

3.1.4 Autonomy

As children grow older, the tension between their growing need for autonomy and parental control increases. Parents oftentimes find themselves struggling to find the correct balance between allowing children the independence they need and setting boundaries, for example regarding device usage (Domoff et al., 2020). The struggle is intensified by how uncertain many parents feel regarding the guidance of their children through the digital world, they want to provide safety, but also allow them to explore independently (Domoff et al., 2020). The early period of adolescence is an important time for negotiation of autonomy, a time when both parties adjust their roles in the relationship (Yang et al., 2023).

In the context of parenting, autonomy refers to practices that support the independent efforts and decisions of children (Lee et al., 2015). Across psychological literature, this concept is recurring, highlighting that as they mature, children's need for independence also grows (LeMoyne & Buchanan, 2013). Parents who support autonomy allow their children to participate in problem-solving and encourage them to voice their opinions and show their perspectives, while also being involved in their lives (LeMoyne & Buchanan, 2013; Schiffrin et al., 2015). On the opposite end of the spectrum, parents who are controlling tend to suppress this need to self-express. Authoritative parenting, a practice that supports autonomy while also providing guidance, as well as the opposite of psychological control, has been found advantageous (Lee et al., 2015). This type of parenting includes "intentional communication" and "emotional attunement", which allow children to voice their thoughts, ideas, and opinions, while feeling encouraged and supported by their parents (Yang et al., 2023).

It has been found that when parents exert excessive (psychological) control, the child's ability to embrace "self-regulated learning" decreases (Lee et al., 2015), as psychological control obstructs autonomy, and in time, erodes self-motivation (Lee et al., 2015). On the other hand, autonomy support has been found to be a highly important factor not only in areas such as academic success, but also in healthy use of technology, and it encourages self-regulation and independent adaptation (Lee et al., 2015). As a result, parents have a higher chance to properly prepare their children for potential digital challenges by promoting initiative as opposed to imposing restrictions.

Parental control tools are generally created and used to protect children, but it has been shown that they might interfere with learning opportunities, or even affect the

parent-child relationship (Yang et al., 2023). For example, digital surveillance practices might lead to these negative consequences by impeding children to learn from experience and self-reflection (Nelson, 2019). Children are more likely to develop qualities such as resilience and self-control when control is replaced by trust. This is why it has been noted that many teenagers will actively resist digital surveillance practices by deleting their browser history, hiding their devices from their parents, or even go as far as providing false information, only to escape the feeling of control and maintain their sense of autonomy (Nelson, 2019). These behaviors have been thoroughly studied, especially among teenagers. More examples of resistance tactics are avoiding answering their phones, or lying about technical issues to avoid digital monitoring, therefore asserting more independence (Gundelach & Sandvik, 2021; Mascheroni, 2017).

Research further reveals that digital surveillance practices might also have an effect on how children or teenagers understand their social environment and might impair their sense of power (Gundelach & Sandvik, 2021; Mascheroni, 2017). Particularly GPS tracking has been shown to negatively affect children's freedom to explore their surroundings and develop "environmental literacy" (Gundelach & Sandvik, 2021), unlike today's parents generation, who grew up roaming around their hometowns accompanied by their friends, with no map or phones to help them when they got lost. There are some children who share their frustration regarding passive tracking, and prefer sharing location data on their own, only when they want to. This behavior suggests a desire for open communication and sets a mutual respect boundary (Gundelach & Sandvik, 2021). By analyzing these examples, a broader image can be painted, where excessive or nonconsensual digital surveillance might unintentionally foster a need for secrecy.

Applications like Circle, a parental control and screen time management software, are great examples for supporting the tensions in the parent-child dynamic. Even though they are framed as tools to enhance responsible parenting, such applications might promote restrictive forms of mediation that limit children's ability to express themselves online (Blum-Ross & Livingstone, 2020). Reviews of similar tools often encourage power dynamics that are asymmetrical, where the parents are the only ones making decisions and the perspectives of children are ignored (Blum-Ross & Livingstone, 2020). There are also parents who make use of these tools to encourage positive digital behaviors, so the extent to which children are affected, whether they feel empowered or disempowered, is based on the parental intention (Blum-Ross & Livingstone, 2020). Therefore, when the child is an active participant in the digital mediation process, as opposed to a "passive recipient", their autonomy is supported.

Despite concerns regarding autonomy, or lack thereof, it has been reported that not all children interpret digital monitoring as an invasive practice. Researchers suggest that a supportive relationship between the parent and the child will determine

children to view monitoring as an expected part of parenting, and they are more likely to accept it in their daily routine rather than to consider it a breach of their privacy (Gleason, 2023).

Finally, these issues are part of a broader discussion regarding children's rights. According to current EU jurisprudence, children are entitled to the right of privacy, as well as in participating in decisions that affect it (Lupton & Williamson, 2017). Future research could still evaluate parenting styles, digital monitoring tools and strategies, but also include the opinions of children, to ensure the findings regarding autonomy and control in the digital age are balanced (Blum-Ross & Livingstone, 2020).

3.2 Parenting styles

A significant area of study in the child development field is parenting styles. Diana Baumrind's foundational work, which was based on a comprehensive longitudinal study of children between the ages of 3 and 15, was concluded by the identification of three main parenting styles: permissive, authoritarian, and authoritative (Segrin et al., 2012). Parents who exhibit a permissive or nondirective style have a generally positive and accepting attitude towards their children, often engaging with them in logical reasoning behind parenting related decisions (Segrin et al., 2012). Permissive parents consider themselves a resource for their children and are not actively trying to control or change the behavior of their children (Segrin et al., 2012). On the opposite hand, authoritarian or directive parents set clear expectations for their children, they value obedience, order, and traditional structure (Segrin et al., 2012). This style of parenting does not typically involve negotiation or reasoning with children, but might involve force to achieve the desired objectives (Segrin et al., 2012). The last parenting style, authoritative, adopts a more balanced approach; parents avoid being overly restrictive, yet they are firm in holding their boundaries and expectations, while still leaving room for discussion in order to respect the children's personality and individuality (Segrin et al., 2012). In this type of dynamic, the parent is highly involved in shaping the behavior of the child, and the decisions are made on the basis of reasoning.

A concept that has been used to describe parents of college-aged young adults who are overly involved in their children's lives is the phenomenon of "helicopter parenting". This behavior often begins much earlier and continues into their adulthood, college and employment years (Segrin et al., 2012). Journalistic accounts suggest helicopter parents experience extreme separation anxiety when their children move away and are unable to detach from them. Instead, they compensate through "over-parenting" or "micromanaging" their children's lives (Segrin et al., 2012). Due to this persistent involvement, the child might struggle to make choices independently later in life, and concerns have been raised regarding their overall development and

autonomy.

Similarly to authoritarian parents, helicopter parents are also concerned with helping their children succeed in life, however, the latter type acts on this desire by doing the children's jobs, taking away the mental load, but also impeding their growth (Segrin et al., 2012). Additionally, the specific focus on academic success and competitiveness suggests that helicopter parents' motivation lies in securing advantages for their children's future, even if the cost is their independence. Reports on helicopter parenting include lower levels of overall well-being in children, higher chances of anxiety and/or depression medication usage, and internalized feeling of inadequacy stemming from lack of trust from parents (Segrin et al., 2012). High levels of parental control can hinder the development of healthy coping mechanisms by undermining children's confidence in their own abilities (Schiffrin et al., 2015).

With modern technology, parents' ability to monitor and manage their children's lives has amplified, and research has shown that ICTs have become enablers of helicopter parenting, by allowing extensive access into the lives of (pre)teens (Mascheroni, 2017). Hence, the culture of surveillance is also normalized. Tracking tools, such as Circle, have been associated with a form of parental control that discourages children from making mistakes, learning from them, and finding their own solutions to problems (Gundelach & Sandvik, 2021), by controlling their online activity, despite the intention of lowering risks (Blum-Ross & Livingstone, 2020).

In the context of media consumption, researchers have developed the "parental mediation theory", which was initially designed to address television consumption by children and included three main mediation strategies: restrictive, active, and co-viewing (Yang et al., 2023). Restrictive mediation involved setting rules and limitations for consumption of media, while active mediation revolved around discussing the consumed media with the child (Yang et al., 2023). Co-viewing, on the other hand, referred to engaging in media consumption together with the child. As technology evolved, these concepts were adapted to online media consumption, not only to the usage of television. In the online realm, restrictive and active mediation are applied similarly as in the past, while co-viewing has switched to digital monitoring (Yang et al., 2023). Through research, it is noted that the active mediation style results in lower levels of aggression and reduces online risks for children without limiting their access to content online (Yang et al., 2023).

Diving deeper into types of parental approaches in regard to digital monitoring, researchers reveal two distinct parental figures based on qualitative analysis, and associated with the abovementioned mediation styles and digital media ethics: the "anxiety-reducing restrictive caregiver" and the "reflexively enabling caregiver" (Blum-Ross & Livingstone, 2020). The first type showed more enthusiasm towards monitoring devices, viewing them as an "answer to prayers" and "a must in every house", explaining how their function is empowering parents to be in control of what

their children consume on the Internet (Blum-Ross & Livingstone, 2020). In this scenario, the concepts of online safety and correct amount of screen time play the role of a moral compass that justifies one's parenting tactics as good (Blum-Ross & Livingstone, 2020). The second type took a more critical stance towards monitoring devices, viewing them as restrictive (Blum-Ross & Livingstone, 2020). Their approach does not fully abandon the idea of restrictions, rather it ensures that the amount of inappropriate content the children are exposed to is minimized. Parental mediation strategies that encourage positive and constructive use of the Internet, as well as autonomous exploration, are used to define these limits (Blum-Ross & Livingstone, 2020).

However, handling online risks is a complex task, and anticipating them is not a straightforward process, considering risks and opportunities online are positively correlated (Blum-Ross & Livingstone, 2020). As a consequence, setting a limit on online exploration for children via restrictive mediation is associated with lower numbers of opportunities and lower skills, even if the exposure to online risks is minimized. This could also mean that children who are limited will be more vulnerable to harmful consequences when problematic online experiences whenever they do occur (Blum-Ross & Livingstone, 2020). Therefore, a tension in modern parenting emerges, with parental mediation styles varying from parent to parent. Many report having difficulties in setting the right boundaries, especially with technology being so integrated in our daily lives (Domoff et al., 2020). Moreover, some parents are aware of how important online freedom is for their children, but report struggling with the fear of online dangers that could also translate into offline dangers (Nelson, 2019).

Even with all the various types of parenting and mediation styles, the fundamental role of parents is broadly agreed upon; without a doubt, parental control and involvement are crucial for children's development and guidance towards adulthood (Mascheroni, 2017). As technology is evolving, so is the involvement of parents in their children's lives. With the option of constant connectedness, the following question arises: to what extent should parents be involved when there is distance? (Mascheroni, 2017) Several academics observe that safety devices and technologies that allow close monitoring with such ease and affordability enforce an intensive type of parenting, which might lead to problematic patterns in the future. Feelings of anxiousness and overprotectiveness in parents have led to a phenomenon called "bubble-wrapping children" (Malone, 2007) that also poses a risk of neglecting significant experiences children should or might have due to fear (Mascheroni, 2017).

Information and communication technologies (ICTs) nowadays facilitate surveillance in the parent-child dynamic and are in strong relation with the sense of care and responsibility parents have over their children. A significant concern is that such technologies might reinforce pre-existing parenting styles that are harmful, for example for parents that have a tendency to hover over their children and dictate their

actions, decisions and opinions (Mascheroni, 2017). Tracking applications might create a sense of "over-proximity", even when there is distance between the parent and the child, for instance when the child is at school or out with their friends. This leads parents to a deceiving state of mistaking control for care (Mascheroni, 2017), a tension that is recurring for parents who use digital tracking. One parent stated that even though there are benefits to tracking their child's location in terms of care and security, they feel as if the child's freedom is under harmful control (Gundelach & Sandvik, 2021). Another parent argued that GPS tracking is conflicting with their parenting styles, and they prefer asking for this information over the phone as opposed to checking it on an application; in this way, the child would not feel as if they do not have a voice (Gundelach & Sandvik, 2021).

Parenting attitudes are also shaped by cultural contexts. For example, the Nordic parenting culture is known for supporting the autonomy and independence of children (Gundelach & Sandvik, 2021). Another important factor in the digital tracking considerations is age. Tracking young children is seen as a "legitimate practice", while tracking a teenager is considered more problematic (Gundelach & Sandvik, 2021). Ultimately, what really outlines the negotiations regarding digital tracking are the common representations of what "good parenting" means at various stages of a child's development (Gundelach & Sandvik, 2021). Hence, tracking as a form of care is normalized in the context of younger children, while for older ones it is seen as a form of control. The precautions parents take to distance their practices from the controlling sphere can be interpreted as a method of fitting tacking technologies into certain parenting cultures. Aside from the digital realm, parental practices generally adapt over time. Via surveys and time-use diaries, research has suggested that a substantial proportion of parenting and involvement takes place during the early years of childhood, while in adolescence, parenting becomes more distant and is carried out more through phone communication (Gleason, 2023).

Cultural differences in parenting styles are more visible when analyzing control levels. For example, it has been known for a long time that Korean parenting puts a strong emphasis on control and academic achievement, which are seen as crucial duties (Lee et al., 2015). This kind of control is exerted over psychological and behavioral areas of children's development, including rules and regulations regarding monitoring their activities, guilt induction and love withdrawal (Lee et al., 2015). The concept of psychological control has been further refined by researchers into achievement-oriented, perceived by children as excessive demandingness, and dependency-oriented, seen as separation anxiety, possessiveness, and overprotection (Lee et al., 2015). Research indicates that these forms of control create a tendency to indulge more in mobile phone use (Lee et al., 2015).

Ultimately, the type and quality of control is more important than the amount. It has been demonstrated that parents who are autonomy supportive raise children

with better social and emotional adjustment, while parents who have a tendency to solve problems for their children lead to underdevelopment of confidence and competence in problem-solving situations (LeMoyne & Buchanan, 2013). Hence, providing independence and support proves to be more helpful in the long run.

3.3 Digital self-governance and surveillance

3.3.1 Contextual integrity

Helen Nissenbaum presents "contextual integrity" as an alternative reference point for privacy, aiming to respond to issues arising from modern information technologies. It connects privacy protection to norms of particular contexts and demands the collection and distribution of information to align with the specific expectations and rules of the given context (Swain, 1989). This framework is useful for analyzing these barriers in the context of digital monitoring of children. Here, the evolution of ICTs and fluctuating cultural expectations are impeding the definition of clear boundaries of information flow. Personal life, school life and online social life are constantly overlapping, challenging the limits of how and when personal data should be shared or accessed.

At the heart of contextual integrity is the principle that no area of life or category of information is exempt from the norms of information flow, and any kind of transaction or activity is shaped by the political, cultural, and social conventions of a given context (Swain, 1989). For example, when children engage with online learning environments or educational data management systems, the lines between academic life and family life become blurred (Gleason, 2023). As a result, parents might feel justified to extend their monitoring practices into this area, risking the privacy and autonomy of their child, and ignoring the contextual norms.

The concept of contextual integrity adds to political philosopher Michael Walzer's idea of "spheres of justice", suggesting that public surveillance can violate privacy rights by violating contextual integrity (Swain, 1989). This can also be applied to the private sphere, when parental monitoring ignores the contextual norms of a child's academic, social or emotional life, becoming a breach of justice. The intention of protection can easily become an expression of exaggerated control, more specifically if the child's right to self-expression and freedom are infringed (Choe & Sodian, 2021).

Helen Nissenbaum argues that the appropriate benchmark for privacy is contextual integrity (Swain, 1989). Therefore, in the parent-child dynamic and the context of digital monitoring, instead of putting the focus on safety concerns and technological advancements, an open discussion regarding boundaries should take place. Both parties should be aware of the information flow and reach an agreement regarding collection and distribution of data. For example, a child might agree to share their

location only if they can also see the location of their parents, or they might agree to share their phone passcode, but not their social media passwords.

Contextual integrity is defined by two types of informational norms: norms of appropriateness and norms of distribution. The first type determines what kind of information is appropriate to share in a certain context. For example, sharing health data is appropriate in a medical context. The second type determines how information should be distributed, by whom and under which circumstances. For instance, when sharing secrets in friendships, the default is confidentiality (Swain, 1989). When applying these norms to the parent-child dynamic, it may be considered inappropriate for parents to have access to their children's social media accounts, especially to their private conversations, and read them anytime they want without the child's consent. It may be the case that these conversations are not harmful or dangerous, but simple bonding between friends, or inside jokes.

If either of the two norms are infringed in a certain situation, then a privacy violation occurs (Swain, 1989). In an academic context where a Student Information System is in place, for instance, plenty of data and analytics regarding a child's performance at school are gathered in one place accessible online. This system might contain grades, assignments, schedules, comments from teachers and so on. If a parent demands access to all this information under the assumption that their child's academic performance is appropriate to review and with the intention of maintaining their child's motivation, it might violate the student's contextual expectation of privacy and autonomy. Therefore, feelings of stress and anxiety might be heightened (Siibak & Lammes, 2021).

Contextual integrity can also be prescriptive, offering guidance regarding the norms of information sharing being just or unjust, but might need additional explanations in technological contexts (Swain, 1989). This is especially relevant in the use of tracking technologies, which require constant evaluation to ensure legitimate functions of protection and avoid reinforcement of control. Moreover, as children age, balancing trust and protection becomes crucial in order to maintain their autonomy and privacy in their online identities (Nelson, 2019).

