Not at the Dinner Table: Parents' and Children's Perspectives on Family Technology Rules

Alexis Hiniker
University of Washington
Seattle, WA, USA
alexisr@uw.edu

Sarita Y. Schoenebeck
University of Michigan
Ann Arbor, MI, USA
yardi@umich.edu

Julie A. Kientz
University of Washington
Seattle, WA, USA
jkientz@uw.edu

ABSTRACT
Parents and children both use technology actively and increasingly, but prior work shows that concerns about attention, family time, and family relationships abound. We conducted a survey with 249 parent-child pairs distributed across 40 U.S. states to understand the types of technology rules (also known as *restrictive mediation*) they have established in their family and how effective those rules are perceived to be. Our data robustly show that children (age 10-17) are more likely to follow rules that constrain technology activities (e.g., no Snapchat) than rules that constrain technology use in certain contexts (e.g., no phone at the dinner table). Children find context constraints harder to live up to, parents find them harder to enforce, and parents' most common challenge when trying to enforce such rules is that children "can't put it down." This is consistent with the idea that banning certain technologies is currently easier than setting more nuanced boundaries. Parents and children agree that parents should also unplug when spending time with family, while children alone express frustration with the common parent practice of posting about children online. Together, our results suggest several mechanisms by which designers and families can improve parent-child relationships around technology use.

Author Keywords
Family; technology; rules; parents; children; teenagers.

ACM Classification Keywords
H.5.2 [Information Interfaces and Presentation]: User Interfaces - Interaction styles.

INTRODUCTION
Parents and children have long struggled to integrate new technologies into family life. The introduction of radios, televisions, and video games into households brought with them new discussions—and sometimes panics—about the impact those technologies would have on the family [7,58,64]. Parents, in particular, have worried about their children's eager adoption and heavy use of technology, fearing that it might limit children's development and expose children to advertisements, predators, harassment, and other potential dangers [12,42,44,50,67]. In response, parents have sought to create and enforce rules about how their children use technology [18,37,39,65]. Rules have often focused on how long technology can be used for and what content can be consumed [35,54,66].

However, as technology has become pervasive in children's lives, establishing and enforcing rules has become increasingly challenging for parents [37,41,42,71]. American children are avid technology users [33] and spend more time using technology than engaged in any other activity besides sleeping [36]. And while technology use is associated with a number of risks, it is also associated with positive outcomes, including academic success and healthy development [55]. Thus, parents must support children in the complex task of finding a healthy balance of technology use, rather than the comparatively simpler options of banning or permitting all activities.

This challenge is exacerbated by the fact that parents themselves may be struggling to set and abide by the rules they set for themselves for technology use [1,25,31]. Extensive prior work has documented children's behaviors with technology as well as parents' concerns about technology [48], while other research has explored the effectiveness of different kinds of parental mediation strategies, especially around television watching and PC use [4,14,17,18,39]. However, little research has investigated what rules parents establish for the whole family around technology use–especially newer technologies like tablets and mobile phones–or how parents and children respond to those rules. Even less research has been conducted on how children feel about their parents' use of technology.

We conducted a survey with 249 parent-child pairs in the United States to investigate family technology rules and perceptions of those rules from both parents' and children's perspectives. We examined participants' open-ended descriptions of:

- Rules for children, as reported by children
- Rules for children, as reported by parents
- Rules for parents generally, as reported by children
- Rules for parents generally, as reported by parents
- Enforcement challenges, as reported by parents

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as well as their quantitative responses to prompts about fairness, ease of compliance, and other properties of these rules.

We find that rules for children are divided roughly evenly into two types of restrictions: *activity constraints*, which set boundaries on the specific activities children can engage in when using technology (such as rules that prohibit using social media, swearing, or sharing nude photos), and *context constraints*, which set boundaries on the social and physical contexts in which technology can be used (such as rules that require children to complete chores and homework before turning on the TV, or prohibit texting at the dinner table). Our child participants are less likely to follow these context constraints and report that doing so requires more effort. Our child participants indicated that they find it easier to refrain from sexting, withhold identifiable information, avoid prohibited websites and games, and even give parents access to their social media accounts, than they do to put their phones away during meals, at school, and at night.

