

Evolutionary Perspectives on Novel Digital Environments: Parental Strategies in the Ecology of Fear

Jessi Boyer
jessiboyer@u.boisestate.edu
Boise State University, Anthropology
Boise, Idaho, USA

Michael Wendell
MichaelWendell@u.boisestate.edu
Boise State University, Computer
Science
Boise, Idaho, USA

Jerry Fails
Boise State University, Computer
Science
Boise, Idaho, USA
jerryfails@boisestate.edu

Kendall House
Boise State University, Anthropology
Boise, Idaho, USA
khouse@boisestate.edu

John Ziker
Boise State University, Anthropology
Boise, Idaho, USA
jziker@boisestate.edu

ABSTRACT

Many children born between 2010 and 2016 have access to an unprecedented variety of digital environments which comprise an evolutionarily novel landscape. Parental caregivers must make decisions without traditional environmental knowledge, introducing a high degree of uncertainty into parenting strategies. Evolutionary approaches reveal an adaptive mismatch between internet-enabled digital technologies and human behavioral adaptations. This mismatch represents a peculiarly human variant on the struggles of organisms to adapt to changing environments, and is characterized by the utilization of information-deficient strategies. This study applies models developed in evolutionary ecology to research on parental strategies for managing children's online activities. Using semi-structured interviews of parents (n=20) of children in middle childhood (ages 6-12) and a dialogic method of synthesis, we found that parents lack effective strategies for navigating online environments and cannot conceptualize the technologies and corporate powers shaping the online worlds their children encounter. We conceptualize these digital environments as an evolutionarily novel landscape producing adaptive lag and propose a continuous two-dimensional framework which describes observed patterns of intersection between parental investment and parenting strategies. Less intelligible threats are rationalized, while tactics aimed at more proximally actionable threats are prioritized. Building on adaptive vigilance and parental investment, our work shows the value of evolutionary models in understanding parental responses to digital environments.

CCS CONCEPTS

• Human-centered computing; • Social and professional topics → Children;

KEYWORDS

Children, parents, family, fear, technology, child-computer interaction, evolution, conflict, anthropology

ACM Reference Format:

Jessi Boyer, Michael Wendell, Jerry Fails, Kendall House, and John Ziker. 2023. Evolutionary Perspectives on Novel Digital Environments: Parental Strategies in the Ecology of Fear. In *Interaction Design and Children (IDC '23)*, June 19–23, 2023, Chicago, IL, USA. ACM, New York, NY, USA, 5 pages. <https://doi.org/10.1145/3585088.3593878>

1 INTRODUCTION

It is widely recognized that parents are concerned about their children's use of technology. Recent surveys report that parents' top concerns are focused on sexually suggestive content and bullying/abusive behavior [3]. Commonly reported major concerns of parents include: the amount of time children use screens, the dangers of online predators, and invasions or disclosures of children's private information [13, 7, 1]. While several investigations have endeavored to better understand these risks and ways to mitigate them [7, 1], our goal is to utilize the conceptual framework of human behavioral ecology to make sense of parental fears and responses to those fears. This work in progress discusses our preliminary findings and introduces an explanatory framework to understand the adaptive significance of these behaviors and their context.

2 CONCEPTUAL FRAMEWORK

This project explores the degree to which concepts derived from evolutionary theory can illuminate the problem of parenting in novel digital environments. Models developed from behavioral ecology explain the adaptations and interactions of individual organisms in specific ecological conditions. These models often explore trade-offs, such as those concerning somatic investment (in growth, development, and repair of the body) [4, 14, 16] and reproductive investment in offspring [17, 21, 6]. Hypotheses are based on an assumption of optimality [19] for the natural selection of behavioral strategies within populations.

A model offering insight into our observations focuses on parent-offspring conflict [18]. This model proposes that parents and offspring may disagree over the level of parental investment. Offspring may demand more resources than is optimal for parents to provide

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).
IDC '23, June 19–23, 2023, Chicago, IL, USA
© 2023 Copyright held by the owner/author(s).
ACM ISBN 979-8-4007-0131-3/23/06.
<https://doi.org/10.1145/3585088.3593878>

or take risks that parents discourage. In our study, we operationalize parental investment as time and resources dedicated by the parent to benefit the safety, health, and future prospects of their offspring.