Tracking technologies can also blur the boundaries of various social contexts, creating imbalance in privacy expectations between parents and children (Siibak & Lammes, 2021). An example could be online peer interactions, that might be taken out of context and misinterpreted, resulting in overreactions and punishments. The child's trust in their parents could, therefore, be affected, as well as their understanding of freedom. Parents will often justify their digital monitoring as a necessity, comparing it to their own childhoods, when such safety measures did not exist (Nelson, 2019). While this contrast is understandable, it also shows that new technologies require updated ethical frameworks that take into account both the perspective of parents and children, respect children's rights, allow for open communication, and

are not based on fear.

3.3.2 Surveillance

In the context of parenting, surveillance practices are viewed as a double-edged sword, balancing care and control. Hence, the purpose of tracking children can stem from protective intentions, but also from a desire to control and discipline (Gundelach & Sandvik, 2021), making surveillance a complex act. Surveillance can either be seen as an "external force" imposed by parents, or, as some scholars have emphasized, monitoring or being monitored could be an interactive and even empowering experience, that fosters autonomy and enjoyment, as long as both parties have given their consent (Gundelach & Sandvik, 2021).

With the emergence of contemporary ICTs, surveillance has turned from a strictly top-down activity, where only one individual tracks the other, to "sousveillance", a practice in which individuals monitor themselves and each other, creating an open surveillance channel (Mascheroni, 2017). "Lateral surveillance", for example, is a type of monitoring used in the family context, where parents monitor their children's location, browsing history and social media use, but children are able to reciprocate the same level of surveillance (Nelson, 2019). Therefore, a reciprocal or lateral monitoring dynamic is created.

As they navigate the tension between care and control, parents often struggle defining the term "surveillance", and prefer expressing their activities as acts of love and care (Gundelach & Sandvik, 2021). To distinguish themselves from the controlling and abusive monitoring style, some parents might resort to "age-appropriate" or "occasional" tracking norms (Gundelach & Sandvik, 2021). GPS-tracking platforms, such as "Find My Friends", allow the parent-child dynamic to remain lateral by offering both parties the same features, and redefine the tracking activity as cooperative rather than authoritarian control (Gundelach & Sandvik, 2021). There are also exceptions to the monitoring norms, with some parents resisting the urge to use persistent tracking tools as they do not align with the familial values they promote. These parents prefer relying on phone calls to verify the location of their children, as they consider it "less invasive and more respectful" (Gundelach & Sandvik, 2021).

Sometimes, digital parental surveillance might only give the illusion of control, since children can disable or manipulate these programs (Mascheroni, 2017). They often resist surveillance and even challenge it, by turning off their location, leaving phones with other people or in safe locations, or even using technical difficulties as a cover (Gundelach & Sandvik, 2021). In these cases, their safety is not guaranteed. It is noted (Barron, 2014) that children and teenagers negotiate their autonomy and mobility in an attempt to assert control over their surveillance, by using their mobile phones and technical skills (Mascheroni, 2017).

Being surveilled shapes the way young people understand social contexts (Mascheroni, 2017) and as they grow, their comfort with digital tracking also evolves. Younger children are more likely to accept parents having access to their data, locations, messages and so on, while older ones typically prefer privacy paired with open communication (Yang et al., 2023). These dynamics extend to educational settings as well. In the United States, for example, online grading has become the main method of reporting the results and progress of students (Gleason, 2023). Student Information Systems (SISs), which are online learning environments and/or educational data management systems, keep track of attendance, grades, teacher feedback and comments, and much more (Gleason, 2023), and are also accessible to parents, providing them with information about the academic progress of their children. SISs have transformed digital parental monitoring into a more common practice, becoming part of their routine. An example would be Online Grading Books (OBGs) (Gleason, 2023) that give parents access to academic data in real time. An upside to these systems is that online parental involvement is now easier to analyze, but scholars describe it as an "epidemic" that should be studied urgently (Gleason, 2023). The transparency of SISs induce stress and tensions in the family, making scholars feel a constant sense of pressure.

Despite these findings, researchers suggest that a high level of digital parental monitoring in academic contexts correlates with better achievements from students (Gleason, 2023). It has also been discovered that SISs that allow parents access to their children's grades increase the time spent between the two, bringing emotional benefits along as well (Gleason, 2023). Yet, a question still remains to be answered: do digital academic tracking tools enhance or replace parental involvement on a personal level?

The "electronic umbilical cord" (Segrin et al., 2012) metaphor illustrates the need of modern parents to maintain almost constant awareness of their children's activities online, offline, as well as their whereabouts, using various methods, such as phone calls, text messages, social networks, location tracking and student information systems. Through this digital connection that has been established within the parent-child dynamic, a cultural expectation for constant supervision and availability is reflected.

3.3.3 Panopticon

Through his writings, philosopher Jeremy Bentham displayed the dual role of surveillance: a tool for control, but also for care (Mascheroni, 2017). He introduced the "theory of panoptical control", stating that "people will obey the prevailing rules and norms when they know they are being watched" (Swain, 1989). The theory was developed around 200 years ago, when Bentham designed a prison model called the

"Panopticon" (Swain, 1989), which involved a circular structure for the cells, similar to the Colosseum, and a watch tower in the middle that had a 360 degree view of the inmates in the cells. According to Bentham, this construction principle is applicable to any establishment in which "people are to be kept under inspection" (Mascheroni, 2017). His vision highlights the double role of surveillance: discipline or punishment, but also protection. In an academic context, for example in a school, the panoptic model could be used for eliminating distractions during study hours, such as excessive play and chatter (Mascheroni, 2017).

This concept received increased attention when Michel Foucault reinterpreted Bentham's panopticon as "a symbol of modern disciplinary societies" (Lupton & Williamson, 2017). The existence or even idea of an invisible observer creates internalized regulation and therefore, the ability to control a group of people is formed. The internalized regulation stems from the feeling of constantly being watched, because even if the observer is not always visible, or not permanently watching, there is always the chance of being seen. Thus, besides a method of institutional control, the panopticon also became a symbol of broad society command (Mascheroni, 2017).

Based on this theoretical foundation, contemporary forms of monitoring, including digital tracking of children, have formed. The "caring dataveillance" concept, for example, represents the modern equivalent of the panoptical control theory, where children are constantly being monitored by parents and are highly aware of this. Their behavior is, therefore, influenced by the permanent surveillance, potentially in a negative manner. Natural development, including mistakes, learning moments, or the ability to make decisions autonomously, could be obstructed (Siibak & Lammes, 2021). An environment of constant oversight creates implicit restrictions and hyperawareness (Domoff et al., 2020), and over time, children will internalize this "parental gaze", leading to self-censorship due to limited autonomy. Children who are given more independence, on the other hand, feel less pressure to conform and recognize how important trust is in the parent-child dynamic (Nelson, 2019).

Nonetheless, there are concerns regarding the complexities of contemporary, digital surveillance accurately being reflected by the traditional panoptic model. Several surveillance theorists argue that the rise of mobile technologies requires a more expansive theoretical framework (Lupton & Williamson, 2017). An example of such evolutions is the "liquid surveillance", a theory that acknowledges contemporary surveillance is mobile and sometimes imperceptible (Lupton & Williamson, 2017). A further development is the "panopticommodity" (Lyon, 2010), where surveillance is ingrained in common consumer technologies, that are marketed as convenient and empowering, but quietly implement control and visibility (Lupton & Williamson, 2017). In this case, surveillance becomes part of the daily routine, detaching from its disciplinary nature and disguising as "personalized" and "fun", but also pushing onto culture a narrative of freedom and flexibility, rather than control and restric-

tion (Lupton & Williamson, 2017). This perspective is also in alignment with the "banopticon" concept (Lupton & Williamson, 2017), which implies that monitoring technologies thrive wherever fear and mobility exist. As opposed to using confinement to establish control, new models capitalize on the tensions between safety and freedom, expanding the surveillance scope to both real-world and virtual environments (Lupton & Williamson, 2017).

3.4 Summary

Although extensive research on privacy, ethics, and digital surveillance exists, several significant gaps, concerning children's rights and the digital practices of parents, remain unaddressed. There is a limited understanding about how technology subtly reshapes the parent-child dynamic, often in ways parents do not fully grasp. There is also an insufficient exploration of children's perspective on digital privacy, including their perception of surveillance and data collection. This is intensified by the absence of extensive digital monitoring guidelines that take children's opinions and autonomy into account.

While digital tracking technologies are continuously advancing, little attention has been paid to how these tools might contribute to unethical marketing practices or violate children's rights. Moreover, current ICTs often overlook the importance of designing digital monitoring tools based on feedback from children, creating an imbalance between control and independence. The effects of "quantified otherness" on child development, but also on the parent-child relationship, also remain unexplored. A clearly defined ethical framework for digital monitoring in the context of a family is missing.

Given these gaps in literature, this thesis will focus on the implications of digital academic tracking tools, as well as social media platforms designed for communication in the academic context. It will explore their impact on children and the parent-child dynamic in the context of education.

4 Research questions

The literature review suggests the parent-child relationship is shaped according to the social, cultural, and technological environment in which it develops. Across generations, parents have used various methods of monitoring, guiding, and supporting their children, including face-to-face communications, establishing rules, and being involved in their education journey. However, the dynamic between the two parts has been influenced by the evolution of technology, more specifically by the integration of tracking tools, such as parental control applications and academic monitoring systems. Hence, the main research question is as follows:

RQ: How do digital tracking tools influence the parent-child relationship across generations, and how can this relationship contribute to designing more ethical tracking systems?

How these technologies are perceived varies from one generation to the other, each viewing them differently based on upbringing and cultural expectations. What may be considered protection in one family, could be seen as intrusiveness in another. Understanding this collection of perspectives is key to grasping how digital tracking tools influence parent-child relationships in practice. This leads to the first sub-question:

SQ1: How are these technologies perceived by different generations of children and parents in relation to their childhoods?

The parent-child relationship itself may provide useful insights for rethinking digital tracking in general. However, delving deeper into the academic area of children's education, the ways in which trust, autonomy and responsibilities are negotiated in their daily life could serve as a foundation for developing educational tracking systems that are more supportive and context-sensitive. This leads to the second sub-question:

SQ2: In what ways can the parent-child relationship serve as a foundation for rethinking digital academic tracking technologies?

Taken together, these questions aim to explore how digital tracking tools shape family relations across generations, and how the lessons from these dynamics might be translated into redesigning more ethical academic tracking systems.

5 Research methodology

This chapter outlines the research methodology framework adopted for exploring how digital tracking tools shape the parent-child dynamic across different generations, and how those insights could, in turn, be used to redesign more ethical academic tracking systems. The study focuses on the Eastern European region, as it provides a meaningful setting for analyzing the effect of digital tracking on family dynamics, given its unique social, cultural, and technological transitions over the last decades, offering a valuable perspective for analyzing generational differences in attitudes towards privacy and control. This focus was also guided by the practical accessibility of participants for the researcher. To capture a diversity of perspectives, four groups of three participants were formed, each representing a distinct generation, and a one-on-one interview was conducted with each participant.

Initially, the study design included a plan to conduct four focus groups, with the aim of encouraging discussions among participants of the same generation, and observing how they collectively negotiated their views. During a test run with one of the groups, however, several challenges emerged. The discussion exceeded the allotted 45 minutes, and some participants tended to agree with the others rather than providing a separate answer, suggesting that the group dynamics had a negative influence on the authenticity of individual contributions. In addition, the group setting appeared to make the participants hesitant in sharing personal or family-related experiences, particularly involving the topics of control and surveillance. These factors raised concerns regarding the reliability of the answers, as well as the potential depth of the insights.

Hence, individual interviews were chosen, as they allowed for deeper personal reflection and the freedom to share personal experiences and opinions without the influence of a group dynamic. Each interview lasted around 30 minutes and was conducted either in-person or via video conference, ensuring flexibility and accessibility. The conversations were based on a semi-structured style, allowing for consistency across interviews, but also the necessary openness for exploring individual experiences and points of view in depth. No supplementary materials were introduced to maintain the focus on the interpretations of the participants.

5.1 Participants

The study involved twelve participants, distributed evenly across four generational groups. The first group, with participants in their 20s, consisted of students/recent graduates who reflected on their childhood experiences with parental tracking, offering insights from the perspectives of children who experienced digital monitoring. The second group, with participants in their 30s, included young adults, who were able to

reflect both on the early stages of parenting with the help of digital tracking tools, but also on their own childhoods with limited to no digital tracking. The third group, with participants in their 40s, consisted of middle-aged adults, who also provided a dual perspective, talking about their childhoods without digital tracking, but also their current practices raising teenagers. Finally, the last group, with participants in their 50s, consisted of parents of older children, who mostly provided insights regarding their parenting practices in the pre-digital and early-digital eras, helpful for building a complete picture of the parent-child relationship evolution.

The participants were recruited via a combination of targeted and maximum variation sampling. The targeted sampling ensured all participants were at least familiar with digital tracking tools, while maximum variation sampling was used to establish variety in backgrounds and experiences. The sample included participants who grew up in both permissive and restrictive households, as well as those who identify as permissive or strict parents, participants who are parents of one or of multiple children, and participants who live in urban, as well as rural environments. The purpose of this approach was to ensure the collection of a broad range of perspectives, while also maintaining the primary focus of the study, the analysis of generational differences in perceptions of digital monitoring.

5.2 Data collection

In order to build a context around the perspective of the participants and support the analysis of the collected insights, several data points were collected. Age was recorded to correctly assign the participants to one of the generational groups. Parental status distinguished participants who are children from those who are parents. The number of children and/or siblings was recorded to explore how family size influences attitudes towards monitoring. The place of upbringing provided information regarding exposure to technology and comfort with using it. The family environment offered perspective on household practices that may have an effect on monitoring, with the aim of analyzing whether a stricter or a more relaxed upbringing influenced participants' attitudes towards digital tracking. The education level of each participant was used as an indicator of their critical reflection and awareness of privacy and ethical considerations, and digital literacy was analyzed to understand its potential effect on familiarity with digital tracking tools, as well as attitudes towards using them. These data points supported an extensive understanding of the participants and their attitude towards digital monitoring.

Through the semi-structured interviews, for which a full list of questions can be found in Appendix A, both quantitative and qualitative elements were collected. The quantitative data was obtained through Likert scale questions that provided measurable insights into the attitudes of the participants, enabling comparisons across

generational groups. The qualitative data was obtained through follow-up open-ended questions, tied to each Likert scale question, capturing rich narratives and personal experiences, and allowing participants to expand on their thoughts, ideas, and opinions without limitations. Together, these data points allowed for a comprehensive understanding of the participants and their perspectives on digital monitoring.

5.3 Data analysis

The qualitative analysis of the interview data followed a deductive thematic approach, initially structured around the key themes identified and explored in the literature review. The subchapters of this section constituted the main structure of the code framework, allowing the study to examine concepts already investigated in prior research. Therefore, the data was systematically organized while a clear link to the theoretical framework was maintained. As the coding progressed, additional themes emerged directly from the interviews, emphasizing concepts that were not fully anticipated in the initial code framework. This iterative process is characteristic to the deductive thematic analysis, and it combines guidance of already existing theory with openness to new insights emerging from the data. The final code framework, including main codes (themes) and subcodes (subthemes), was as follows:

- **Children's perspectives**
  - Children's behavior, Children's thoughts
- **Parent-child relationships**
- **Parental approaches**
  - Communication, Control, Freedom, Parenting styles, Safety, Support
- **Digital tracking practices**
  - Digital catalog (academic monitoring), Location tracking, Social media tracking, Tracking tools
- **Digital self-governance and surveillance**
  - Contextual integrity, Panopticon, Quantified self, Surveillance
- **Privacy and ethics**
  - Autonomy, Consent, Ethical concerns, Privacy

To support the qualitative analysis, the software NVIVO was used to manage the coding process and conduct a range of techniques. Text and matrix queries were used to explore code co-occurrence and relationships between themes, in a process similar to axial coding, providing a systematic overview of how different concepts intersected across generational groups. Word frequency analysis was conducted to identify notable terms and topics, which contributed to observing recurring concerns, patterns in language use and important phrases or ideas that might require further exploration. These steps ensured that the qualitative findings were systematically derived, with robustness and transparency, providing a solid foundation for the subsequent analysis.

The study also incorporated quantitative analysis, with Likert scale questions that allowed participants to rate statements on perceived usefulness, ease of use, attitudes, behavioral intentions, and external variables with regard to digital tracking, privacy and parental control. Their responses were analyzed using mean scores, and cross-group comparisons, providing a complementary perspective along the qualitative narratives. The quantitative analysis allowed for the identification of patterns across generations, parental roles and various levels of digital literacy, clarifying differences in parenting attitudes and practices around surveillance, monitoring and privacy.

It is important to note that while several demographic data points were collected to provide a rich context, not all of them were used in the final thematic or qualitative analyses. "Education level" and "Digital literacy" were excluded from the analysis across generations due to a lack of significant variation within the sample. The majority of the participants had a high level of education and digital proficiency. Additionally, "Area of upbringing", which was initially intended to correlate with exposure to technology, was also excluded, as it no longer provided a different analytical perspective.

The combined analysis approaches offered a complex understanding of how digital tracking tools influence the parent-child dynamic, emphasizing both shared and dissimilar experiences across generations and family contexts.

5.4 Methodology limitations

Despite efforts to ensure variety and accuracy in the study, several limitations of the methodology should be noted. First, the sample size was relatively small, with only twelve participants across four generational groups. While this allowed for an in-depth exploration of individual perspectives, it limited the generalizability of the findings to a broader population.