We report several other findings, including: children's concerns about the information parents share on social media, a small taxonomy of rule-types that accounts for the overwhelming majority (more than 90%) of family rules, and practices and relationship factors that predict rules' effectiveness. We explore these patterns and suggest approaches for helping families to better manage technology use in family life. Understanding how families establish and follow technology rules promises to help parents raise children in a digital age, to help children make thoughtful and informed choices about their own technology use, and to help designers create technologies that consider not only the needs of the user but also of his or her greater social system.

BACKGROUND AND RELATED WORK

Families' Historical Technology Ownership and Use

Major advances in consumer-facing technologies have routinely been accompanied by both adoption and integration into American family life. In the 1970s, television ownership among families had long been pervasive and viewing was frequently a regular and communal activity, drawing together the entire family to consume the same content [6]. Though independent viewing has increased as families have acquired multiple television sets [6], a substantial body of prior work over several decades has documented that television, VCRs, cable, and related technologies have continually catalyzed socialization within families by creating topics of common interest for conversation and opportunities for shared experiences [20,22,46].

By 2001, family homes were becoming more media rich, with separate physical spaces carved out for television viewing and for computer use [46]. Teens were more likely to have media access in their bedrooms, including VCRs and cable television, which increased their ability to personalize their entertainment media and to retreat from the family [38]. However, families continued to report that they watched television socially with other family members, and by this point had begun to socialize with individuals outside the home through email [46].

While television and email remain fixtures in American life, today's media landscape offers families an array of additional options. In 2012, 77% of children between 12 and 17 owned cell phones, including 87% of those age 14 and older, while 23% of children in this age range owned a smartphone [34]. Parents of children are also heavy technology users; today, 91% own a cell phone and two-thirds use social network sites [74]. A number of recent studies show how parents use technology and social media in their everyday lives [1–3], while other recent research surfaces some of the challenges they experience in managing their own technology behaviors [25].

Parents' Concerns, Rules, and Mediation Strategies

Though consumer-facing technologies have had tremendous success and steady adoption by American families, they have also introduced parental and societal fears about their impact on children and family life. For example, parents have worried that television content is too violent [32], oversexualized [58], and advertising-heavy [50]. Prior work documents parents' concerns that the Internet exposes children to predators [39], facilitates bullying [42], and increases experiences with inappropriate sexual content [63].

Prior work has found many of these fears to be well-founded, tying exposure to violent media content to increases in hostility and hostile attribution bias [56,69], increases in total screen-time to health risks [59], and media multi-tasking to negative long-term emotional outcomes [52]. Other work has documented that media use can disrupt interpersonal family relationships, with romantic partners reporting that cell phone use undermines their communication and relationship satisfaction [40], children saying that parents' phone use during after-school pick-up and school performances is disappointing and impedes closeness [62], and family members showing resentment of one another's solitary use of technology [46]. Further work has documented that parents feel unprepared to raise children in a media-rich world [71].

Yet despite these risks, families find the net impact of technology on daily life and well-being to be positive [5], and many technology-related behaviors are beneficial to children and conducive to healthy development [55,67]. Social media use has been shown to provide a number of benefits such as social capital, wellbeing, and job opportunities [9,10,60]. Thus, parents are faced with the challenge of defining and enabling healthy technology engagement, rather than the comparatively more-straightforward choices of either opting out or permitting unrestricted use. Understanding families' bounds on technology use, and the extent to which children stay within these limits, is an area of active investigation.

Parental Mediation Practices

One of the most effective means [26,57] of reducing children's risk of negative effects of technology is *parental mediation*, a term used to describe the practice of overseeing a

child's exposure to and use of technology and mass media. Increases in mediation lead to reductions in total screen time [8] and selection of higher-quality content [69]. Prior work has documented that three types of parental mediation are common across a variety of technologies: 1) active mediation, where parents and children discuss and reflect on content and usage; 2) restrictive mediation, where parents set limits on permitted activities; and 3) co-viewing, where parents and children consume content together [37,65]. Though many parents have adopted such strategies, roughly half of all families have no household rules or expectations about technology use at all [41].