We draw on another concept in behavioral ecology dealing with predator-prey relationships: the concept of fear ecology. Studies of fear ecology focus on adaptive lag in behavioral adaptations to novel anthropogenic built environments. Adaptive lag occurs when novel environments lead individuals to make decisions appropriate to prior environments, potentially resulting in maladaptive outcomes. It has been widely applied to the study of animal behavior in human-built environments. A fear ecology perspective considers the adaptive costs and benefits of behavioral responses to the perception of predation threats. Fear ecology adds a broad array of fear driven behavioral responses or tactics that can alter both reproductive and somatic investment [15]. We operationally define fear ecology as parental efforts to manage their children's access and interactions with internet-enabled digital technologies based on the parent's perception of risk.

General surveys of internet usage reveal parent's fears [13]. Within and beyond the human-computer interaction (HCI) field, many have investigated privacy concerns for children [7, 1, 12, 5]. Other research has found that parents may report lower levels of risks encountered by their children than children reported encountering [9]. Older children (teens) embrace more opportunities, but also encounter more risks [10]. Differing beliefs on what is appropriate to share can trigger parent-child (teenager) conflict [20], and parents face challenges when negotiating how they share children's information and identities online [1].

3 METHODS

Our research is an interdisciplinary effort bringing together expertise in evolutionary theory and behavioral ecology, ethnographic and qualitative research methods, cybersecurity, and human-computer interaction. In the first phase of this ongoing research we analyzed the open-ended responses of parents in semi-structured interviews with respect to relevant models of human behavior. We conducted twenty interviews with parents of children in middle childhood (ages 6 to 12). Interviews were conducted by graduate research assistants with backgrounds in anthropology and computer science. We focused on the widely recognized developmental stage of middle childhood because this is when children start to build relationships beyond the family [8].

Since this study focuses on middle childhood, only parental concerns about children between the ages of 6 and 12 were specified, however, the influences of younger and older siblings were investigated when present. Eighteen of the twenty participants were mothers, two were fathers. Eleven families were from Boise, Idaho, with eight from more rural locations in Idaho, and one participant from Ohio. Our recruitment processes sought to include a diverse range of family types, however, most of the responding participants came from two-parent, heterosexual households ($n=19$). Table 1 in Appendix A provides an overview of the participants. Participant quotes are identified by their ID in the table.

All participants were given the option of meeting in-person or remotely, and all but one chose to participate remotely via Zoom. This limited our ability to observe the home environment. The team

created an interview guide (see Appendix B) aimed at capturing participants' day-to-day parenting experiences with technology, such as device types and uses, screen time rules, and other types of limits associated with specific or generalized concerns and fears. The guide was applied flexibly by the interviewers in order to capture emergent themes. Interviews proceeded in a dialogic manner bordering on the collaborative, enabling participants to shape the dialogue by being explicit about the purpose and objectives of the study and inviting personal insights into thematic groundwork.

After digitally transcribing interviews, we engaged in a manual sorting exercise inspired by grounded theory [2]. An overarching framework in the form of a conceptual map was produced by first sorting a set of over 100 artifacts (in the form of quotes and singular micro-themes) into macro-themes, and then workshopping the relationships between them as a full team. When we analyzed the parents' statements we observed why, what, and how parents restrict children's behaviors. Out of these questions we derived factors influencing parental investment strategies. This map also provided the conceptual basis for digitally coding transcripts using NVivo. Codes were iteratively refined by collaborative review.