Second, the recruitment process included selecting participants who were already familiar with digital tracking tools, which may have introduced a biased perspective. This criterion was established to ensure the participants would be able to answer all

the questions. However, since individuals with little to no experience with tracking technologies were not represented, the scope of insights regarding technology adoptions or views on monitoring and privacy could potentially be narrowed.

Lastly, the study focused on a specific cultural and geographical context, the Eastern European region, offering meaningful insights into its particular social, cultural and technological transitions, but may limit transferability of findings to other regions and contexts.

Acknowledging these limitations is essential for positioning the findings within their appropriate context, and guides their interpretation. Further studies could also address these aspects by involving more diverse participant groups, using complementary research methods, and extending the investigation to other cultural and geographical contexts to enhance the validity and scope of the results.

6 Results

This chapter presents the empirical findings derived from the interviews, outlining the factual observations emerging from the data. It begins with a high-level overview of the main themes and their frequencies, before delving into an in-depth analysis of each theme, supported by qualitative and quantitative data. The findings are also supported by verbatim quotes from participants, and visual summaries.

6.1 Overview of themes

As outlined in the "Research methodology" chapter, the thematic analysis was structured around a code framework containing six main codes, and corresponding subcodes. Applying this framework across the entire participant pool revealed the frequency with which each of the themes was discussed, and which were the most notable topics. The findings are summarized in Table 1.

Main Thematic Code	Total Frequency (References)
Children's perspectives	112
Parent-child relationships	107
Parental approaches	350
Digital tracking practices	347
Digital self-governance and surveillance	101
Privacy and ethics	86

Table 1: Frequency of Main Thematic Codes Across All Interviews

The frequency analysis indicates that "Parental approaches", with 350 references, and "Digital tracking practices", with 347, are the central themes in the discussions with the participants. This suggests that the conversation around digital tracking is rooted in the "how" (the practices) and the "why" (the approaches) of parenting with technology. Themes like "Children's perspectives" and "Parent-child relationships", with 112 and 107 references, respectively, were also prominent, but only discussed about a third as often. An interesting takeout is that despite being a central academic concern, "Privacy and ethics" was the least frequently coded theme, with only 86 references. This implies that in the daily thinking of the participants, the practical and relational aspects of digital monitoring outweigh abstract ethical considerations in terms of importance.

To further illustrate how these main themes are connected to each other, Figure 1 presents a conceptual map of the most important code co-occurrences.

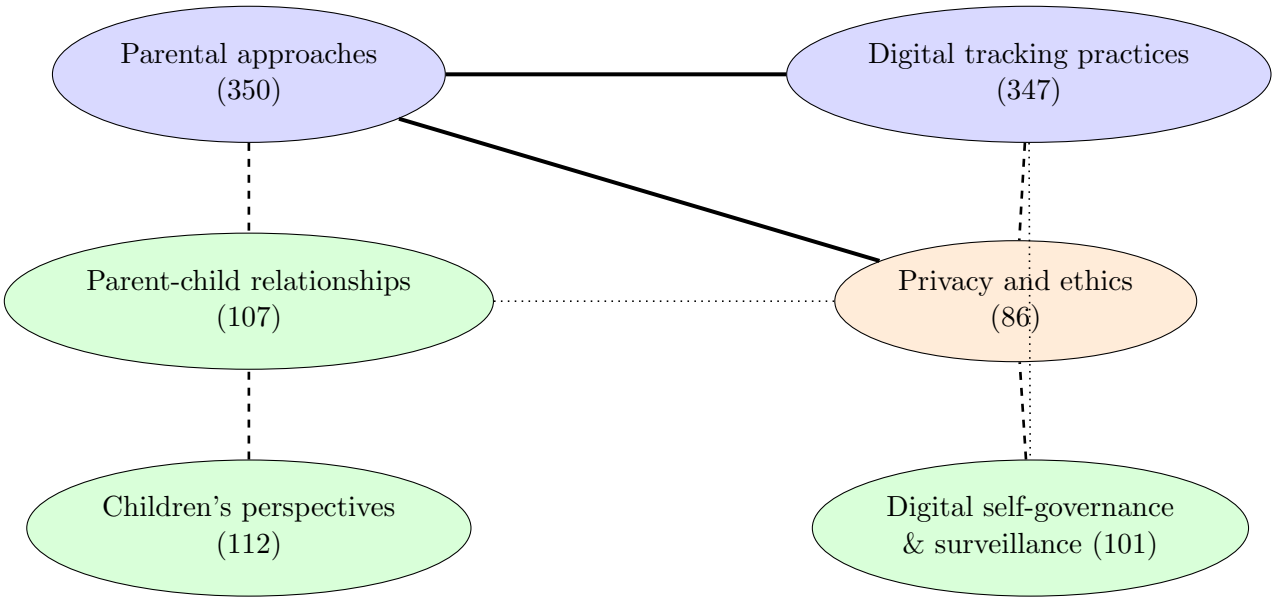

Figure 1: Conceptual Map of Main Code Co-occurrences and Frequencies. Node size reflects the total frequency of references, while line style indicates the strength of the co-occurrence relationship based on the coding matrix.

The connection strengths in Figure 1 are derived directly from the coding matrix, confirming that "Parental approaches" and "Digital tracking practices" are the central hubs of discussion. The graph reveals two very strong connections, one between the two central hubs, and one between "Parental approaches" and "Privacy and ethics", further confirming that the strategies adopted by parents are the primary source of ethical tensions explored in this study. Several strong co-occurrences link the core themes to the relational and experimental code, for example, the impact of "Parental approaches" on "Parent-child relationships". This visualization provides a roadmap for the upcoming thematic analysis, showing the primary connections that will be explored.

6.2 Conceptual lenses for analysis

Two conceptual lenses informed the organization of the results, guiding the way recurring patterns were grouped and described. The first lens is second-order cybernetics (Scott, 2004; von Foerster, 2003), understood as "the cybernetics of observing systems", the idea that observers are part of the systems they observe, making the act of observation subjective and self-referential. From this perspective, parental use of digital tracking tools cannot be treated as a neutral information gathering act, instead, a dynamic feedback system is formed, where parents, children, and digital tracking

tools are influencing each other. In some cases, the interview data revealed this recursive logic, where monitoring influenced behavior, and based on behavior, monitoring techniques were altered, and raised the ethical question, emphasized by von Foerster, the founder of second-order cybernetics, of whether such practices expand or constrain a child's possibilities for trust and autonomy. This perspective also aligns with contextual integrity, which affirms that privacy is preserved when the flow of information conforms to set social and contextual norms. In the observing system created by parental tracking using digital tools, the norms are co-constructed in the cases of some participants: the monitoring practices adopted by the parent shape how children behave, influencing the interpretations and decisions of the parent about what is appropriate to observe and monitor.

The second lens employs two tracking and privacy principles, as outlined in Helen Nissenbaum's work on contextual integrity (Nissenbaum, 2004), which are particularly relevant in the context of parental tracking via digital tools. In this case, the second principle, "Restricting Access to Intimate, Sensitive, or Confidential Information", refers to protecting data that meets the societal standards of sensitivity, such as children's location, private communication channels or academic records. The third principle, "Curtailing Intrusions into Spaces or Spheres Deemed Private or Personal ", could be translated to the idea that individuals have a right to access and control their personal environments, such as the home or other personal domains. These two principles offered a framework for capturing the tensions and patterns emerging in the interviews, such as which types of information were deemed sensitive, which spaces were considered off-limits in regard to monitoring, and who should hold authority in decision-making over data sharing and tracking.

6.3 Overview of collected data

The dataset consists of twelve participants distributed evenly across four generational groups (20s, 30s, 40s, 50s), and includes:

- Parental status: used to differentiate between children and parents, as well as between people who will only be discussing the child perspective or also the parent perspective
- Number of children: used to analyze if it affects perceived usefulness and attitudes towards raising children or if being raised in a bigger family has effects on tracking
- Area of upbringing (urban, rural, or mixed): intended to be used to analyze if it influences exposure to technology and comfort levels regarding technology, but eventually excluded as it no longer provided a different analytical perspective

- Family environment (relaxed, balanced, or strict): used to analyze if it affects perceived usefulness and attitudes towards raising children or if being raised in a stricter family has effects on tracking
- Education level (last school graduated): intended to be used to observe critical reflection, awareness of privacy and ethical considerations, but eventually excluded due to a lack of significant variation within the sample
- Level of digital literacy: intended to be used to observe the "ease of use" questions and to analyze if it has any effects on strictness, but eventually excluded due to a lack of significant variation within the sample

Each participant engaged in a semi-structured interview that combined Likert scale questions with follow-up open-ended questions, generating both qualitative narratives and quantitative measures for comparison. Table 2 provides a concise summary of participant characteristics.

Table 2: Summary of Participant Characteristics

Generation	Participants	Parental Status	Number of Children	Area of Upbringing	Family Environment	Education	Digital Literacy
20s	3	Child	0	Urban/Mixed	Relaxed/Balanced	Bachelor/Master	High
30s	3	Parent	1	Rural/Mixed	Balanced/Strict	Bachelor/Master/PhD	Medium–High
40s	3	Parent	1–2	Urban/Mixed	Balanced/Strict	Bachelor/Master	High
50s	3	Parent	2	Urban	Relaxed/Balanced/Strict	Vocational School/Bachelor	Medium

6.4 Qualitative analysis findings

This subchapter explores the qualitative findings from the interview in detail, and is divided into six sections, corresponding with the main codes from the code framework: "Children's perspectives", "Parent-child relationships", "Parental approaches", "Digital tracking practices", "Digital self-governance and surveillance", and "Privacy and ethics". Each section will provide an in-depth analysis of its respective theme, supported by matrix queries, co-occurrence analyses, and verbatim quotes, to illustrate the recurring patterns and generational differences that emerged from the data.

6.4.1 Children's perspectives

Theme overview: This section represents a descriptive layer of children's behaviors and thoughts, as described by parents or by children themselves, in relation to digital tracking, serving as contextual groundwork and illustrative support for the upcoming themes. The sub-code "Children's behavior" refers to observable actions, such as reactions to tracking, whether they hid things from parents, or negotiated rules, while the sub-code "Children's thoughts" encompasses internal perspectives, such as feelings about being tracked, or how they perceived notions like fairness and trust.

Children's behavior/Behavioral responses: Table 3 displays the frequency of references to children's behavior across generations, and reveals an evident peak in discussions related to this theme among the 30s and 40s age groups. This indicated that the participants who are in the phase of parenting young children and teenagers are highly preoccupied with observing and interpreting their children's reactions to digital tracking. The 30s group, representing parents of the youngest children, shows the highest frequency among the generations, with 23 mentions of behavior, suggesting that understanding this dynamic is a primary concern for new parents.

Theme/Subcode	20s Group	30s Group	40s Group	50s Group
Children's behavior	6	23	15	7

Table 3: Frequency of References to Children's Behavior Across Generations

This active concern is visible in their descriptions of current and anticipated behavioral changes. For instance, a parent from the 30s group anticipates future conflict based on the personality of their child:

> "It's possible with her attitude that we will face problems later. My daughter is quite explosive. And indeed, as I know her now, she may have comments." (P10, 30s)

Similarly, a parent in their 40s described an ongoing struggle with their older child's reaction to monitoring:

> "For the older one, it's more serious. Her private life is influenced by these, and she doesn't always react well to me checking in on her. She's disabling her location sometimes because she doesn't want me to know where she is." (P9, 40s)

In contrast, the lower frequency of mentions among the 20s and 50s groups indicates a more reflective attitude, where this behavioral response loses the central focus. This stance is visible in the testimony of a parent from the 50s group, who connects the absence of negative reactions to their parenting style:

> "I never put any pressure on them and they're not afraid. As my oldest one said, she has a girl in her class who cries because her mother threatens her when she gets a low grade. There was no such thing here. There were no problems either." (P6, 50s)

A co-occurrence analysis of the keywords (Communicate, Discuss, Hide, Talk) with the "Children's behavior" subcode in Table 4 reveals a clear and significant theme: concealment. The term "Hide" appears with the highest frequency (10 mentions), significantly outnumbering the keywords associated with dialogue combined (5 mentions in total). This pattern suggests that when participants describe the observable actions children take in response to digital tracking, the dominant behavior is one of secrecy and resistance.

Metric	**Communicate**	**Discuss**	**Hide**	**Talk**
Frequency within "Children's behavior"	2	1	10	2

Table 4: Frequency of Behavioral Keywords within the "Children's behavior" Subcode

The qualitative data provides a clear illustration of how secret surveillance can trigger this behavior with negative consequences for the parent-child relationship:

> "I know of a situation of some family friends where the monitoring, unfortunately, ruined the relationship between the parent and the child. But because the child was [...] 16, he felt that their parents were entering his life and effectively not allowing him any kind of privacy, and it was quite difficult to get over. [...] The child didn't know he was being monitored, and he skipped school, went to another city, and that's when he actually found out that he had been monitored for a year. Here, I think it's somehow, maybe, the shock, because you don't expect some things and you have the impression that they're your parents and that they're not hiding anything from you, and you wake up and realize that, no, things are different." (P12, 30s)

In contrast, actions representing communication and negotiation are mentioned less frequently. This shows a potential reality of the parent-child dynamic, where children respond to monitoring not through dialogue, but through hiding. This reactive dishonesty is a recognized pattern, as noted by another parent:

> "If you and the child are okay, they tell you everything they do and where they are. But in certain cases I think it helps, because many children lie to their parents." (P5, 30s)

A critical actionable insight for parents that can be extracted is that the transparency and method of digital monitoring have a direct influence on whether the child reacts with honesty or concealment. One parent framed this dynamic as an equation of trust and fear:

> "I also have a surveillance camera in the house, for example, and my child is not hiding from the camera. You don't hide if you have nothing to hide and if you're not afraid, but not afraid in the sense of necessarily being afraid, I mean of being scolded, of certain consequences." (P8, 40s)

Conclusions: The findings consistently indicate that the primary behavioral response to digital tracking is concealment, a reaction linked to the perception of monitoring as controlling and/or secretive. A child's observable actions, either resistance or honesty, are a direct reflection of the monitoring context, suggesting that the parental approach is a key factor in shaping these responses.

Children's thoughts/Cognitive responses: Table 5 displays the frequency of references to children's thoughts across generations, and reveals a pattern related to the life stage of the participants. The discussion about children's thoughts peaks for participants in their 30s, who are new parents of young children, with 28 mentions. This suggests that this generation is the most concerned with understanding the cognitive and emotional impact that digital tracking has on their children.

Metric	**20s Group**	**30s Group**	**40s Group**	**50s Group**
Frequency of "Children's thoughts"	7	28	16	10

Table 5: Frequency of References to "Children's thoughts" Across Generational Groups

This concern is often related to the child's age and their perceived acceptance of monitoring, as one parent from this group mentions:

> "At least at her age, because my daughter is still small, she is 7 years old. It doesn't bother her that we follow her. She knows she has the AirTag in the kindergarten, but for her, it is something normal, natural. So, probably the age and the needs associated with the age didn't create a pushback in this sense." (P10, 30s)

The 40s group, composed of parents of teenagers, also shows a high engagement with the topic, with 16 mentions of the theme, indicating that these concerns remain highly relevant during the negotiation stages of adolescence. Parents are preoccupied with the shift in thoughts during this period, as one of the participants explains:

> "I think it really depends a lot on the communication between the parent and the child. I think that from a certain age, as I was telling you, when

> the child enters adolescence and knows that you are constantly watching him, he certainly does not feel very comfortable." (P12, 30s)

In contrast, the theme is far less notable for the 20s group (7 mentions), who are reflecting on their experiences as children, a process explained by a participant from this generation, who reflected on their own thought evolution:

> "When I was smaller, I was feeling like I was being controlled, now I feel like it's better for parents to know where their children are." (P3, 20s)

A co-occurrence analysis of the keywords (Feel, Freedom, Control, Support, Trust) with the "Children's thoughts" subcode in Table 6 shows that the internal perspective of children is mainly framed in emotional terms. The keyword "Feel", which appears 15 times, dominates the discourse and indicates that the primary lens through which parents understand their children's experience is their direct emotional reaction to being tracked. The concept of "Control" is the second most frequent theme, with 5 mentions, suggesting it is an important driver of these feelings.

Metric	**Feel**	**Freedom**	**Control**	**Support**	**Trust**
Frequency within "Children's thoughts"	15	0	5	1	2

Table 6: Frequency of Thematic Keywords within the "Children's thoughts" Subcode

This connection between the control concept and a child's internal feelings was captured by one of the participants:

> "It can also be seen as control, and somehow for the child it's a challenge every day not to get a bad grade." (P11, 40s)

The positive concepts are almost entirely absent, with "Freedom" not being mentioned at all, and "Support" and "Trust" only twice and once, respectively. An actionable insight for parents is that the key to alleviating these negative feelings and promoting positive ones is proactive communication in combination with clear boundaries, as one participant advised:

> "But I think using some normal boundaries and where the parents don't give the child the impression that they're watching them every second, I think it helps." (P12, 30s)

With this kind of approach, the dynamic shifts from control to trust and support. A participant in their 50s explained how imposing the use of digital tracking tools without asking children for their consent triggers negative feelings, whereas involving them in the process fosters confidence:

> "From my point of view, the child would lose confidence or feel somehow negatively about using the tool if it were imposed on him, and he would have nothing, no say, and no possibility to, I don't know, disable the functionality." (P4, 50s)

This is reinforced by another participant, who explained how their consensual approach led to a lack of negative feelings:

> "We didn't feel any reluctance from them. We discussed why we wanted this [location tracking], they understood, and they agreed to give us access to their location. We didn't want to be intrusive." (P7, 50s)

In these successful cases, the child's thoughts are rewired from feeling controlled to feeling supported, which can ultimately benefit the relationship between the parent and the child:

> "I think they have strengthened it [their relationship], because my child observes that I care about her." (P11, 40s)

Conclusions: The findings reveal that children's internal perspectives on digital tracking are primarily framed by their emotional reactions, particularly by the feeling of being controlled. This perception, which only intensifies during the teenage years, can be turned into a sense of trust and support if parents prioritize their children's consent, open dialogue, but also clear boundaries.