By reducing total screen time and exposure to media violence, parental mediation improves children's social behaviors, academic performance, and sleep habits [17]. Active mediation is also associated with long-term reductions in aggression and fear of victimization [13,56]. The benefits of mediation have been shown to apply to both young children [66] and teens [54]. Yet despite its beneficial effects, 1) some common mediation strategies are relatively ineffective (e.g., discussing content with children has more protective effects than passively viewing it with them [37]), 2) the effectiveness of mediation practices likely depend in part on parent and child demographics [35] and individual differences in child behavior [67], and 3) children continue to encounter risky and unpleasant situations when using technology even when their parents engage in mediation routinely [42,70]. Thus, while mediation is well-established as a recommended and effective means of fostering healthy behavior, defining personal mediation practices is far from straightforward. Our study explores family practices that fall under the umbrella of restrictive mediation—the rules and expectations families establish around technology use.

Mediating Parents' Use of Technology

Prior work has documented that family rules about technology typically concern the content children consume and the total amount of time they spend with technology [35,47,54,58,66]. By comparison, there has been very little exploration of household guidelines about adults' technology use, despite the fact that parents' media habits predict children's media habits [24]. Some research suggests that adults do reflect on this topic and consider their technology use through the lens of its potential impact on children and child behaviors [1,25]. Adults also consider the impact of their technology use on other family members, such as romantic partners negotiating technology use in the context of its impact on relationship quality [11,40]. We build on prior work by documenting the technology rule-types that are prevalent today, the alignment between parents' and children's perspectives on these rules, and the degree to which families extend these expectations to parents.

METHODS

We prepared two related but independent surveys with one version designed for parents and a second corresponding version designed for children. These surveys were intended to elicit information about family rules and expectations regarding technology use. We intentionally left it to participants to interpret "technology" as they saw fit. Our analysis of their free responses suggests that most reflected on technologies like mobile phones, television, computers, and other Internet-enabled devices. We included additional modules in the survey to collect data on topics beyond the scope of this investigation; this data is not reported here.

Parent Survey: The parent survey began by asking parents the first name of the child who was participating and the age of that child. In the recruitment, if the parent had more than one child, they were asked to pick one child who was between the ages of 10-17 and to think of that one throughout the survey. The child's first name was coded into the rest of the survey questions to ask the parent specifically about that child.

Each parent was asked to describe two rules regarding technology use they have for this target child. The parent reported each rule through a free-recall, open-ended response. For each rule, we then asked a series of Likert questions probing:

- Whether the child knows about this rule
- How often the child follows it
- How difficult it is to enforce
- How acceptable it is for the child to break it
- How much input the child had in establishing it

We further asked the parent to provide an open-ended description of the biggest challenge they experience, if any, in trying to enforce each preference or rule. Finally, we asked each parent to provide two open-ended descriptions of technology-related rules they believe parents in general should follow.

For each adult, we also measured parenting satisfaction and parenting self-efficacy using the Parenting Sense of Competence Scale (PSOC). This scale was originally developed by Gibaud-Wallston and Wandersman (1978) for parents of infants and was later adapted by Johnston and Marsh (1989) for parents of older children [30]. The 17-item validated instrument measures parenting frustration, anxiety, and motivation (satisfaction) and competence, problem-solving ability, and capability (efficacy) [51]. The final set of questions were demographic in nature and drew on survey items used in Pew Research Center surveys.

Child Survey: The child survey was structured similarly to the parent survey, first asking the child's age and relationship to his or her adult counterpart (e.g., "Mother," "Stepfather," etc.), which we coded into the rest of the questions. We then asked each child for an open-ended description of two preferences, expectations, or rules that his or her parent has about how he or she uses technology. Using a series of Likert-style questions, we followed up on each rule, asking:

- How often the child follows the rule
- How difficult it is to follow
- How acceptable it is not to follow this rule

- How much input the child had in establishing it
- How fair the child believes it is

As with parents, we asked each child for an open-ended description of two rules about technology use that he or she believes parents should follow.

Each child then completed the Parent-Adolescent Relationship Scale (PARS) [19], a validated 8-item instrument that measures the quality of the parent-child relationship from the child's perspective. The first three questions investigate the child's identification with their parent (e.g., "S/he is a person I want to be like") and the next five measure perceived parental supportiveness (e.g., "How often does s/he praise you for doing well?"). Finally, we collected demographic information on the child's grade in school, gender, family composition, and average academic grades.