4 PRELIMINARY FINDINGS & DISCUSSION

A major feature of parental investment is imitation of strategies previously proven to be successful. Parents strive to replicate experiences that they perceive as having contributed positively to their own upbringing. However, little traditional knowledge specific to digital environments exists due to the rapidity of their development. This rapid development is the basis of the novel environment that this project considers. While most parents in our sample reported having no exposure to the internet during middle childhood, our initial work demonstrates that they attempt to draw on their own childhood experiences to guide decisions about their children's technology use. Table 2 in Appendix C summarizes the interview themes as they relate to the theoretical concepts discussed above.

4.1 Parental Perceptions of Threats

Screen addiction was almost ubiquitously reported as participants' top fear. When asked about the allotment of time spent on managing digital activities, this concern usually represented the largest investment. Specifically, respondents identified development of self-regulation as their objective when limiting screen time and some spoke about the addictive effect of neurotransmitters like dopamine. A participant said of continuous feed apps: "You just binge watch. There are no commercials. It just keeps playing and playing." (P9)

The platform most often specifically referenced as problematic was YouTube. One participant said, "On YouTube, you never quite know what they're gonna get into. 'Cause these suggested things will go from, you know, something totally normal to something a little weirder, really fast" (P19). A different parent said, "YouTube Kids, there's so much garbage on there that you're like, whoa, what are you watching?" (P6) YouTube ads garnered attention as well, both because of their targeted nature and because their appropriateness can't be controlled for. Since ads don't appear in viewing histories, monitoring capabilities are limited.

Respondents were asked to articulate their concerns for the future, and phones and social media stood out as the most common.

“I honestly think Instagram and Facebook, like, social media, is the most harmful for young kids because of the pressures that it puts on them” (P18), said one of two respondents who expressed anxiety about how social media will impact their daughters’ self image. Unmonitored communications and bullying were additional concerns related to cell phones.

The focus on phones in particular could represent children seeking more autonomy than parents are prepared for. This may be a manifestation of parent-offspring conflict. Aligned with this hypothesis, a few kids in our sample have a Gizmo (n=3), which is a cellular and gps-enabled watch with limited contacts pre-programmed by the parent. Each Gizmo-owning parent said they wanted to be able to track and/or contact kids as they begin to do more activities away from home and families. Interestingly, each of these parents also reported difficulty getting kids to wear the watches due to their un-coolness and limited capabilities, and all had given up.

Other top threats fall into more exogenous categories, such as exposure to objectionable content, influence from outsiders with incompatible ideological dispositions, and vulnerability to being accessed in some manner by strangers. Several families have rules aimed at limiting engagement with strangers, such as who their children can interact with on the chat features in Minecraft or Roblox, which operate on public servers. Sexual predation was mentioned occasionally as a future fear, however, perhaps due to the ages we focused on in our research, relatively little immediate concern was expressed.

4.2 Factors Influencing Parental Investment Strategies

Parents struggle to balance their desire to trust as opposed to control their child’s activities. Their strategies are influenced by digital fluency as well as access to financial resources and time and the degree to which threats are perceived along a continuum of concrete to abstract.

4.3 Impact of Digital Fluency and Parental Resources

Parents’ levels of digital fluency varied significantly and this appeared to have a powerful impact on the types of strategies they deploy in guiding and protecting their children. Our interviews suggest that low digital fluency is associated with less awareness of or use of parental control software and less discernment between types of perceived threats. High digital fluency is associated with awareness of, if not use of, parental control software, and a higher degree of specificity in their articulated perceptions of online threats.

Resource deployment is reflective of the priorities of the parent given their available resources. In some cases, greater financial resources enable investments that reduce time commitments, such as when the family hires a nanny. In other cases, the parent commits a great deal of time to supporting an activity that does not necessarily require a significant financial commitment, such as volunteering to coach a team. As can be seen in Figure 1, there appears to be a spectrum of screen time permissiveness that could be connected with whether or not the parent is able to or chooses to coordinate other activities.

Enrolling kids in extracurricular activities seems to be a preferred tactic to minimize screen time, when the resources to do so are available. There is a notable hierarchy of desirability of activities with physical exercise and sports, educational and cultural enrichment such as chess and piano lessons, and free play with other children preferred over “pointless” (P5) activities like gaming, video streaming, or social media. Many respondents reported that they fill their kids’ days with diverse “real world” activities with a goal of promoting self-moderation and the ability to disengage from activities regarded as harmful or useless.