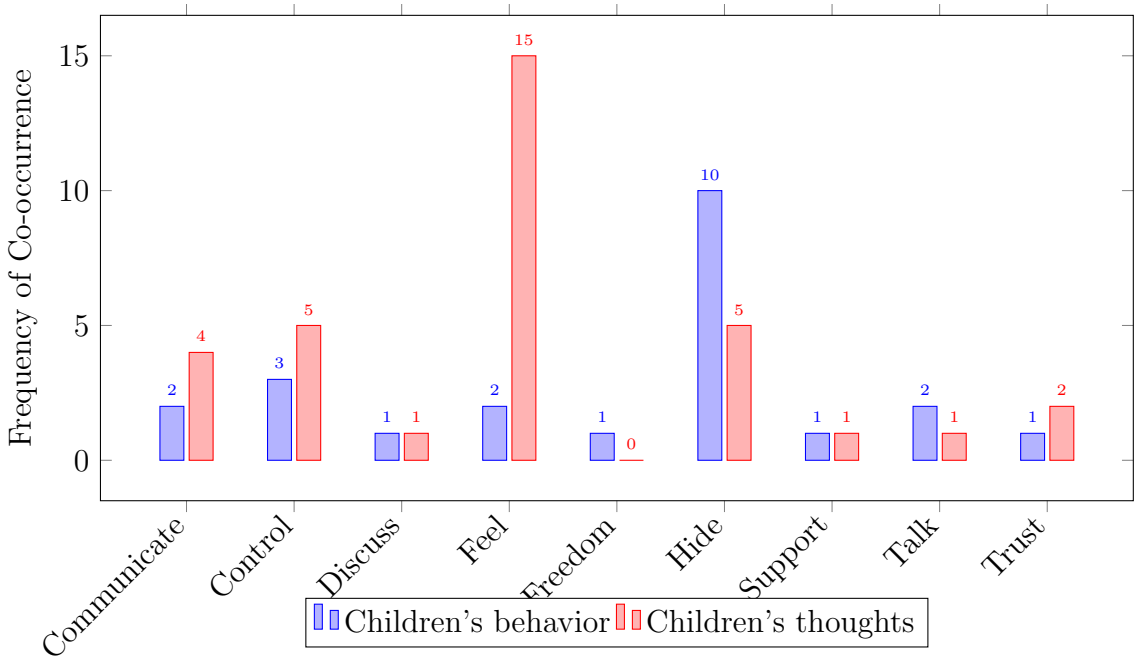

Figure 2: Comparison of Keyword Frequencies within "Children's behavior" and "Children's thoughts".

After analyzing both "Children's behavior" and "Children's thoughts", Figure 2 depicts a visual comparison of keyword frequencies between the two subthemes of "Children's perspectives".

6.4.2 Parent-child relationship

Theme overview: This section explores how digital tracking practices affect the relationship between the parent and the child, particularly the areas of trust, communication, and emotional connection. This theme encapsulates the overall parent-child bond, and, unlike other main themes, it is not composed of any subcodes, as it has been consistently framed by participants as a stand-alone concept. The analysis reveals how monitoring can be perceived as either beneficial or harmful to this relationship, depending on parental approach and context. The findings are presented through a combination of generational frequency data, co-occurrence queries revealing intersections of themes, and a word frequency analysis showing the primary concepts associated by participants with this theme.

Figure 3 provides a visual summary of the core vocabulary of this theme. Beyond the expected primary terms, such as "child" or "parents", the distinction of cognitive verbs like "know" and "think" highlights that the parent-child relationship is

understood by participants primarily through the lens of perception, awareness, and mutual understanding.

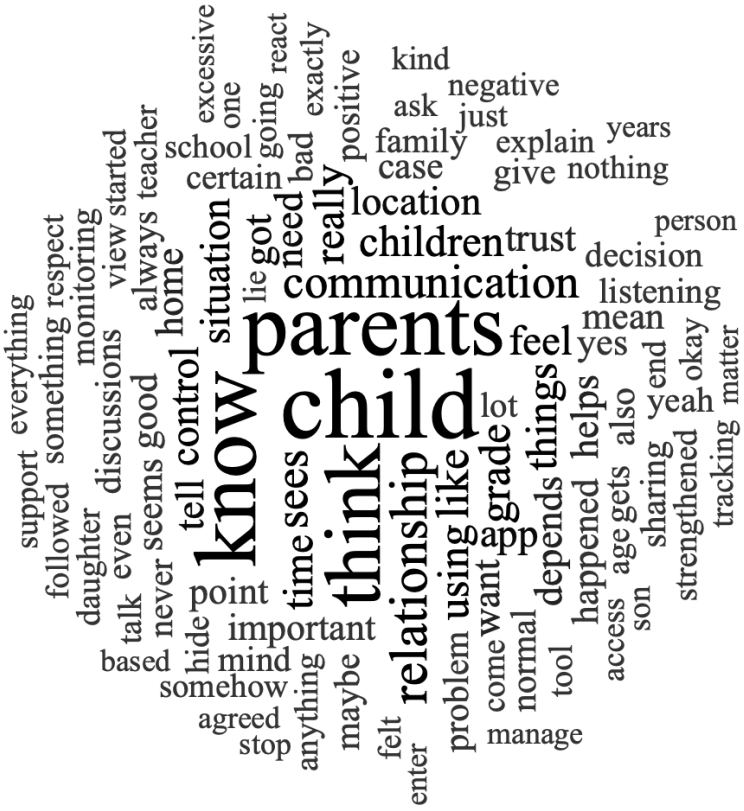

Figure 3: Word Cloud of the Most Frequent Terms in the "Parent-child relationship" Theme.

Table 7 shows that the "Parent-child relationship" is a consistently notable theme across parental generations (the 30s, 40s, and 50s groups), with the highest frequency occurring in the 30s group (31 mentions). This suggests that new parents are the most interested in how tracking technologies might shape the foundation of their relationship with their children.

Theme	**20s Group**	**30s Group**	**40s Group**	**50s Group**
Parent-child relationship	23	31	25	28

Table 7: Frequency of References to "Parent-child relationship" Across Generations

This active consideration of the relational impact is shown by one of the parents who puts an emphasis on how the tracking is framed:

> "My daughter, for example, knows that she has an AirTag there, I explained it to her. It's important for the parents to know where you are, to know that you're safe, or to know that you're with a teacher. For us, it's a form of peace and safety, to know you well. It depends on how you convey this idea of tracking, how you explain it." (P10, 30s)

In the 20s group, on the other hand, there is not as much consistency in how these practices are perceived. One of the participants explained that digital monitoring actually had a positive impact on their relationship with their parents:

> "My relationship with my parents was strengthened by using a tracking app. [...] I started being more truthful to them." (P1, 20s)

The 50s group also linked digital tracking to positive outcomes while reflecting on long-term outcomes, particularly to building trust and confidence over time:

> "They simply never ever closed this app, even though it would be very easy for them. So, my confidence grew, and I realized that I can always trust my kids." (P6, 50s)

The co-occurrence analysis from Table 8 shows the most influential factors on the parent-child relationship according to participants. The theme co-occurs most frequently with "Parenting styles" (50 references) and "Communication" (47 references), but has a weak connection with "Control" (7 references).

Theme	**Communication**	**Control**	**Freedom**	**Safety**	**Support**	**Parenting styles**
Parent-child relationship	47	7	12	8	6	50

Table 8: Co-occurrences between "Parent-child relationship" and "Parental approaches"

This pattern suggests that participants consider the overall parenting type and the quality of dialogue to determine the health of the relationship, as opposed to specific acts of control. The low connection with "Control" indicates that participants do not link healthy parent-child relationships with controlling behavior, on the contrary, they view such actions as potentially harmful for the relationship, as one of the parents warns:

> "It's tempting for the parent, of course, because you're in a position of strength, so to speak, and then you ask the child for the password, you go in and look and that's it. But it seems to me that, I don't know, you're stepping into the child's life and positioning yourself in a very high position with respect to them, which could be quite a rift." (P12, 30s)

From here, a crucial actionable insight for parents can be extracted: maintain a positive relationship, focusing on open dialogue and collaboration rather than unilateral control. This idea was captured by one participant who prioritizes working together with their child over exerting authority:

> "I believe in communication and working together with the child to decide what is considered allowed and what not, or what are the limits, rather than an excessive control with which the child does not agree, and which, in the end, doesn't really help the parent either." (P7, 50s)

Table 9 shows that in the co-occurrence analysis between "Parent-child relationship" and "Children's perspectives", there are more intersections with "Children's thoughts" (30 mentions), than with "Children's behavior" (20 mentions).

Theme	**Children's behavior**	**Children's thoughts**
Parent-child relationship	20	30

Table 9: Co-occurrences between "Parent-child relationship" and "Children's perspectives"

This suggests that participants perceive the impact on the relationship as being more connected to the child's internal state, including their feelings and doubts, than to their observable actions, so managing the relationship is about managing the child's cognitive and emotional experiences. A participant from the 20s group explains this idea:

> "I think the benefits, at least from parents' point of view, are greater than the disadvantages, especially felt by the child. Like, if you maybe sit down and explain to your kids why this is important for their safety or just peace of mind in general, I think you can get rid of most of those doubts that children might have about their freedom." (P2, 20s)

The word frequency analysis in Table 10 displays a linguisting map of the theme. The predominance of "child", "parent", "parents", and "relationship" is expected, however, the high frequency of cognitive verbs, such as "know", with 38 mentions, or "think", with 35 mentions is meaningful. It reinforces the previous finding that the parent-child relationship is strongly connected to knowledge, understanding, and perception.

Word	Count	Weighted Percentage (%)
child	52	3.89
know	38	2.84
think	35	2.62
parents	23	1.72
parent	22	1.65
relationship	19	1.42
like	13	0.97
children	12	0.90
really	12	0.90
grade	11	0.82
see	11	0.82
time	11	0.82
communication	10	0.75
got	10	0.75
app	9	0.67

Table 10: Top 15 most frequently used words in the "Parent-child relationship" theme

The danger of incomplete knowledge or misunderstandings was explained by one of the parents:

> "Negatively, it happened only once when I listened to him talking and I misunderstood something. Because, yeah, I listened for a little while and hung up, and I misunderstood something. [...] And later he calmed me down and explained the situation to me when I had misunderstood some things." (P8, 40s)

Conclusions: The findings show that the quality of the parent-child relationship is not determined by the act of digital monitoring itself, but by the manner in which it is implemented and used. A healthy relationship is consistently linked to open bidirectional communication, a consensual approach, and a parenting style that values trust over control. Whenever these elements are not present, there is a risk that digital tracking might cause emotional rifts, ultimately damaging the relationship, instead of protecting it.

6.4.3 Parental approaches

Theme overview: This section presents a descriptive summary of parental approaches, specifically how they manage and interact with their children in the context

of digital tracking. The analysis is structured around the subcodes "Communication", "Control/Freedom", "Parenting styles", and "Safety/Support", reflecting the range of strategies used by parents. Some of the subcodes have been combined as they represent conflicts of interest.

The data in Table 11 provides an overview of these strategies, showing the frequency of reference of each subcode within the "Parental approaches" theme. The numbers show that "Parenting styles" is the most referenced concept, with 140 mentions, which indicates that participants conceptualize their monitoring behaviors not as individual actions, but as components of their overall parenting philosophy. "Communication", with 69 mentions, and "Safety", with 61, are also highly significant, while "Control", "Freedom", and "Support" are discussed less frequently, suggesting they are viewed as specific components within the broader approaches. Figure 4 visually illustrates the composition of the theme.

Theme	**Communication**	**Control**	**Freedom**	**Parenting styles**	**Safety**	**Support**
Parental approaches	69	37	28	140	61	15

Table 11: Co-occurrences between "Parental approaches" and its Subthemes

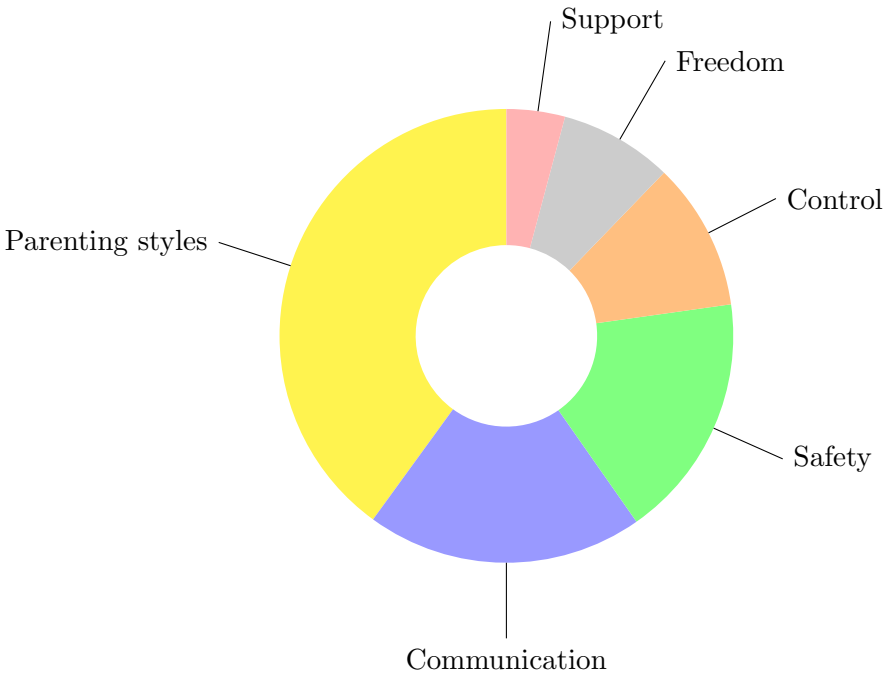

Figure 4: Proportional distribution of "Parental approaches" subthemes by frequency.

Communication: The data in Table 12 shows that for the parental generations, communication is a key approach, especially for the 30s group, where it has been mentioned 22 times, and for the 50s group, where it has been mentioned 26 times.

Subtheme	**20s Group**	**30s Group**	**40s Group**	**50s Group**
Communication	8	22	13	26

Table 12: Frequency of References to the "Communication" Subtheme

The keyword analysis in Table 13 reveals a shift in the nature of the communication across generations. The 30s group, consisting of new parents, is more focused on the general act of "Communicating" (13 mentions), while the 40s groups puts more emphasis on "Talk" (10 mentions), and the 50s towards "Discuss" (4 mentions) and "Consent" (2 mentions). This suggests an evolution from a one-way communication style from the parent to the child, to two-way discussions based on engagement and consent from the child.

Keyword	**20s Group**	**30s Group**	**40s Group**	**50s Group**
Communicate	4	13	5	2
Discuss	1	1	3	4
Talk	1	1	10	3
Consent	0	1	0	2

Table 13: Frequency of Communication-Related Keywords Across Generations

An actionable insight from the older, more experienced parents, is the importance of including the child in the conversation, as one participant explains:

> "The child should have something to say regardless of their age." (P6, 50s)

This principle of collaborative communication is seen as the most effective way to implement tracking while avoiding conflict. Another participant also showed their support of this approach:

> "I believe in communication and working together with the child to decide what is considered allowed and what not... rather than an excessive control with which the child does not agree, and which, in the end, doesn't really help the parent either." (P7, 50s)

Conclusions: Communication is a primary approach adopted by parents, but the way it unfolds depends on the age of the child. The findings indicate a progression from general communication to more specific acts of talking or discussing, and finally to including the consent of the child. The key insight is that a dialogue-based approach that involves collaboration is consistently viewed as more effective and ultimately, beneficial to the parent-child relationship, as opposed to the unilateral approach.

Control/Freedom: Table 14 depicts the primary conflict of the study, the tension between control and freedom. The interviewed children, the participants of the 20s group, "Freedom" and "Control" are the most frequently discussed themes, with 14 and 12 mentions, respectively. For the parental generations, the focus on "Freedom" decreases dramatically, while "Control" remains a consistent concern, until the 50s, where it drops significantly.

Subtheme	**20s Group**	**30s Group**	**40s Group**	**50s Group**
Control	12	11	11	3
Freedom	14	3	4	7

Table 14: Frequency of References to "Control" and "Freedom" Subthemes

The numbers suggest that the tension between freedom and control is mostly felt by the ones who are monitored. As one participant from the 20s group explained, the feeling of control depends on the attitude of the parent:

> "It really depends on what type of parent you are, because if you're a child, and you're afraid to tell your parents what grade you got... then it's going to be controlling because they know everything about you." (P3, 20s)

Parents, on the other hand, often view the balance between control and freedom as a developmental process, that changes according to the child's age and maturity levels:

> "The younger the child is, the harder it is for him to take responsibility... Whereas as he grows up, he should have a greater degree of discernment to decide for himself." (P7, 50s)

A critical insight for parents is the importance of setting clear boundaries while avoiding excessive control, which can be seen by children as a violation of privacy:

> "Morally, as a parent, I think monitoring has to have some limits. You can't film him in his room... I think this is already a violation of any free will, any right of the child." (P11, 40s)

A practical solution for mediating this tension is to design systems that allow children some agency, which can gradually build trust:

> "From my point of view, if the person using it, the child in this case, has the ability to deactivate it whenever they want. For me, this can build the trust between parent and child." (P4, 50s)

Conclusions: The tension between control and freedom is a defining feature of a child's experience with digital tracking, while parents view it as a necessity, and tend to adjust it in time. The findings suggest that parents who establish clear limits on monitoring and allow children a degree of agency have the highest chances of building a relationship with their children that is based on trust, and eliminating the feeling of being overly controlled.