Recruitment and Analysis

Participants were recruited through a national recruitment service. An email solicitation invited one parent and one child per family to participate in an online survey about technology use. Once the parent completed the survey, he or she was presented with a new unique URL linking to the child survey described above. The parent was asked to provide this URL to his or her child and to give the child privacy while he or she completed the survey.

In total, 1,917 parents clicked on the recruitment message to open the survey. Of those, 766 clicked through the consent process to begin the survey. We filtered out incomplete surveys, surveys answered only by one member of the dyad, surveys with a large proportion of invalid (e.g., nonsense) responses, and surveys with implausibly high agreement between parent and child (such as identical lengthy descriptions of the rules) suggesting the child did not complete his or her survey independently. Our final sample included 249 dyads representing 498 participants.

Participants were distributed across 40 different U.S. states. California, New York, Florida, New Jersey and Ohio had the highest rates of participation, roughly consistent with the geographic distribution of the U.S. population [76]. Mothers participated more than fathers, and the median reported parent age was 43 (ranging from 27 to 76). Among child counterparts, 55% were female, and the median reported age for children was 13 (ranging from 10 to 17). We refer to this sample as "children" (rather than pre-teen, teen, or adolescent) throughout, to capture the 10-17 age range and to highlight the parent-child relationship in this framing.

Our data oversampled white Americans, who currently make up 64% of the U.S. population [75] but 78% of our sample. It also oversampled families with two partnered adults (80% compared to 61% nationally) [73]. 47% of parents reported an annual household income between $30,000 and $75,000, consistent with census data reporting a median household income of $52,250 in the United States [49]. Comprehensive demographic information is reported in Table 1.

Parent gender	Male (31%), Female (69%)
Parent age	Mean (sd) = 43.3 (8.8) years Minimum = 27, Maximum = 76
Parent race	Non-Hispanic White (78%), Black (8%), Hispanic (7%), Asian (4%), Mixed Race (1%), Other (2%)
Parent education	High School or Less (18%), Some College (34%), Bachelor's Degree (25%), Some Graduate (9%), Graduate Degree (14%)
Parent political views	Very Conservative (10%), Conservative (22%), Moderate (45%), Liberal (16%), Very Liberal (6%)
Parent marital status	Married (71%), Living with a Partner (9%), Divorced (10%), Separated (1%), Widowed (1%), Never Married (8%)
Parent employment	Employed (47%), Employed Part-Time (13%), Stay-at-Home Parent (31%), Looking for Work (4%), Retired (3%), Student (2%), Unable to Work (2%)
Child gender	Male (45%), Female (55%)
Child age	Mean (sd) = 13.3 (2.3) years Minimum = 10, Maximum = 17
Child GPA	A (28%), A/B (46%), B (13%), B/C (10%), C/D (2%), School Does not Use Grades (1%)
Household income	< $30K (14%), $30-50K (23%), $50-75K (25%), > $75K (38%)

Table 1. Participant demographics (n=249 dyads)

We coded all open-ended responses iteratively using a grounded-theory approach to qualitative analysis [61]. We coded the following participant responses for themes:

- Rules for children, as reported by children
- Rules for children, as reported by parents
- Rules for parents generally, as reported by children
- Rules for parents generally, as reported by parents
- Enforcement challenges, as reported by parents

We repeatedly recoded data to accommodate emerging themes. Responses were initially coded by a single researcher who established code categories with examples in a communal code book. The code book was reviewed and revised iteratively by the research team. After coding was complete, a second researcher coded a randomly selected 10% of the data (25 dyads) across all responses. Cohen's κ was .703 for rules and .850 for enforcement challenges.

RESULTS

Technology Rules for Children

Rules for Children as Reported by Children: Of our 249 child participants, 6% reported that their parents have no rules or expectations about technology use at all. Another 4% only described one rule or expectation. Thus, our child participants described a combined 455 unique rules. Of these, 91% fit neatly into one of 12 thematic categories (see Table 2). Of the rule descriptions that we were unable to categorize, the

majority were too vague to capture a specific rule (e.g., "*Keep it appropriate*," "*Use it wisely*"). A few others described rules that were not specific to technology (e.g., "*No staying out late*," "*No boyfriends*"). Of the full set of 455 child-reported rules, only eight were specific, technology related, and outside the themes listed in Table 2 (e.g., one rule about keeping the phone charged, another about keeping the volume turned down).