4.4 Parenting Attitudes

Trust vs control was a prominent theme. Parents wanted their children to self-monitor and build critical thinking skills, and hope to build and maintain trust: “I want my kid to be able to come to me.” (P14) But this conflicted with wanting to monitor and impose constraints to keep them safe. Consequently, most parents choose passive methods of management such as screen time limits or simply listening in on videos rather than directly reviewing browsing history or setting up parental control software. These more passive techniques are easy ways for them to reduce potential exposure which require minimal knowledge of the digital environment. This aligns with other literature indicating that limiting time is a common regulation mechanism [11]. Here we organize our observations of these tactics using dimensions of time and financial investment, where both represent an investment trade-off in favor of the child. Figure 1 provides an overview of the observed parental responsibility matrix with dimensions of time and financial investment.

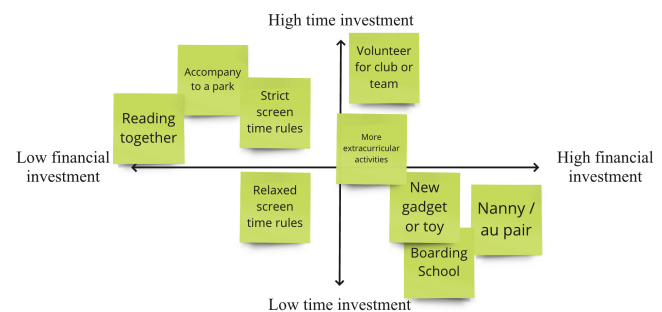


Figure 1: Parental responsibility matrix (financial investment vs time investment).

Higher vigilance is sometimes associated with more sophisticated strategies. For example, one parent who expressed an elevated sense of danger utilizes multiple types of parental controls in conjunction with strict screen time limits. At other times it leads to unsophisticated responses, such as wholesale banning of device types and platforms. We hypothesize that higher levels of vigilance may affect how parents perceive threats.

4.5 Concrete vs Abstract (Proximal vs Diffuse)

Our analysis of parents’ statements reveals a difference between threats parents feel empowered to understand and act on and those

they do not. There appears to be a variable threshold of complexity beyond which parents do not have the capacity to conceptualize or problem solve. We call these abstract threats. Abstract threats include things like data mining, browser tracking, and corporate surveillance, targeted ads, identity theft, user agreements, and feed algorithms. Their abstractness is measured in intelligibility (or rather, unintelligibility) and in how effectively a parent can address the threat locally. Parental tactics are primarily aimed at easily addressable threats, such as how much time kids spend using technologies and which platforms they are permitted to use. Screen addiction, bullying, sexual content, and revealing locations to strangers are classified as concrete threats, because they are easy to comprehend and to act on.

Another dimension of abstractness of threat is how diffusely the risk is spread out over the population. The entities responsible for shaping digital environments are known only in a nebulous sense, and parents making judgements are generally short on time and technical expertise so they rely on a combination of personal experience, anecdotal guidance, and over-simplified information that may be only partially accurate. As mentioned above, the more digitally fluent a parent is, the better they understand a greater number of abstract threats, however, even one respondent who is employed as a network analyst reported exclusive investment in proximal concerns. Parents did not organically raise the topic of diffuse threats, so we surmise that they are a relatively opaque feature of the novel digital environment.

A participant from Boise expressed feeling inhibited in her capacity to address abstract threats: “...About corporate tracking? No, I mean I know it’s there. I guess it’s one of those things I can’t really think about. And it’s so... there’s so much, you know... Yeah, I guess I can’t really think about it. I used to think about it all the time with myself. I’m like, I’m never having location services on, and I don’t want cookies. And all this stuff, and I still don’t want that stuff for myself. But for some reason I can’t wrap my head around that with my kids, because well, I think because they can’t be bothered. So why worry about it? If they can’t be bothered? I can’t change that.” (P15)

Parental strategies are guided by personal experiences, social networks, media, availability of resources and by children themselves. Their perceptions of threat influence the type and amount of investment they commit. They will attempt to balance a trusting and empowering relationship with guidance, limitations, and discipline aimed at moderating children’s growing bid for independence.