Parenting styles: As shown in Table 15, the "Parenting styles" theme is most present among the 30s group, with 52 mentions, suggesting that new parents are reflecting on their parenting philosophy and still defining it.

Subtheme	**20s Group**	**30s Group**	**40s Group**	**50s Group**
Parenting styles	17	52	33	38

Table 15: Frequency of References to the "Parenting styles" Subtheme

The co-occurrence data in Table 16 shows that the parenting philosophy is most frequently associated with the concept of "Rule" (12 mentions), which indicates that for many participants, parenting is defined by structure and boundaries.

Theme	**Decision**	**Responsible**	**Rule**	**Trust**
Parenting styles	6	5	12	4

Table 16: Co-occurrence of "Parenting styles" with Related Keywords

One of the parents captured this perspective by describing their approach as a mix of freedom and guidelines:

> "Strict, but within a normal limit, let's say, in which they offered the child the freedom... but also with the strictness, of course, of respecting some rules." (P12, 30s)

Another participant described this as a balanced approach, emphasizing the necessity of rules:

> "Somewhere in the middle. I think I would call it balanced. I mean, there are times when I act strict, because I don't think we can function without rules." (P10, 30s)

The following tables, Table 17 and Table 18, show that parenting styles are also dependent on family context.

Subtheme	**0 Children**	**1 Child**	**2+ Children**
Control	12	18	7
Freedom	14	7	7
Safety	18	31	12
Support	1	1	13

Table 17: Influence of Family Size on the Language of Parental Approaches

Table 17 reveals that parents with one child are highly focused on "Safety" (31 mentions) and "Control" (18 mentions), and in contrast, parents with two children mention "Support" significantly more often, suggesting a potential shift in approach as family size increases.

Subtheme	**From Relaxed Environment**	**From Strict Environment**	**From Balanced Environment**
Control	3	10	24
Freedom	3	5	20
Safety	9	15	37
Support	2	1	12

Table 18: Influence of Family Environment on the Language of Parental Approaches

Table 18 indicates a strong correlation between the parenting style of the participants, as described by them, and their actual approach. Those who consider themselves "Strict" put more emphasis on "Control" and "Safety", while those who describe themselves as "Balanced" discuss all concepts more frequently, suggesting a more complex approach.

Conclusions: "Parenting styles" is a central topic, especially for new parents, and is frequently defined by a framework of rules. The various parenting styles are influenced by contextual factors, such as family size and family environment.

Safety/Support: The data in Table 19 illustrates a clear evolution in the priorities of the parents. "Safety" is a dominant and consistent concern for parents in their 30s and 40, but also for the 20s group, while the "Support" theme is almost absent for the younger groups, but becomes more significant for the 40s and 50s groups. This suggests a shift from a protective mindset while the child is young, to a supportive one when the child is closer to becoming an adult.

Subtheme	**20s Group**	**30s Group**	**40s Group**	**50s Group**
Safety	18	17	17	9
Support	1	0	9	5

Table 19: Frequency of References to "Safety" and "Support" Subthemes

The co-occurrence data in Table 20 reinforces this difference, showing that "Safety" and "Support" are treated almost entirely as separate concepts, with very little overlap in the keywords associated with them.

Theme	**Check**	**Safety**	**Support**
Safety	2	14	0
Support	2	0	9

Table 20: Co-occurrence of "Safety" and "Support" with Related Keywords

This separation is pinpointed by parents who frame their actions as supportive, rather than controlling:

> "For me, it's about support, it's not about power. I don't show my power through this app." (P9, 40s)

One of the participants provided a concrete example of what support looks like in practice, differentiating it from plain monitoring:

> " [...] for school strictly for help with homework and structure. Because at any moment you know that he has to learn, so you can help him." (P9, 40s)

Oftentimes, using tracking for safety has a deeper purpose, that of enabling independence within a secure context, not to restrict it. This insight was shared by a parent who saw the location tracking application as a tool for granting "controlled freedom":

> "This app allowed me to give him the freedom to grow, to explore... to give him independence, but still in a somewhat safe and controlled way." (P8, 40s)

A key actionable insight is that the tool itself is less important, and the way it is used matters the most. A non-intrusive approach is essential in making a digital tracking tool feel helpful:

> "Find My, I would recommend it, because it seems to me that it is not very intrusive, and if you don't use it compulsively... it can really help you." (P7, 50s)

Conclusions: Safety is the primary driver in parents of younger children, while parents of older children tend to adopt a support-based strategy. The findings suggest that parents differentiate between the two, safety meaning using tracking tools to provide a secure foundation for independence, and support meaning offering help structure, especially in the academic context, both approaches being dependent on a non-instrusive way of using.

6.4.4 Digital tracking practices

Theme overview: This section illustrates how parents monitor and track their children with the use of digital tools, within academic, social, and geographical contexts. The co-occurrence data in Table 21 provides an overview of these practices by showing how frequently each one of them appears within the main theme, and revealing that "Tracking tools" as a general idea is the most frequently discussed concept, with 149 mentions. Specific practices such as "Location tracking", with 98 mentions, and "Digital catalog", with 90 mentions, also stand out, indicating that these are the primary methods of tracking used by participants. In contrast, "Social media tracking" is only mentioned 10 times, showing that it is either a less common or a more sensitive practice.

Theme	Digital catalog	Location tracking	Social media tracking	Tracking tools
Digital tracking practices	90	98	10	149

Table 21: Co-occurrences between "Digital tracking practices" and its Subthemes

Figure 5 illustrates the distribution of digital tracking practices across generations, which will be further examined by practice type in the subsequent sections.

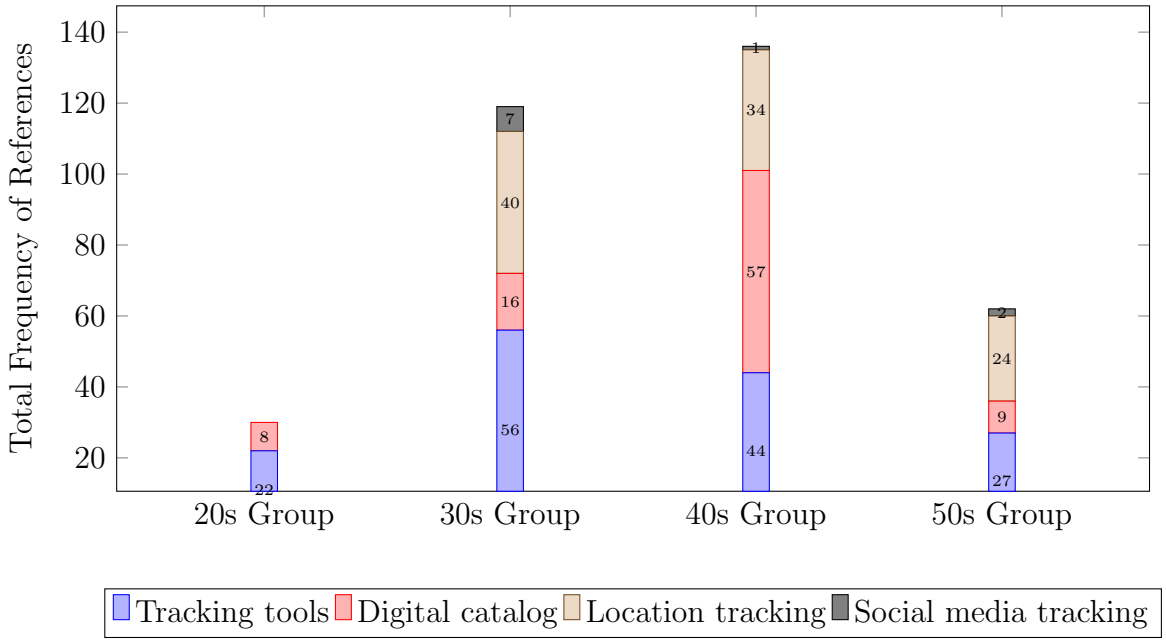

Figure 5: Distribution of "Digital tracking practices" Subthemes Across Generations.

The keyword analysis in Table 22 reveals a generational shift in the language used to describe those practices. The 20s group frequently uses verbs such as "Track" (10 mentions) and nouns like "Location" (18 mentions), while the parents from the 30s and 40s groups make more use of verbs such as "Monitor" (25 mentions in total) and nouns like "Application" (45 mentions in total) or "Phone" (30 mentions in total). The difference in vocabulary depicts a change of perspective, from being monitored to monitoring.

Keyword	20s Group	30s Group	40s Group	50s Group
Application	4	10	35	10
Check	2	2	5	1
Location	18	13	5	5
Monitor	0	13	12	6
Phone	0	14	16	4
Social media	0	0	2	4
Track	10	9	1	0
Watch	1	10	2	1

Table 22: Co-occurrences between "Digital tracking practices" and Related Keywords Across Generations

The data in Table 23 depicts the different motivations behind each type of tracking. "Location tracking" is heavily associated with "Safety" (32 references), confirming this is almost its only purpose from the parental perspective. In contrast, "Digital catalog" is linked with "Support" (11 references), reinforcing the idea that parents use it as a tool for academic help. "Social media tracking" is the only practice with a significant connection to "Control" (6 references), suggesting its invasive nature. "Tracking tools" are most frequently discussed in the context of "Parenting styles" (46 references) and "Communication" (24 references), indicating they are viewed as a large component of the overall parenting strategies requiring dialogue.

Parental Approach	Digital catalog	Location tracking	Social media tracking	Tracking tools
Communication	7	12	0	24
Control	9	3	6	13
Freedom	1	5	0	4
Parenting styles	13	30	5	46
Support	11	1	0	1
Safety	1	32	0	19

Table 23: Co-occurrences between "Parental approaches" and "Digital tracking practices" Subthemes

Digital catalog (academic tracking): Table 24 shows that the "Digital catalog" is mostly concerning parents in their 40s (57 references), whose children are (pre)teenagers in middle or high school.

Subtheme	20s Group	30s Group	40s Group	50s Group
Digital catalog	8	16	57	9

Table 24: Frequency of References to "Digital catalog" Across Generations

For this group, academic tracking is not seen primarily as an act of control, rather a tool for involvement in their education and responsible parenting. This perspective is expressed by a participant from this group:

> "Although it may sound like control, I think it's an extraordinarily useful tool, to keep in touch with your child, and to somehow make the parent responsible... and involve him in everything the educational process." (P8, 40s)

Parents of younger children share this view, and frame academic tracking as a means of awareness rather than control:

> "I don't see it as control necessarily. I see it as a way to show exactly what's going on. To be aware, actually. Because you don't control anything, actually. You're just aware of what's already happened." (P12, 30s)

Conclusions: The digital catalog is seen by parents as a tool for awareness of and involvement in their children's education, more than it is seen as a tool for control. The tool is mostly relevant to parents of teenagers, who use it to stay informed about their academic progress.

Location tracking: As seen in Table 25, "Location tracking" is a practice almost exclusively discussed by the parental generations, with the highest frequency among the 30s and 40s groups.

Subtheme	20s Group	30s Group	40s Group	50s Group
Location tracking	7	40	34	24

Table 25: Frequency of References to "Location tracking" Across Generations

Parents primarily frame it as a practical tool for guidance and safety, especially in high risk situations, where the child might be lost or in danger:

> "My son, he's a little disoriented, and he happens to get lost a lot... I look and find him somewhere on the map. And then I immediately call him and I redirect him." (P8, 40s)

However, there is some awareness that location tracking can become problematic once children get older. An actionable insight for parents is to acknowledge that the perception of this practice changes with age, and what is seen as helpful for a young child can be seen as stressful or annoying for a teenager:

> "Maybe when they enter adolescence, I think this need to follow the parent becomes a bit annoying and then the child feels followed, feels stressed, and it may not be such good communication anymore..." (P12, 30s)

Conclusions: Location tracking is an essential practice for parents, and is mainly justified as a practical tool for safety, however, there is a clear understanding that its level of appropriateness depends on the age of the child, and there is a possibility that it could impact the relationship between the parent and the child negatively.

Social media tracking: Table 26 confirms that "Social media tracking" is the most sensitive and least discussed topic, with very few mentions across the generational groups.

Subtheme	**20s Group**	**30s Group**	**40s Group**	**50s Group**
Social media tracking	0	7	1	2

Table 26: Frequency of References to "Social media tracking" Across Generations

Participants consider this form of monitoring as highly intrusive, and potentially damaging to a child's normal development and sense of trust. One participants expressed their concerns regarding social media tracking:

> "I think you can't really grow up normally, right? And become a healthy adult if someone is constantly controlling you. I mean, knowing every message on your phone is being read by someone." (P12, 30s)

An actionable insight is that a strong parent-child relationship might not necessitate social media monitoring, as parents who trust their children do not feel the need to engage in this kind of tracking, but instead support their children in making their own decisions regarding information shared online:

> "It was always her decision what she posts, so here I never intervened. With the relationship we had, and we have, I have never felt the need for this kind of control." (P7, 50s)

Conclusions: Social media tracking is seen as a highly invasive kind of monitoring, with the potential to harm the parent-child relationship, as well as the normal development of the child. The findings suggest that this practice is largely avoided, especially in families who have already built a foundation of trust.

Tracking tools: As seen in Table 27, "Tracking tools" as a general category is a frequent topic of conversation across all generations, especially for the 30s and 40s groups. A significant insight emerging from the interviews is that the tool itself is less important than the way it is used.

Subtheme	**20s Group**	**30s Group**	**40s Group**	**50s Group**
Tracking tools	22	56	44	27

Table 27: Frequency of References to "Tracking tools" Across Generations

Participants consistently support the idea that these rules should be adapted to the age of the child and their level of maturity:

> "It's one thing to track a 5-year-old and another is a 14-year-old, 16-year-old and so on. Clearly, they should be different." (P12, 30s)

There are, however, limits to this adaptability, and some parents have set boundaries regarding the usage of these tools. For example, one participant argued against the idea of allowing a child to disable their location sharing, considering it a logical function for the application to be effective:

> "I wouldn't negotiate that... if you tell me you're in one place, and you... turn off my monitoring for four hours, what good does it do me...? I mean, I don't see any logic in it." (P12, 30s)

Conclusions: Tracking tools are central to the discussions, with a consensus that their usage should be age-appropriate. While negotiation is often taken into consideration, parents may set firm boundaries regarding the important features of tracking applications to ensure their primary function. Therefore, a tension between the need for control and the desire for flexibility arises.

6.4.5 Digital self-governance and surveillance

Theme overview: This section explores how digital self-governance and surveillance are perceived and experienced within the parent-child dynamic, with a focus on how families negotiate boundaries and visibility in digital spaces.

The data in the co-occurrence Table 28 provides an overview of references to each of the subconcepts of this theme, "Contextual integrity", "Panopticon", and "Surveillance", in relation to the theme, and reveals that "Surveillance" is the predominant topic, with 64 mentions. The theoretical concepts of "Panopticon" (23 mentions) and "Contextual integrity" (14 mentions) are also discussed, but much less frequently.

Theme	Contextual integrity	Panopticon	Surveillance
Digital self-governance and surveillance	14	23	64

Table 28: Co-occurrences between "Digital self-governance and surveillance" and its Subthemes

In relation with other themes, Table 29 shows that "Surveillance" and "Panopticon" are highly associated with feelings of "Control", with 19 and 15 mentions, respectively, and concerns about "Privacy", with 18 and 14 mentions, respectively. These numbers suggest that the experience of surveillance is linked to a power dynamic and its impact on personal boundaries.

Theme/Subtheme	Contextual integrity	Panopticon	Surveillance
Parent-child relationship	4	4	16
Communication	2	1	9
Control	3	15	19
Freedom	4	2	6
Safety	3	1	9
Support	1	0	1
Autonomy	5	1	5
Consent	1	6	6
Ethical concerns	1	6	8
Privacy	4	14	18

Table 29: Co-occurrences between "Digital self-governance and surveillance" and "Parent-child relationship", "Parental approaches", and "Privacy and ethics"

Figure 6 visually depicts these connections.