Rules for Children as Reported by Parents: Adults' reports about rules and expectations for their children were similar. Of our 249 adult participants, 2% reported that they have no rules or expectations about how their child uses technology, and another 2% only described one rule or expectation. A Wilcoxon signed ranks test revealed that children were significantly more likely than parents to report having no rules at all ($Z = -2.673$, $p = .008$), consistent with prior work showing that parents report more technology monitoring than their children [16,68].

Altogether, our parent participants described a total of 481 rules for their children. As with data collected from children, 437 (91%) of these parent-reported rule descriptions fell under the same 12 categories. Though the frequency with which adults mentioned each category differed slightly from the frequency with which each category was reported by children (Figure 1 shows ranked frequency for each group), the categories of rules and the salience of each category were well-aligned between children and adults.

Of the rule descriptions from adults that did not fit any of these themes, the majority either were too vague to convey a specific rule ("*Be cautious*"), described a rule that was not related to technology, or made a statement about technology usage habits that was not related to family rules. Of the 481 rules described by parents, only 16 described technology-related rules that did not align with any of the dominant themes (e.g., "*He can't let other people use his phone*").

Activity Constraints and Context Constraints

Prior work has documented parents' concerns about the activities children engage in with technology (e.g., [12,37]). Our data suggests that parents also establish rules about the context of the technology use. That is, in addition to restrictions on what children do with technology, families also have expectations about when, where, and how they do it. Accordingly, we divided the 12 themes described above into those that constrain the ways in which children use technology (e.g., requiring that they post respectful comments or withhold personally identifiable information) and those that constrain the contexts in which children are permitted to use technology at all (e.g., putting it away in certain social contexts or after a time-limit has elapsed). We labeled these categories *activity constraints* and *context constraints*. We found that rules reported by children were almost perfectly split between these two categories, with 213 activity constraints and 200 context constraints. Similarly, both categories were well-represented among rules reported by parents, with 254 activity constraints and 183 context constraints.

Enforcing and Following Rules for Children

Across all rule categories, children reported that they follow 83% of these rules "most" or "all" of the time. They reported that 64% of rules were either "a little bit easy" or "very easy" to follow. Like children, parents felt that children were generally compliant and reported that children follow 87% of these rules either "most of the time" or "always." Similarly, they reported that 70% of these rules were either "a little bit easy" or "very easy" to enforce. We examined the relation-

Category	Description: Example	Constraint
Be present	No technology at all in a certain social context: "I am not allowed to use anything during dinner, including TV. My dad is pretty strict about that."	Context
Privacy	Protect identity and personal information: "To be safe and not give anyone my real name or where I live."	Activity
Not at night	No technology after bedtime: "I can't have my cell phone in my bed when I'm sleeping."	Context
Parent audit	Real-time check-ups by parents: "My parents are allowed to check my phone anytime."	Activity
Content restrictions	Ban on a site, game, activity, or device: "He made me stop playing grand theft auto"	Activity
Responsibilities first	No technology until certain obligations are fulfilled: "I can't play with my computer games till I finish my school work."	Context
No sexual content	No producing, sharing, or viewing sexually explicit media: "Absolutely no racy pictures is his staunch rule."	Activity
Time-bound	Fixed time limits: "Even if I'm in the middle of a game, when my time is up that's all the time I get."	Context
Moderate use	Use technology in moderation and balanced with other activities: "Limit games during the weekend, go outside instead."	Context
Be kind	No hurtful comments about others: "I should always think about the possible consequences of my actions, would I like the post if it were about me?"	Activity
Cost restrictions	Specific restrictions to save money: "No data without wifi."	Activity
No bad language	No sexually explicit language or swear words: "I can't cuss online or in texting."	Activity

Table 2. Taxonomy of rules for children and sample descriptions from children

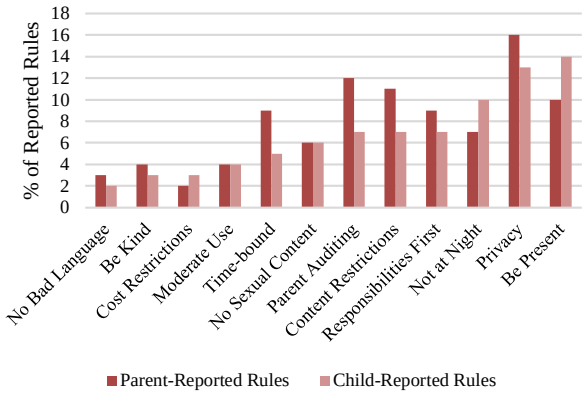

Figure 1. Theme frequencies for children and parents

ship between children's input into rule-setting, children's perceptions of the fairness of the rules, children's compliance with rules, and how easy children feel it is to follow rules. We found highly significant correlations among all four of these measures (see Table 3).