5 CONCLUSION & FUTURE WORK

Human behavioral ecology is largely concerned with parental investment strategies, parent-offspring conflict, and factors affecting life history and evolution. In this research, we view parenting attitudes, responses to threats, and availability of resources explicitly in this light. Humans make decisions about the world based on imperfect information. This assumption is modeled in optimal foraging theory, another area of human behavioral ecology. We find that parents are unable to assess a great deal of information in the digital environment, especially where potential threats are diffuse and abstract.

As we continue to investigate evolutionary insights into the novel conditions encountered in digital landscapes, numerous perspectives are available to explore. Our preliminary findings demonstrate that parent-offspring conflict and fear ecology models are compatible, and do in fact have explanatory power regarding parenting in the digital age. Expanding on that explanatory power should include defining the parameters of digital spaces as novel landscapes to determine whether some strategies relevant to the pre-digital world are mismatched with current conditions and are likely to result in maladaptive outcomes when deployed inappropriately.

Parents are at the front lines of user privacy concerns due to their protective role, however, because the powers shaping the internet and digital environments are obscured, some threats are difficult for them to deal with on a proximal level. Diffuse risks exacerbate confusion and result in begrudging capitulation to policies perceived as erosions of privacy (e.g., broad permissions in user agreements, remote camera access, government/corporate surveillance). Research on parental attitudes toward technology must address these issues, as well as the role of social influence, which might be linked to differences between how parents and children perceive levels of risk. Finally, we are interested in the ways in which parent-offspring conflict manifests in intra-familial negotiations, including the likelihood of screen addiction and conflict over imposed limitations.

Future research will seek to include a broader range of families in a diverse socio-economic range, and families of different backgrounds and configurations, as not everyone experiences these spaces the same way. Behavioral observation, cultural probes, and participatory ethnography will be invaluable in generating data that might enable hypothesis testing and going beyond this initial interpretive alignment of theory and evidence.

ACKNOWLEDGMENTS

This work was supported by NSF award 2210082.

6 SELECTION AND PARTICIPATION OF CHILDREN

No children participated in the data collection for this work-in-progress. There were 20 adult participants as depicted in the Table 1. Institutional Review Board (IRB) approval was attained to conduct this research. All participants signed a consent form.

REFERENCES

- [1] Tawfiq Ammari, Priya Kumar, Cliff Lampe, and Sarita Schoenebeck. 2015. Managing Children’s Online Identities: How Parents Decide what to Disclose about their Children Online. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems (CHI ’15)*. Association for Computing Machinery, New York, NY, USA, (Apr. 2015), 1895–1904. ISBN: 978-1-4503-3145-6. doi: 10.1145/2702123.2702325.
- [2] Antony Bryant and Kathy Charmaz. 2007. *The Sage handbook of grounded theory*. Sage.
- [3] 2020. FOSI | Tools for Today’s Digital Parents. Tech. rep. FOSI, (Nov. 2020). Retrieved Mar. 13, 2023 from <https://www.fosi.org/policy-research/tools-for-todays-digital-parents>.
- [4] Kim Hill. 1993. Life history theory and evolutionary anthropology. en. *Evolutionary Anthropology: Issues, News, and Reviews*, 2, 3, 78–88. doi: 10.1002/evan.1360020303.
- [5] Juan Pablo Hourcade, Anja Zeising, Ole Sejer Iversen, Mikael B. Skov, Alissa N. Antle, Lisa Anthony, Jerry Alan Fails, and Greg Walsh. 2018. Child-Computer Interaction SIG: Ubiquity and Big Data – A Changing Technology Landscape for Children. In *Extended Abstracts of the 2018 CHI Conference on Human Factors*