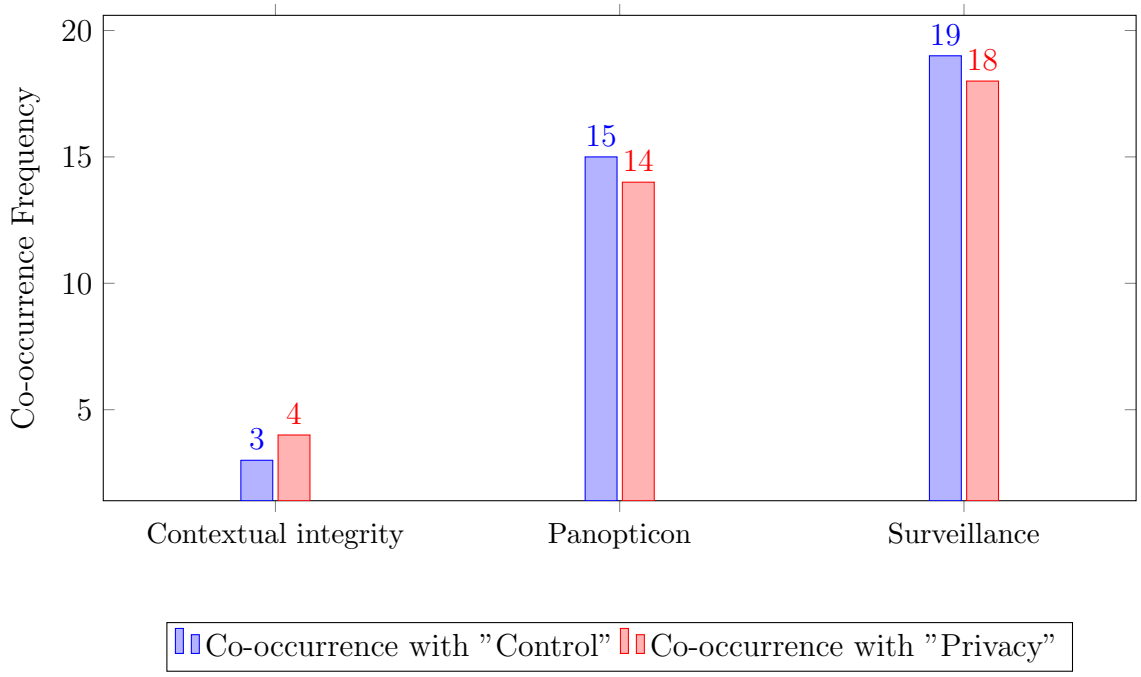

Figure 6: Co-occurrence of "Control" and "Privacy" within "Digital self-governance" Subthemes.

Contextual integrity: Table 30 shows that "Contextual integrity", the idea that information sharing must be context-appropriate, is most frequently discussed by the children, the 20s group (6 mentions). This implies that the ones who have the most recent experience of being tracked are most aware of how important it is to set boundaries and ensure the monitoring is appropriate to the various scenarios.

Subtheme	**20s Group**	**30s Group**	**40s Group**	**50s Group**
Contextual integrity	6	1	3	4

Table 30: Frequency of References to "Contextual integrity" Across Generations

Parents also recognize this need, explaining the difference between acceptable (public) and unacceptable (private) contexts for monitoring:

> "Morally, as a parent, I think monitoring has to have some limits. You can't film him in his room or what he talks to his friends... I think it is only for traveling or commuting, that's all." (P11, 40s)

An important actionable insight that emerges is the need for these contextual

rules to adapt over time. Participants suggest that the level of control should depend on the age of the child:

> "Below 15 or something, 12... they cannot change the tracking at all, like their parents are in control. And then after the age of, I don't know, 14, 15, whatever, then maybe kids should be allowed to change it." (P3, 20s)

Conclusions: Contextual integrity is a primary concern, especially for the younger generation, who is more sensitive to the level of appropriateness of being monitored. Parents also acknowledge this by setting limits on surveillance. The findings suggest that an efficient approach to maintaining these boundaries is to create age-dependent rules, granting children more control over the shared information as they grow up.

Panopticon: The "Panopticon" concept, the feeling of constantly being watched, is most prominent among the 30s group, with 13 mentions, as seen in Table 31, which indicates that parents of younger children are highly aware of the panoptic dynamic tracking tools can create.

Subtheme	20s Group	30s Group	40s Group	50s Group
Panopticon	4	13	5	1

Table 31: Frequency of References to "Panopticon" Across Generations

They are aware that constant monitoring, even if not ill-intentioned, can feel invasive and make the child hyper-aware that they are being watched:

> "It depends on how invasive we are, because if I monitor a lot of things, and then I'm very nagging and say "Why did you do that?" constantly, it feels like he's being watched all the time." (P5, 30s)

From the perspective of a child, this feeling can also be triggered by specific features found in tracking applications that create a sense of constant oversight:

> "Some apps have like this thing where you can implement notifications so for example if you arrive home your parent immediately gets a notification that you're home and I feel like that can be a little bit way too much like too controlling." (P1, 20s)

Conclusions: The feeling of constantly being seen is a major concern, especially for new parents who are conscious about the potentially negative power of tracking tools. Certain features of tracking applications have the power to further intensify this feeling, transforming caring observation into a feeling of exaggerated control.

Surveillance: Table 32 shows that "Surveillance" is mostly discussed by parents in their 30s and 40s, and a key theme in these discussions is that surveillance must evolve along with the child.

Subtheme	20s Group	30s Group	40s Group	50s Group
Surveillance	13	30	16	5

Table 32: Frequency of References to "Surveillance" Across Generations

Parents themselves state that a reduction in monitoring is necessary over time as part of a healthy development of the child:

> "With increasing age, the level of supervision and control theoretically should be inversely proportional. As the child matures, control should decrease." (P8, 40s)

However, parents often struggle with the ethical ambiguity of certain surveillance features, justifying their use based on their own intentions rather than the child's perception of these features, creating a potential disconnect in the reality of the parent and the experience of the child:

> "The listening feature can be interpreted somehow... as an intrusion into privacy. From my point of view, I don't normally consider it that way, because that's not what I use it for." (P8, 40s)

Conclusions: The practice of surveillance is mainly framed by parents as a dynamic process that should decrease in intensity as the child grows up, however, a crucial tension still exists between parents using intrusive monitoring techniques and justifying them based on their beliefs and the way children perceive these actions, leading to a potential breach of trust.

6.4.6 Privacy and ethics

Theme overview: In this section, the issues of privacy and ethics are examined in the context of digital tracking, specifically how they are understood and negotiated within the parent-child relationship.

The data in Table 33 provides an overview of how the subthemes, "Autonomy", "Consent", "Ethical concerns", and "Privacy", are distributed within the main theme. "Privacy" and "Autonomy", with 29 and 24 mentions, respectively, are the most frequently discussed topics, showing the predominant tension between the parental oversight and the children's wish to have personal space. Figure 7 visually illustrates this distribution.

Theme	**Autonomy**	**Consent**	**Ethical concerns**	**Privacy**
Privacy and ethics	24	14	15	29

Table 33: Co-occurrences between "Privacy and ethics" and its Subthemes

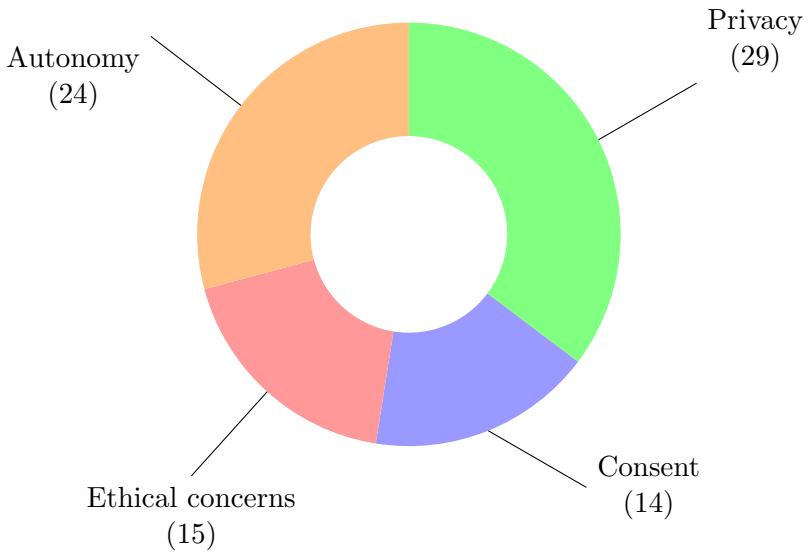

Figure 7: Proportional Distribution of "Privacy and ethics" Subthemes by Frequency.

The analysis in Table 34 shows the connections between these concepts and other related subthemes. "Privacy" is strongly linked to the feeling of "Control" (12 references), and the use of "Tracking tools" (13 references), further accentuating the previously mentioned conflict, while "Autonomy" is most strongly connected to "Freedom" (10 references).

Theme/Subtheme	Autonomy	Consent	Ethical concerns	Privacy
Parent-child relationship	6	4	2	7
Communication	3	4	1	5
Control	4	5	6	12
Freedom	10	3	1	6
Safety	2	0	0	5
Support	1	0	0	1
Digital catalog	2	0	0	0
Location tracking	2	1	1	7
Social media tracking	1	4	4	7
Tracking tools	4	8	6	13

Table 34: Co-occurrences between "Privacy and ethics" and "Parent-child relationship", "Parental approaches", and "Digital tracking practices"

The lexical analysis from Table 35 shows a generational evolution: the language of the 20s group is centered on "Opinion" and "Freedom", while the vocabulary of the parents progress from "Rule" and "Responsible", for the 30s group, to "Talk", for the 40s group, and finally, to "Trust", for the 50s group, mapping the changes in priorities over the course of the years.

Keyword	20s Group	30s Group	40s Group	50s Group
Decision	2	0	4	3
Freedom	2	2	3	0
Opinion	3	3	1	0
Ethical	3	4	1	3
Hide	1	5	4	1
Privacy	0	3	2	0
Responsible	1	6	4	3
Rule	0	9	4	0
Talk	1	1	10	3
Trust	0	1	3	7

Table 35: Frequency of Key Thematic Keywords within "Privacy and ethics" Across Generations

Autonomy: Table 36 shows that for the 20s group, "Autonomy" is the primary concern, with 13 mentions, and it is directly linked to having agency over the tracking tools themselves, since they are the children, and they are the ones being tracked.

Subtheme	20s Group	30s Group	40s Group	50s Group
Autonomy	13	3	3	5

Table 36: Frequency of References to "Autonomy" Across Generations

This provides them with the feeling of being in control, as one of the participants explained:

> "It was definitely feeling in control, first of all, because of course, you know, the app that you are using, so then you know where to look if you want to turn it off. So that for me feels like being in control on my side." (P2, 20s)

From the parental point of view, however, autonomy is seen not as an inherent right, but as a developmental goal. One parent explained how using a location tracking application for their child led him to become more independent:

> "I see how my son was when he started with this application... he took responsibility, he saw what he had to do, he learned, and he knows where to go, where to look." (P9, 40s)

Conclusions: Autonomy is the main concern of the younger generation, and they define it as having control over the tool itself, while parents tend to view tracking tools as a way of building autonomy, viewing it as a milestone of responsibility, rather than an issue of control. A powerful actionable insight for both children and parents is to become aware of this difference in views, and make sure to collaborate towards reaching common ground.

Consent: The data in Table 37 displays that "Consent" is a significant concern for both new parents, with 6 mentions for the 30s group, as well as for more experienced parents, with 5 mentions for the 50s group.

Subtheme	20s Group	30s Group	40s Group	50s Group
Consent	2	6	1	5

Table 37: Frequency of References to "Consent" Across Generations

Across these generations, there is a consensus that monitoring should never be done secretly, as it would mean an immediate breach of trust. One participant made this principle clear:

> "I would totally disagree if the monitoring is done without his knowledge, no matter how young he is." (P4, 50s)

Additionally, from the perspective of the child, having the ability to grant consent is an empowering act that reframes the parent-child dynamic from one of control to one of collaboration. This idea is highlighted by a participant from the 20s group:

> "It was my decision to share my location with them." (P1, 20s)

Conclusions: Consent is an ethical principle recognized across all generations, similarly to how secret surveillance is viewed as a violation of trust across the board. For children, the act of giving consent is an essential factor in reestablishing the power balance in the parent-child dynamic, and transforming it from an imposition of control to a cooperative decision.

Ethical concerns: Table 38 indicates that "Ethical concerns" stand out for the 30s group, with 9 mentions, suggesting that new parents are the ones most actively dealing with the moral ambiguities of digital tracking.

Subtheme	20s Group	30s Group	40s Group	50s Group
Ethical concerns	1	9	3	2

Table 38: Frequency of References to "Ethical concerns" Across Generations

A key insight is that the ethical justification for tracking is often related to the age of the child and the legal responsibility of the parent. As one parent explained, ethical issues become clear when the child is a minor and consent is involved:

> "I consider it ethical, especially when it is done in agreement with the child... And as long as the child is a minor, yes, without any discussion, it's ethical." (P7, 50s)

However, the ethical scene is not always straightforward. From the perspective of a child, monitoring can sometimes feel morally confusing, falling into a grey area that is neither good or bad:

> "I don't find it either not ethical, but not very ethical either. It's like a bit controlling. So, as I said, it has upsides and downsides. But yeah, in terms of ethics, I don't think it falls in any category of either being bad or good." (P2, 20s)

Conclusions: New parents pay the most attention to ethical concerns, and often link monitoring to their legal responsibility for minors and the presence of consent, even if children may not fully grasp the concept of giving consent. For them, tracking can feel ambiguous, with the benefits of safety and the downsides of control creating an ambivalent ethical experience.

Privacy: As shown in Table 39, the discussions about "Privacy" peak for the 30s group, with 14 mentions, the generation that uses tracking tools most actively.

Subtheme	20s Group	30s Group	40s Group	50s Group
Privacy	2	14	8	5

Table 39: Frequency of References to "Privacy" Across Generations

An important tension arises between the child's right to privacy and the parent's desire for the reassurance they get when they know the whereabouts of their children. This conflict was expressed clearly by one of the participants from the 40s group:

> "After a certain age, I think it's normal to have privacy that everyone should respect, but sometimes I want to know where she is." (P9, 40s)

This struggle can lead parents to justifying tracking practices that are potentially invasive or harmful to the relationship, by deeming them necessary for dangerous or extreme situations. This happens regardless of them being aware that children might perceive them as "exaggerated controlling":

> "I consider this listening part an extremely important function for extreme situations... But also to eavesdrop a little, I mean 5 seconds... Yes, it may sound like exaggerated controlling, I don't know." (P8, 40s)

Conclusions: Privacy is a principal concern for parents who are actively using digital tracking tools, and who experience the conflict between their own desire to know their child is safe, and the child's personal space. Because of this tension, they might justify crossing the boundaries of their children as emergency measures, even when recognizing the ethical ambiguity of the practice.

6.5 Quantitative analysis findings

This section reports the quantitative findings derived from the Likert scale responses of the 12 participants, who are divided into four generations: 20s (n=3), 30s (n=3), 40s (n=3), and 50s (n=3). Given the small sample size and the qualitative nature of the study, the focus of the quantitative analysis is the calculation of mean scores with the aim of identifying notable trends, patterns, and differences across the four generational groups. The primary goal of this analysis is to provide quantitative validation for the qualitative narratives explored in the preceding sections, specifically addressing how perceptions of digital tracking vary by generation (SQ1), and how these dynamics can serve as a foundation for rethinking digital academic tracking tools (SQ2).

6.5.1 Key generational differences

Based on the average values, the data reveals a consistent pattern: the 20s group, representing the tracked children, consistently expresses more skepticism and concern regarding tracking practices, a perspective that aligns with the qualitative findings that in this group's discussions, the "Autonomy" and "Freedom" themes predominated. In contrast, the older groups, 40s and 50s, represented by parents of teenagers and young adults, perceive these tools in a more positive light, highlighting their usefulness for oversight and safety, which is consistent with the qualitative finding that they use tracking tools mostly for "Safety" and "Support". The 30s group, which is a transitional group, composed of parents of younger children, mainly aligns with the older groups, but still maintains the critical perspective of the 20s group.

(Scores are on a scale of 1-5, with higher scores generally indicating a more positive or stronger agreement with the statement.)

6.5.2 SQ1: Generational perceptions of digital tracking

As a foundation for answering the first research sub-question (SQ1), quantitative insights related to "Parental approaches", "Privacy and ethics", and "Digital tracking practices" have been selected.

Table 40: Mean Scores by Generation and Key Themes

Question/Theme	**20s Avg.**	**30s Avg.**	**40s Avg.**	**50s Avg.**
Perceived Usefulness (U)				
Usefulness for Safety	4.3	3.7	5.0	5.0
Usefulness for Communication	3.3	4.7	4.7	3.7
Attitude Towards Using (A)				
Attitude: Being Tracked Personally	4.0	5.0	5.0	5.0
Attitude: Academic Tracking	3.0	4.3	5.0	4.3
Behavioral Intention to Use (BI)				
Influence on Responsible Behavior	2.3	3.0	4.7	3.7
External Variables				
Ethics of Tracking in Parenting	3.7	4.0	4.7	5.0

Perceived Usefulness: Safety vs. Communication While participants generally perceived digital tracking tools as highly useful for safety, with average scores of 4.3 and 3.7 for the younger generations and maximum for the older ones, their value for improving communication creates a generational divergence. The youngest and oldest generations have rated this aspect the lowest, suggesting they do not see these tools as a bridge for communication within the family. This finding contrasts with the parental perspective illustrated in the "Parent-child relationship" section, that framing tracking as a form of "peace and safety" (P10, 30s) is seen as a crucial strategy. For the two middle generations, the ratings went up to 4.7, indicating they view surveillance as a form of communication and care.

Attitudes Towards Using: Control vs. Autonomy The most significant difference is apparent in the attitude towards being tracked. When asked about their feelings on being tracked, the 20s group had the lowest score, with an average of 4.0, while all the other generations were unanimously positive about it, with the maximum score. These results quantify the tension between the parental desire for control, and the children's need for autonomy, a central theme identified in the qualitative data. The lower score among participants in their 20s reflects their qualitative emphasis on "Autonomy" within the "Privacy and ethics" theme, and aligns with the focus on "Feel" and "Control" in the "Children's thoughts" section. This suggests that younger participants tend to view tracking as a breach of autonomy, while higher scores suggest that parents see it as a legitimate parenting tool.