To model these collinear relationships with higher fidelity, we drew on recent research demonstrating that individuals are more committed to contracts when they have input into contract definition, as active participation leads to perceptions of contract-fairness which in turn increase compliance [15]. A Sobel test confirmed that, within our sample, children's perceptions of rule-fairness completely mediate the relationship between children's input into rule setting and their ability to follow these rules (see Figure 2). This suggests both that a child's perception that a rule is fair increases his or her commitment to follow it, and that involving the child in the rule-setting process is one effective way of fostering a sense of fairness.

Child Compliance and Rule Type

We also examined how the type of rule affects children's ability to follow it. We compared children's perceptions of activity constraints (where children were asked not to engage in specific activities when using technology) with children's perceptions of context constraints (where children were asked not to engage with any technology in certain contexts). An independent samples *t*-test revealed that children were significantly more likely to follow rules about activity con-

	Rule is easy to follow	Had input in setting rule	Believes rule is fair
Follows rule	.563**	.070	.433**
Rule is easy to follow	-	.173**	.582**
Had input in setting rule	-	-	.292**

***p < .001*

Table 3. Correlations among children's beliefs about rules

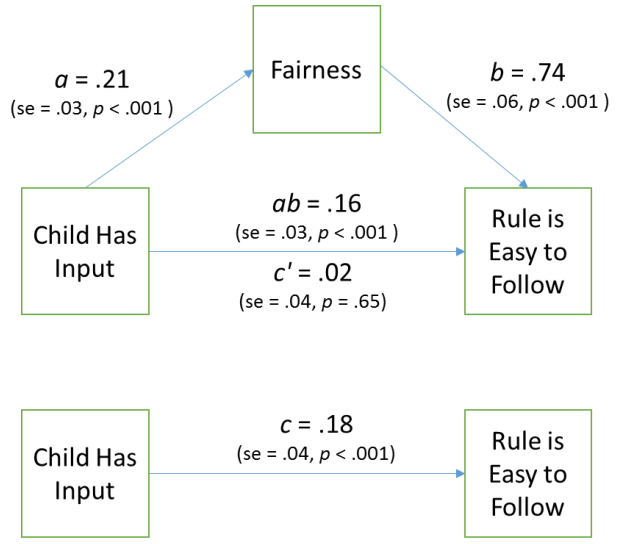

Figure 2. Children's perceptions of rule-fairness completely mediate the relationship between child-input into rule setting and their ability to follow the rule

straints (mean = 3.46, sd = .733) than about context constraints (mean = 3.08, sd = .789, $t = 5.02$, $p < .001$). Similarly, children reported feeling that rules about activity constraints were significantly easier to follow (mean = 3.42, sd = .787) than rules about context constraints (mean = 2.72, sd = 1.01, $t = 7.77$, $p < .001$). Thus, children reported finding it easier to comply with rules that restrict them to particular technology activities than rules that prohibit them from using technology at all, even for short periods of time (such as during a family meal).

We further examined the relationship between rule type and children's compliance in light of the high collinearity between children's compliance and other rule-properties. We created a linear regression model that included rule type (i.e., activity constraint or context constraint), child age, child gender, strength of parent-child relationship (as measured by the identification and supportiveness subscales of PARS), the degree to which the child had input into setting the rule, the degree to which the child believes the rule is fair, and the degree to which the child believes his or her parent would be tolerant of the child breaking the rule, as independent variables. We used the degree to which the child follows the rule as the dependent variable. This model explained a significant amount of variance in the degree to which the child followed the rule ($F(8, 404) = 20.24$, $p < .001$).

Parent supportiveness, believing a rule is fair, and whether a rule is an activity constraint or a context constraint each explained a significant amount of variance in rule-following (see Table 4). Thus, even after controlling for fairness, input, age, gender, and parent-child relationship, whether or not a rule requires a child to put technology away for a certain period of time remains a highly significant predictor of whether he or she will follow it.