- in *Computing Systems* (CHI EA '18). Association for Computing Machinery, New York, NY, USA, (Apr. 2018), 1–4. ISBN: 978-1-4503-5621-3. DOI: 10.1145/3170427.3185368.
- [6] Hillard Kaplan. 1996. A theory of fertility and parental investment in traditional and modern human societies. en. *American Journal of Physical Anthropology*, 101, S23, 91–135. DOI: 10.1002/(SICI)1096-8644(1996)23+<91::AID-AJPA4>3.0.CO;2-C.
- [7] Priya Kumar, Shalmali Milind Naik, Utkarsha Ramesh Devkar, Marshini Chetty, Tamara L. Clegg, and Jessica Vitak. 2017. 'No Telling Passcodes Out Because They're Private': Understanding Children's Mental Models of Privacy and Security Online. *Proceedings of the ACM on Human-Computer Interaction*, 1, CSCW, (Dec. 2017), 64:1–64:21. DOI: 10.1145/3134699.
- [8] Christopher W. Kuzawa et al. 2020. Evolutionary life history theory as an organising framework for cohort studies: insights from the Cebu Longitudinal Health and Nutrition Survey. *Annals of Human Biology*, 47, 2, (Feb. 2020), 94–105. Publisher: Taylor & Francis. DOI: 10.1080/03014460.2020.1742787.
- [9] Sonia Livingstone and Magdalena Bober. 2005. UK Children Go Online : final report of key project findings. (Apr. 2005).
- [10] Sonia Livingstone and Ellen Helsper. 2010. Balancing opportunities and risks in teenagers' use of the internet: the role of online skills and internet self-efficacy. en. *New Media & Society*, 12, 2, (Mar. 2010), 309–329. Publisher: SAGE Publications. DOI: 10.1177/1461444809342697.
- [11] Jörg Matthes, Marina F. Thomas, Anja Stevic, and Desirée Schmuck. 2021. Fighting over smartphones? Parents' excessive smartphone use, lack of control over children's use, and conflict. en. *Computers in Human Behavior*, 116, (Mar. 2021), 106618. DOI: 10.1016/j.chb.2020.106618.
- [12] Kathryn C. Montgomery, Jeff Chester, and Tijana Milosevic. 2017. Children's Privacy in the Big Data Era: Research Opportunities. eng. *Pediatrics*, 140, Suppl 2, (Nov. 2017), S117–S121. DOI: 10.1542/peds.2016-1758O.
- [13] Reem Nadeem. 2020. Parenting Children in the Age of Screens. en-US. (July 2020). Retrieved Mar. 8, 2023 from <https://www.pewresearch.org/internet/2020/07/28/parenting-children-in-the-age-of-screens/>.
- [14] Daniel Nettle. 2010. Dying young and living fast: variation in life history across English neighborhoods. *Behavioral Ecology*, 21, 2, (Mar. 2010), 387–395. DOI: 10.1093/beheco/arp202.
- [15] Piatã Santana Marques, Luisa Resende Manna, Therese Clara Frauendorf, Eugenia Zandonà, Rosana Mazzoni, and Rana El-Sabaawi. 2020. Urbanization can increase the invasive potential of alien species. en. *Journal of Animal Ecology*, 89, 10, 2345–2355. DOI: 10.1111/1365-2656.13293.
- [16] Paula Sheppard and Kristin Snopkowski. 2021. Behavioral Ecology of the Family: Harnessing Theory to Better Understand Variation in Human Families. en. *Social Sciences*, 10, 7, (July 2021), 275. Number: 7 Publisher: Multidisciplinary Digital Publishing Institute. DOI: 10.3390/socsci10070275.
- [17] Kristin Snopkowski and John P. Ziker. 2020. Sexual initiation among Canadian youth: A model comparison approach of evolutionary hypotheses shows greatest support for extrinsic mortality cues, intergenerational conflict, and early life psychosocial stressors. en. *Evolution and Human Behavior*, 41, 2, (Mar. 2020), 105–116. DOI: 10.1016/j.evolhumbehav.2019.08.003.
- [18] Robert L. Trivers. 1974. Parent-Offspring Conflict. *American Zoologist*, 14, 1, (Feb. 1974), 249–264. DOI: 10.1093/icb/14.1.249.
- [19] Bruce Winterhalder and Eric Alden Smith. 2000. Analyzing adaptive strategies: Human behavioral ecology at twenty-five. en. *Evolutionary Anthropology: Issues, News, and Reviews*, 9, 2, 51–72. DOI: 10.1002/(SICI)1520-6505(2000)9:2<51::AID-EVAN1>3.0.CO;2-7.
- [20] Sarita Yardi and Amy Bruckman. 2011. Social and technical challenges in parenting teens' social media use. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '11). Association for Computing Machinery, New York, NY, USA, (May 2011), 3237–3246. ISBN: 978-1-4503-0228-9. DOI: 10.1145/1978942.1979422.
- [21] John P. Ziker and Kristin Snopkowski. 2020. Life-History Factors Influence Teenagers' Suicidal Ideation: A Model Selection Analysis of the Canadian National Longitudinal Survey of Children and Youth. en. *Evolutionary Psychology*, 18, 3, (July 2020), 1474704920939521. Publisher: SAGE Publications Inc. DOI: 10.1177/1474704920939521.