Ethics and behavior: Differing views on ethical control Another important divide is found in the question of whether tracking tools create responsible behaviors in children. The youngest group was deeply skeptical, with an average score of only 2.3, indicating a belief that these kinds of tools do not trigger any internal sense of responsibility. This view directly opposes the perspective of a parent, who described an application as an incentive for their son to "take responsibility" (P9, 40s). On the other hand, the 40s and 50s groups strongly believed in their positive influence, scoring 4.7 and 3.7, which also aligns with their views on the ethics of tracking, where they had the highest average scores, 4.7 and 5.0, likely linking tracking with their parental duty, while the 20s group displayed the most criticism.

6.5.3 SQ2: The parent-child dynamic as a foundation for digital academic tracking

In the data related to academic tracking, the core tension between control and support is clearly quantified. When asked about their attitudes towards digital academic tracking, the 20s group scored an average of 3.0, while the older generations scored averages of at least 4.3, suggesting a sharp division between children and parents.

This finding reveals that children perceive academic tracking less as supportive, and more as a control tool that undermines their privacy and autonomy, and their ratings suggest a desire to remain independent in the academic context. On the other hand, based on the higher average scores, parents perceive academic tracking as an essential tool in their parental approaches, providing support for their children and allowing them to be involved in their education. This is consistent with the qualitative findings from the "Digital tracking practices" section, where parents described the digital catalog as "an extraordinarily useful tool" for being involved in their child's educational process (P8, 40s). Therefore, overall parenting responsibilities include the academic progress of children.

Hence, a central design challenge arises: building an academic tracking platform that could satisfy all stakeholders. The parent-child dynamics visible in these quantitative results point to a need for a system that could negotiate this tension, so, besides the basic surveillance feature, an ethical design would also take children's autonomy into consideration, facilitate communication between parents and children regarding academic progress, and help build trust within the relationship, rather than enforce parental control.

6.6 Integration of findings

When viewed together, the qualitative and quantitative results offer a cohesive overview of the generational tensions created by digital tracking. The personal narratives ex-

tracted from the qualitative data reveal a fundamental conflict between the parental drive for safety and control, and the children's developmental needs for privacy and autonomy. The parental approaches driven by "Safety" often result in children's responses of "Hiding", and internal feelings of being "Controlled". The quantitative data further validates this conflict, particularly in the different attitudes towards academic tracking (Avg. 3.0 vs. 4.3+) and the perceived influence of tracking on creating responsible behavior (Avg. 2.3 vs. 4.7). The synthesis of the analyses confirms that what the younger generation sees as control, the older ones view as care.

In response to SQ1, the data suggests that perceptions of tracking technologies are not just different, but evolve with one's role and life stage. There is a clear distinction between the one who is monitored, whose focus is on "Autonomy" and "Freedom", and the one monitoring, whose concerns progress from establishing "Rules" (30s group) to facilitating "Talk" (40s group) to building "Trust" (50s group). For SQ2, the findings pinpoint the principal source of disagreement that must be addressed in the redesign of an academic tracking system: the parental view of academic monitoring as an act of "Support", as demonstrated by the interview quotes, versus the children's perception of it as an invasion of privacy and lack of trust or independence.

This chapter has established what the key disputes within the parent-child relationship are regarding digital tracking, and the following chapter will interpret the findings, discussing what they mean in the context of Human-Computer Interaction, ethical design, and family-oriented tracking technologies.

7 Discussion

This chapter transitions from the objective presentation of the empirical findings to an extensive interpretation of their significance. The primary aim is to bridge the gap between what was discovered and what these findings mean by analyzing recurring themes and generational patterns through the established theoretical lenses. The data will be connected to the broader academic conversation via comparison between the outcomes of the study and the existing literature. The interpretative analysis will contribute in two areas: the implications of the study for Human-Computer Interaction, and the proposal of a tangible framework for redesigning digital academic tracking systems.

7.1 The core generational conflict

The findings of the study reveal a meaningful generational conflict regarding the perception of digital tracking, focused on the parental need for "Safety", and the children's developmental need for "Autonomy". Both the qualitative and the quantitative results show that while parents view tracking technologies as practical tools that help in caring for children and ensuring their protection, the younger generation often views them as tools that interfere with their privacy and trust. This fundamental conflict, visually represented by the different Likert scale averages, for example for "Attitude Towards Being Tracked" 4.0 for the 20s group versus 5.0 for parents, will be interpreted through several theoretical lenses in order to understand its underlying dynamics.

7.2 Interpreting the parent-child dynamic: The recursive loop of surveillance and trust

The findings consistently show that the parent-child dynamic in the context of digital tracking is not a static, one-way application of control, but an interactive, two-way system, subject to changes. Through the second-order cybernetic (Scott, 2004) lens, the parent, the child, and the tracking technology form a recursive feedback loop, in which the acts of observation and monitoring fundamentally change the system being observed.

A real-life example of this recursive logic is perfectly captured in a parent's (P9, 40s) testimony, whose daughter responds to being monitored by "disabling her location sometimes because she doesn't want me to know where she is". This is a direct behavioral response of "Hiding", the most frequent keyword found in the analysis of "Children's behavior" (Table 4), and a classic "resistance tactic" (Barron, 2014).

Because of this act of resistance, the parent is forced to adopt a new strategy, thus preserving the recursive feedback loop.

This dynamic can be further interpreted in relation to the parenting styles discussed in "Literature review". A parent who leans towards "helicopter parenting" or a more authoritarian style (Segrin et al., 2012), may use the resistance of the child as a reason to increase control, therefore intensifying the loop. However, the parent's motivation to increase control could also stem from the "moral panic" (Mascheroni, 2017) around "stranger danger" that is amplified by media, which initially kicks off the monitoring cycle by instilling fear in the parent. The design of modern tracking tools promises constant visibility of the child, therefore allowing parents to permanently monitor their children, and facilitating "caring dataveillance" (Siibak & Lammes, 2021) or a digital "panopticon" (Lupton & Williamson, 2017; Mascheroni, 2017).

The design of the FindMyKids/Pingo application duo provides a powerful, concrete example of this panoptic dynamic. Figure 8 shows the parent's interface, which includes a real-time map view of the child's location, unilateral parental actions such as "Listen" and "Honk loudly", allowing the parent to remotely activate the child's microphone or make their phone emit a noise. These features transform care into a form of "caring dataveillance" and establish an asymmetrical power dynamic. This design reinforces the recursive loop where the child, aware of this constant parental gaze and the potential for intrusion, may resort to self-censorship or active resistance, as described by participant P9.

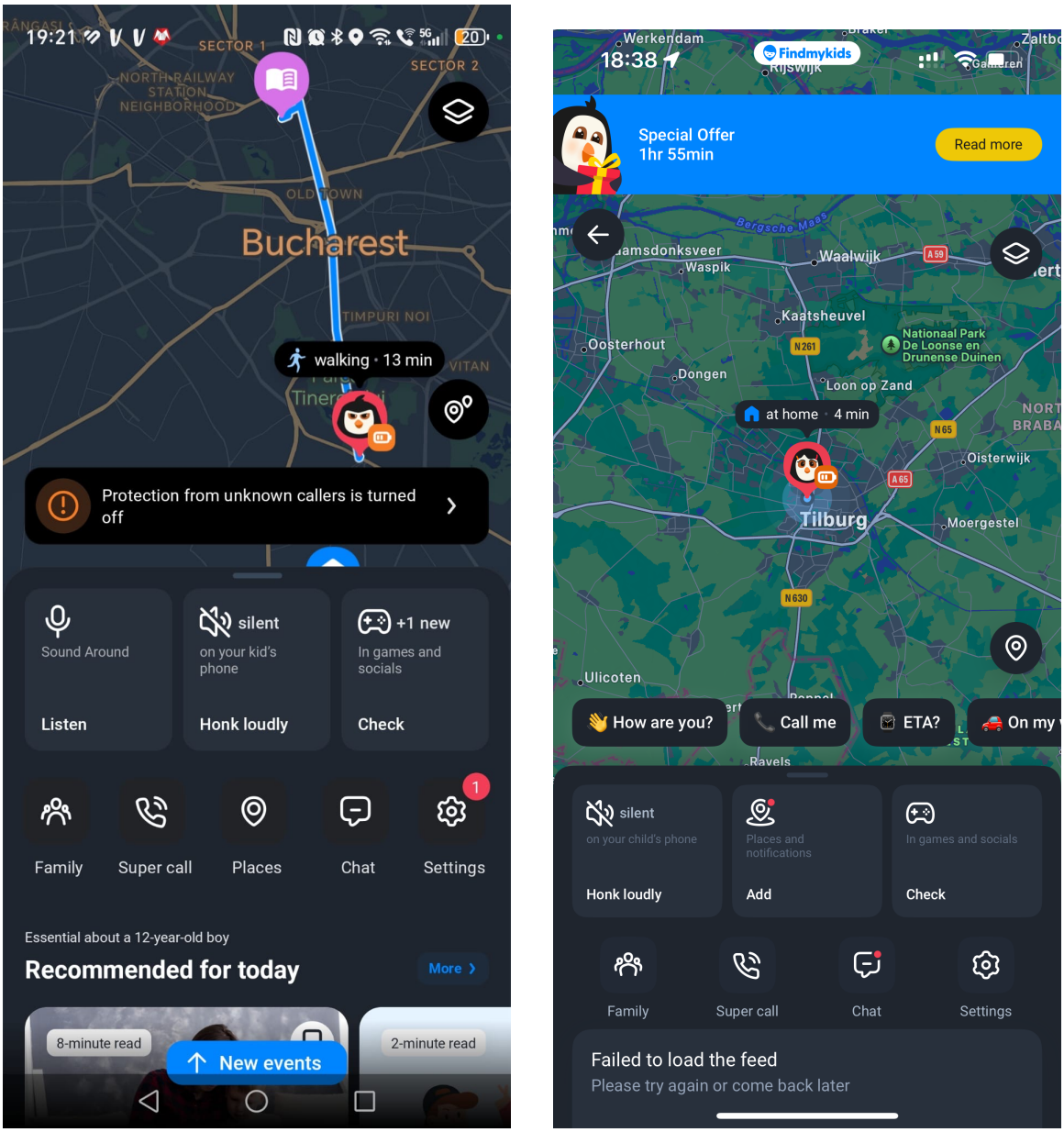

Figure 8: Interface of the FindMyKids application, parent's view of FindMyKids

7.3 Privacy versus control in the parent-child relationship

The primary conflict driving the recursive loop of surveillance is based on the disagreement over privacy and the negotiation of its terms. The nature of privacy in the familial context, however, is complex and unique, so to fully understand the tensions revealed in this study, it is essential to differentiate between the two types of privacy that dominate academic literature and technological design: user-to-platform privacy and user-to-user privacy.

The leading privacy type in both public discourse and research is user-to-platform privacy, often referred to as vertical privacy (Zhuang et al., 2023). This model focuses on the relationship between an individual user and a large-scale corporation, such as Google or Facebook (Mathias & Luqman, 2023). The biggest concern in this model is how these platforms collect, use, and share extensive quantities of user data, most of the time in ways that are not transparent to the user. Therefore, the power dynamic between the user and the platform becomes asymmetrical, with the platform holding significant control over the personal data of the user. Research in this area often analyzes "privacy-regulation behavior", which refer to strategies that users implement to manage their own data, such as adjusting settings or withholding information (Zhuang et al., 2023).

Through the empirical findings of this study, it has become apparent that the most prominent and emotionally intense conflicts within the family do not fit this model, instead they are instances of user-to-user privacy or horizontal privacy (Zhuang et al., 2023). This privacy type shifts the focus from the user's relationship with the platform to the flow of information between two users in close relationships. In this case, the power dynamics are influenced by emotional and interpersonal factors, such as love, trust, or authority. The ethically challenging practices shared by participants in the interviews serve as powerful illustrations of this distinction. The admission of P8 (40s) about using a listening feature to "eavesdrop a little... for 5 seconds" is a profound violation of user-to-user privacy, but also of the healthy distance required for a healthy relationship, creating a sense of "over-proximity" (Mascheroni, 2017). Similarly, the story told by P12 (30s) about the teenager who had been secretly monitored for a year shows a deep trust breach between the parent and the child.

Given this context, the privacy management mechanisms also need to be understood differently. Tracking applications provide technical privacy controls, such as settings and permissions that allow users to control the information flow between them and the platforms. However, relying only on those controls has proved insufficient and a lot of the times counterproductive. The various parental responses to the privacy versus control dilemma can be mapped directly onto the "parental mediation theory" (Yang et al., 2023) presented in "Literature review". Parents using primarily "restrictive mediation", meaning they impose control unilaterally, are the ones most

often encountering resistance and reporting damage in trust. This approach reflects the "anxiety-reducing restrictive caregiver" model (Blum-Ross & Livingstone, 2020), where the anxiety of the parent is used as an excuse to override the privacy needs of the child.

In contrast, families who have navigated these tensions based their decisions on negotiated or social privacy controls, which are informal rules, ongoing conversations, and mutual agreements. Participants who reported positive outcomes engaged in this negotiation process, mirroring the "active mediation" (Yang et al., 2023). As stated by P7 (50s), "I believe in communication and working together with the child to decide what is considered allowed and what not". This approach is also supported by P4 (50s), who explained that trust is built when the child is able to deactivate the application whenever they want, and it aligns perfectly with Baumrind's "authoritative" parenting style (Segrin et al., 2012), which values reasoning and negotiation.

Furthermore, the empirical findings highlight the importance of consent, a fundamental part of the literature review. For example, the secret surveillance described by P12 (30s), is directly opposed to the consent-based parental tracking approach observed in Denmark (Gundelach & Sandvik, 2021) and the principles of child agency (Mascheroni, 2017). When there is no consent, digital tracking is perceived as a violation, but when it is present, it can be used as a tool for strengthening the parent-child relationship. P1 (20s) stated, "it was my decision to share my location with them", and also explained the relationship with their parents is strong. On the other hand, when parents relied solely on the technical privacy controls without any negotiation, the tracking tool was more likely perceived as an exertion of unilateral control, triggering the recursive loop of resistance, secrecy and lack of trust.

Understanding the difference between the technical privacy controls offered by an application and the social privacy controls, obtained through interactions between the parent and the child, is essential to designing technologies that strengthen, rather than weaken trust.

7.4 Implications for Human-Computer Interaction

The integration of these findings carries valuable implications for both the theoretical side of Human-Computer Interaction, as well as for its design practice. From a theoretical standpoint, the study highlights the importance of shifting from individualistic models to family-oriented technologies that are analyzed through relational perspectives, particularly second-order cybernetics and user-to-user privacy. On a practical level, it provides a clear directive for designers: upgrading basic parental control tools to systems that foster communication, negotiation and trust between parents and children.

Based on the analysis and as a response to SQ2, the following framework trans-

lates the obtained insights into three actionable principles for rethinking the design of digital academic tracking systems into an ethical system that balances parental support and children's autonomy. These principles are informed both by the empirical data and the foundational literature.

7.5 A framework for building ethical academic tracking systems

Adaptive autonomy The design must recognize that, as supported by existing literature, a child's need for autonomy is a developmental process that changes with age (Domoff et al., 2020; LeMoyne & Buchanan, 2013; Yang et al., 2023). Rather than relying on a binary model in which parental access can be turned on or off, systems should implement progressive controls that can be changed and adapted to the child's age and maturity level. For a young child, for example, the parent might see a detailed overview of their day at school, including notes and recommendations from teachers, while for a teenager, the view could transition to a more general summary that only includes final grades or notifications for important events. This approach provides a practical design solution for the tensions arising around the "helicopter parenting" (Segrin et al., 2012), while directly addressing the quantitative finding of the 20s group's desire for independence (13 mentions of "Autonomy" in Table 36) and their low average score for academic tracking attitude (3.0 in Table 40).

Negotiation and active mediation To mitigate the risks associated with purely restricted mediation, systems should be designed to intentionally promote active mediation (Yang et al., 2023). The interface should function as an active tool that facilitates communication between parents and children, rather than a passive instrument of surveillance, and could have a feature that prompts privacy settings, agreements, and discussions. This design approach puts the principles of consent and open communication into practice, aligning with the effectiveness of the "authoritative" parenting style (Segrin et al., 2012), and addressing the generational differences observed in the "Usefulness for Communication" quantitative data.

The design for this type of communication is critical. Figure 9 shows Pingo, the child's interface for the FindMyKids application. Pingo which offers pre-written messages such as "I'm home" or "I'm at school" and an "SOS" button in the bottom part of the screen for emergencies. While these features facilitate communication, they primarily serve the parent's need for reassurance rather than the child's need for expression. From an ethical standpoint, design should extend beyond limiting communication to predefined messages. The inclusion of a chat function, which allows children to compose their own responses, represents a meaningful step toward

fostering autonomy and authentic interaction.

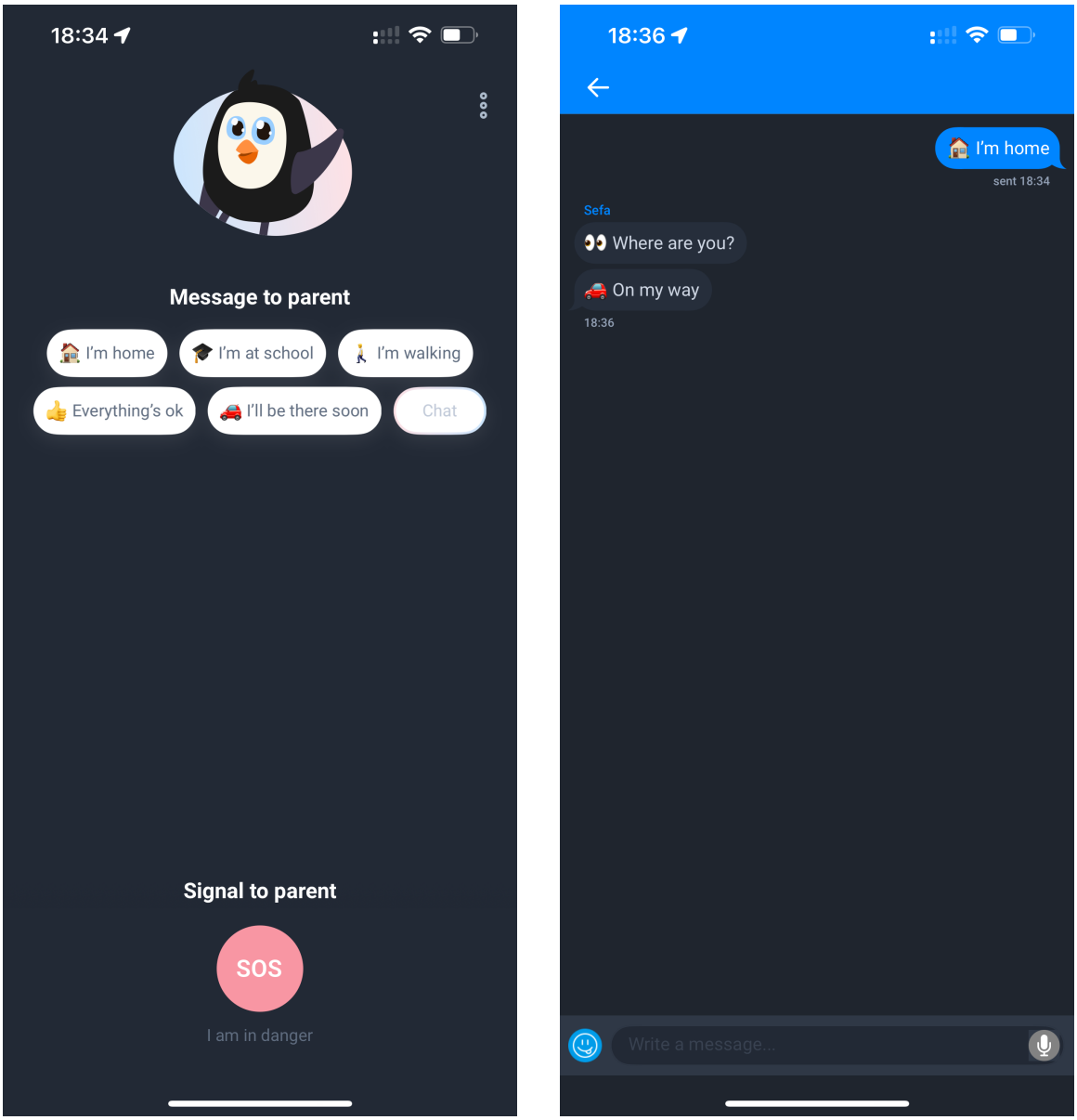

Figure 9: Interface of the Pingo application, children's view of FindMyKids

Embedded contextual integrity Figure 10 displays the "Viva catalog" application, an academic tracking platform that keeps track of all school-related information for a student. Below the name and class of the student, a parent has a horizontal menu presenting the child's grades, attendance, comments from teachers, record history, and attachments. The first image shows the grade list, split into multiple rectangles, each with their own subject, and containing all the grades for that subject. The second image displays the comments section in the same format as the grades section.

As outlined in the literature review through Nissenbaum's theory (Swain, 1989), privacy is context-dependent, however, digital academic tracking tools often disregard this by merging multiple forms of data into a singular system, directly violating the two principles of contextual integrity that were introduced as a conceptual lens for this analysis. "Viva catalog" shows a clear illustration of this violation.

Low-sensitivity, objective data (final grades) and high-sensitivity, subjective information (negative behavioral comments such as "Unfortunately he talks in class and plays with colleagues") share the same level of accessibility, so the system breaches the principle of "Restricting Access to Intimate, Sensitive, or Confidential Information".

The undifferentiated stream of academic information represents a violation of the principle of "Curtailing Intrusions into Spaces or Spheres Deemed Private or Personal", in this case, the child's academic and developmental space. By failing to distinguish between the two contexts, the design blurs their meaning and removes the child's ability to negotiate boundaries.

An ethical design must respect the difference between low and high sensitivity information. Access to high sensitivity items should involve a context-specific consent process, which would protect the child's right to privacy, as emphasized by participants like P11 (40s), but also prevent the system from becoming a "moralizing machine" (Mascheroni, 2017).

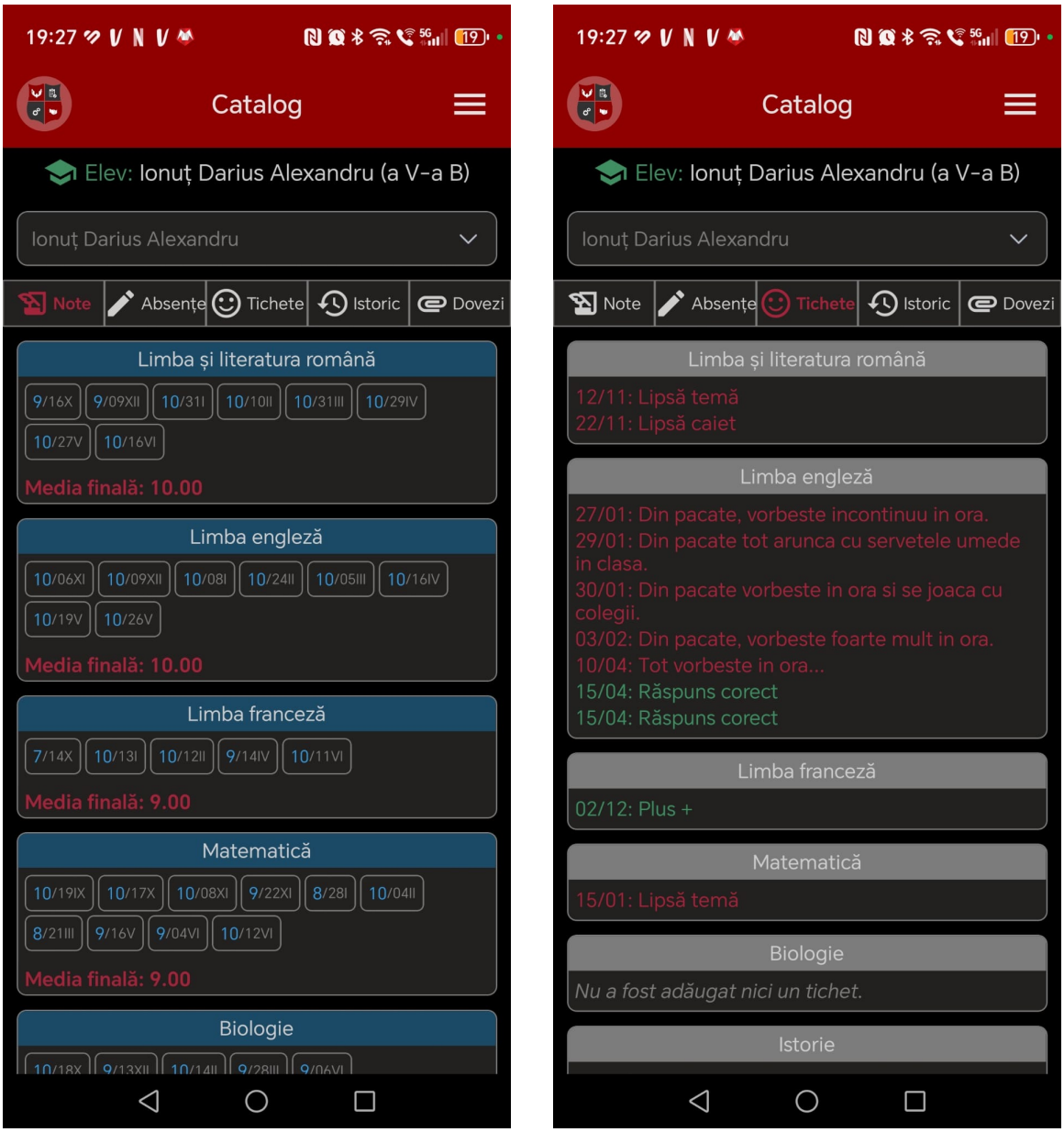

Figure 10: The interface of the Viva catalog, illustrating the violation of contextual integrity by presenting objective grades (left) and sensitive behavioral comments (right) in the same format.

7.6 Limitations and future research

While this study provides deep qualitative insights into the dynamics of digital tracking, its limitations, as detailed in the "Research methodology" chapter, must be acknowledged. The small sample size, of only 12 participants, and the restricted geographical area, Eastern Europe, mean that the findings should be viewed as an in-depth exploration of complex relational dynamics, rather than a broad generalization. Recognizing these constraints is also helpful for identifying clear and meaningful directions for future research.

First, a large-scale quantitative study is needed to further validate the findings, and to examine whether the identified generational patterns in this study hold across various cultural settings, as well as other generations not included in the participant pool.

Second, a longitudinal study following several families over a few years would be highly valuable. This approach would allow researchers to observe how the loops of safety versus autonomy and surveillance versus negotiation evolve in real time as children shift from childhood to adolescence, and as technologies evolve, offering crucial insights into the parent-child dynamics, as well as resistance strategies adopted by children.

Finally, the most impactful next step would be a co-design process involving children, parents, designers, teachers and psychologists, to prototype a new academic tracking system. Such a prototype would serve as a practical application of the proposed framework in this study, testing whether the three principles can genuinely produce technologies that build trust within the family.

8 Conclusions

This thesis set out to examine how using digital tracking tools shape the relationship between parents and children across multiple generations, with the goal of using these relational insights as a guide for redesigning digital academic tracking systems in an ethical way. By using a mixed-method approach, including semi-structured interviews with participants from four generational groups, the study revealed fundamental tensions, motivations, and behavioral dynamics that describe the dynamic of families who use those technologies. This concluding chapter synthesizes the essential findings in relation to the research questions, focusing on the primary contributions of the study, and offering final reflections on the upcoming development of family-oriented technologies.

8.1 Summary of key findings

The main research question explored how digital tracking tools affect the parent-child relationship and how understanding them could help in informing more ethical design practices. The findings indicate that the impact of these technologies is shaped not by the tools themselves, but by the parental approach and by the quality of the communication surrounding tracking, limits, and boundaries. When tracking is imposed as a one-sided act of control, it often triggers a cycle of resistance and concealment from the child's side. However, when it is framed as a collaborative environment, in which the child feels welcome to express their thoughts and feelings regarding it, and a tool used for safety and support, the relationship, trust, and mutual understanding can be strengthened.

Addressing the first sub-question, which analyzed the general perceptions of digital tracking tools, the study uncovered a distinct and consistent divide across generations. For participants in their 20s, who represented the child's perspective, the conversation was centered around autonomy and freedom, with monitoring often perceived as intrusive. In contrast, the parental generations (30s, 40s, and 50s) prioritized safety, viewing tracking as a necessary and legitimate form of care. The quantitative results reinforced this gap, exposing contradictory opinions about being tracked, and whether these tools foster responsibility and independence.

In response to the second sub-question, which investigated how these insights might inform rethinking digital academic tracking tools through an ethical lens, the findings suggest that the parent-child relationship itself provides the foundation for an ethical design. The qualitative insights showed that successful dynamics involved active mediation, consent, and open dialogue, while tensions were tied to secrecy and the lack of child agency. These patterns demonstrate that ethical tracking systems should not only deliver data to parents, instead they should actively foster commu-

nication, negotiation, and mutual understanding.

8.2 Contributions of the study to Human-Computer Interaction

This study offers several key contributions to the Human-Computer Interaction field, and to the broader topic of family-oriented technologies.

The primary theoretical contribution is based on using second-order cybernetics as a framework for interpreting the parent-child relationship. By conceptualizing this dynamic as a recursive feedback loop, the research can shift from the simple model of "parents tracking children" to a more complex and dynamic understanding of an evolving system, in which observation and resistance continuously impact each other. Additionally, the study's focus on user-to-user privacy within the family context exposes an underexplored, yet essential aspect of privacy research, showing that relational power dynamics require different analytical approaches than conventional user-to-platform models.

The methodological contribution emerges from the effective implementation of a cross-generational mixed-methods design. Quantitative measures, such as Likert scale averages, frequency and co-occurrence matrices, offered data-driven support for the rich, contextual narratives extracted from the qualitative analysis. This approach produced a layered perspective in which the quantitative "what" was contextualized by the qualitative "why".

The most significant practical contribution is the proposal of a framework for ethical digital academic tracking systems. The three guiding principles, "Adaptive autonomy", "Negotiation and active mediation", and "Embedded contextual integrity", transform the theoretical insights and empirical findings of the study into actionable design recommendations. This framework provides designers, developers and educators an alternative to the context-insensitive tendencies of existing systems, highlighting a clear pathway for building technologies that balance parental care with children's developmental need for autonomy.

8.3 Final Remarks and Recommendations

As digital tracking technologies become increasingly embedded in our daily lives, the parent-child relationships reach a turning point. The findings of this study suggest that progress does not lie in redefining the mechanisms of surveillance, but in reorienting design towards promoting trust and communication. The constant tension between the parental need to provide care and ensure safety, and the children's need to become independent should not be treated as an imperfection to be eliminated

through a digital program, but as an essential dynamic that must be acknowledged, understood, and supported by technology.

Therefore, this study issues a call-to-action for the designers and developers of the Human-Computer Interaction community, to shift the focus from systems offering parental control to systems promoting safe spaces for communication, trust and understanding within the family, honoring context and the growing needs of children. The future of ethical family technologies depends not on developing a more sophisticated panopticon, but on building tools that cultivate meaningful interactions and relationships in an increasingly digital world.

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A Interview questions

Structure of Interviews / Questions

1. **Part 1: Perceived Usefulness (U):** Looking at how attitudes change over time regarding privacy and contextual integrity as technology evolves.

   (a) On a scale from 1 (not useful at all) to 5 (very useful), in the context of improving children's safety, where would you place digital tracking tools (e.g., GPS tracking, school platforms, parental control applications)?
   Follow-up: Can you describe a situation where a digital tracking tool helped you or a child you know feel safer?
   Purpose: Assessing U in terms of safety, which is the primary justification for using digital tracking tools, but also in various contexts.

   (b) On a scale from 1 (not useful at all) to 5 (very useful), in the context of improving communication within the family, where would you place digital tracking tools (e.g., GPS tracking, school platforms, parental control applications)?
   Follow-up: Did digital tracking tools strengthen or weaken your parent-child relationship? How do you think that happened?
   Purpose: Understanding how U evolves from practical value to emotional/social value.

2. **Part 2: Perceived Ease of Use (E):** Looking at how comfortable users across generations are with digital tracking tools.

   (a) On a scale from 1 (very difficult) to 5 (very easy), how easy was it for you/your parents/your children to use digital tracking tools?
   Follow-up: What were the features that made them difficult to use? What changes would you make and why?
   Purpose: Assessing usability across generations and revealing usability issues based on age or context.

   (b) On a scale from 1 (not confident at all) to 5 (very confident), how did/do you feel navigating privacy settings or managing permissions on digital tracking tools?
   Follow-up: Did feeling/not feeling in control of what information is being shared affect your relationship with your parent/child? Why/why not?
   Purpose: Understanding perceived control and competence, which are helpful for building an ethical design.

3. **Part 3: Attitude Towards Using (A):** Looking at how attitudes change over time regarding tracking.

   (a) On a scale from 1 (very negative) to 5 (very positive), how would you describe your attitude about being tracked as a child/parent?
   Follow-up: Has your attitude changed over time? If so, how?
   Purpose: Analyzing changes in perception/acceptance of being tracked, influenced by personal or external factors.

   (b) On a scale from 1 (very negative) to 5 (very positive), what is your attitude towards academic tracking (e.g., grades, attendance) being available to parents?
   Follow-up: How do you think the parent-child relationship is affected by academic tracking? Do you see it as controlling or supportive?
   Purpose: Looking at attitudes in a specific context (contextual integrity).

4. **Part 4: Behavioral Intention to Use (BI):** Determining whether participants were/are likely to use or support digital tracking tools.

   (a) On a scale from 1 (not at all likely) to 5 (very likely), how likely would it be for you to recommend digital tracking tools to other parents?
   Follow-up: What makes you encourage or discourage their use?
   Purpose: Analyzing the intention to support and use tracking technologies, and gaining insights into ethical boundaries.

   (b) On a scale from 1 (not at all) to 5 (very much), how influential do you think digital tracking tools are in creating responsible behaviors in children?
   Follow-up: Do you think children change their behavior when being tracked? If so, how and why?
   Purpose: Investigate internalization and surveillance, as well as participants' belief in long-term impact, which is also helpful for an ethical design.

5. **Part 5: External Variables:** Analyzing sociocultural and value-based factors that influence the acceptance of tracking technologies.

   (a) On a scale from 1 (not important at all) to 5 (very important), how important do you think it is to design a tracking system that is based on the child's age and maturity levels?
   Follow-up: How should such a tracking system affect the power balance between parents and children? Should the child be involved in negotiating tracking conditions?

Purpose: Connecting ethics, autonomy and developmental stages, useful for building an appropriate tracking system.

(b) On a scale from 1 (not at all) to 5 (very), how ethical do you think tracking is in the context of parenting?
Follow-up: Can you think of a time when tracking helped or harmed the relationship with your parent/child? What features do you think would help build trust rather than impose control?
Purpose: Exploring external values and building a system that is sensitive to them.