A OVERVIEW OF PARTICIPANTS

See Table 1 for an overview of the participant's location, children's ages and genders, interview type, and brief description of the family configuration.

Table 1: Overview of participants, general location, interview type, and family configuration.

ID	Location	Children's Ages/Gender	Interview Type	Family Configuration
P1	Urban	8 female	Zoom	Two-parent household
P2	Urban	7 female, 8 male	Zoom	Two-parent household
P3	Suburban	8 male	Zoom	Two-parent household
P4	Urban	10 male	Zoom	Single-parent household
P5	Urban	9 male, 11 male	Zoom	Two-parent household
P6	Urban	7 female	Zoom	Two-parent household (w/ step-parent)
P7	Rural	10 male, 12 male	Zoom	Two-parent household
P8	Urban	11 female	In-person	Two-parent household
P9	Urban	(2) 9 female	Zoom	Two-parent household
P10	Suburban	7 female	Zoom	Two-parent household
P11	Urban	7 male, 8 male, 8 female	Zoom	Two-parent household
P12	Urban	7 female	Zoom	Two-parent household
P13	Urban	8 female	Zoom	Two-parent household
P14	Rural	6 female, 11 male	Zoom	Two-parent household, Hispanic
P15	Urban	12 female	Zoom	Two-parent household
P16	Rural	5 male, 8 female	Zoom	Two-parent household, Cajun
P17	Rural	(2) 7 female, 11 male	Zoom	Two-parent household
P18	Rural	7 male, 9 male	Zoom	Two-parent household
P19	Urban (small)	7 female	Zoom	Two-parent household
P20	Urban (small)	5 female, 9 female	Zoom	Two-parent household

B INTERVIEW PROMPTS

This phase of our study featured semi-structured interviews with parents using the following interview prompts.

- (1) What kinds of things do your children (ages 6-12) do with and without technology?
- (2) What kind of concerns or preferences do you have about the activities they choose?
- (3) What kinds of devices, and how many, do they use?
- (4) What parental controls do you use, if any?
- (5) Tell us about your family's technology rules and limitations, and why you set them.
- (6) What concerns do you have about your child's future technology use?
- (7) Would you consider yourself more or less strict compared to your partner or peers?

C THEORETICAL FRAMING

See Table 2 for an overview of the theoretical frames of references that are aligned with the a brief description of the associated findings.

Table 2: Theoretical frames of reference with corresponding themes derived from interviews.

Theory	Theme from Interviews
Fear Ecology	Parental Perceptions of Threat
Parental Investment	Digital Fluency Parental Resources Parenting Attitudes
Intersection	Threat intelligibility