Coefficients	*B*	SE_B	*β*	*p*
Intercept	1.18	.42		.006
Rule type	-.28	.07	-.18	< .001
Believes rule is fair	.39	.05	.38	< .001
Had input in setting rule	-.06	.03	-.08	.09
Identifies with parent	.10	.05	.09	.081
Parent supportiveness	.27	.09	.16	.001
Child age	-.01	.02	-.04	.367
Child gender	.123	.07	.08	.07
Average grades	-.03	.03	-.06	.174

B = unstandardized regression coefficient; *β* = standardized coefficient

Table 4. Regression analysis predicting whether a child will follow a rule

To understand whether parents also perceived a gap in compliance based on rule type, we also examined the effect of rule type on parents' ability to enforce rules. An independent samples *t*-test revealed that parents find it harder to enforce rules about context constraints (mean = 2.91, sd = .977) than rules about activity constraints (mean = 3.38, sd = .862, $t = 5.21$, $p < .001$). And they agree with their children that children are less likely to follow rules about context constraints (mean = 3.12, sd = .763) than rules about activity constraints (mean = 3.57, sd = .707, $t = 6.31$, $p < .001$).

These results suggest that rules that create a context constraint are harder for children to follow than rules that create an activity constraint. From this, we hypothesized that when children are able to abide by these context constraints, doing so will require extra effort relative to the effort necessary to comply with activity constraints. To test this prediction, we ran a repeated-measures ANOVA with the degree to which a child follows a rule and the degree to which the child feels the rule is easy to follow as two different measurements of compliance. We treated rule type (activity constraint or context constraint) as a between-subjects' factor. We predicted that we would see a bigger gap between how easy it is to follow a rule and how often the child follows when the rule is a context constraint, reflecting the greater effort required to comply with rules which require a period of time when technology must be put away.

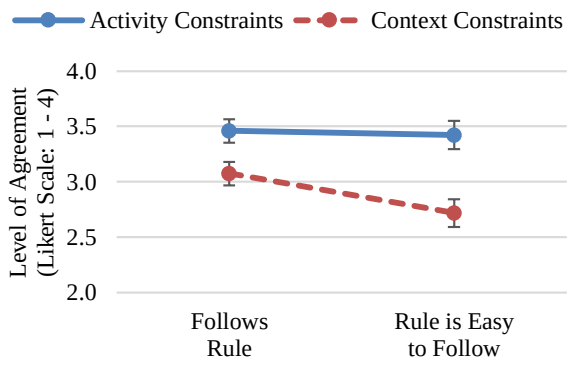

Figure 3. Children's ability to follow rules by rule type (activity or context constraint) and the effort they expend to achieve this level of compliance. Error bars = 95% CI.

As shown in Figure 3, we found the predicted interaction effect between rule type and compliance measure. Though our child participants are significantly less likely to comply with rules about context constraints than rules about activity constraints ($F(1, 394) = 54.71$, $p < .001$), they are working harder to achieve this lower rate of compliance ($F(1, 394) = 15.57$, $p < .001$).

Compliance Challenges

To better understand families' perspectives on the possible driving forces behind compliance and non-compliance, we looked to parents' self-reported enforcement challenges. For 381 of the 437 meaningful rules reported by parents (87%), the greatest enforcement challenge aligned with one of nine major themes (see Table 5).

Of the challenges that did not align with these themes, the majority were not specific enough to be categorized (*"He doesn't always listen*," "*A bit of a challenge*"). Others were not truly descriptions of challenges but rather more general discussions of the respective rules ("*Only during some emergency can this be broken*"). Of the 437 meaningful rules reported by parents, 14 were accompanied by a description of a specific enforcement challenge that fell outside the themes listed in Table 2 (such as inconsistent enforcement between two different parents or difficulty asking a child to follow a rule when parents do not).

We also examined the effect of rule type on the type of enforcement challenges parents reported. A chi-square test revealed highly significant differences in the types of challenges parents face when trying to enforce an activity constraint compared to a context constraint ($\chi^2(8) = 51.7$, $p < .001$). Post-hoc contingency-table analysis revealed that specifically, parents are more likely to report that they have few or no challenges if they are trying to enforce an activity constraint ($Z = 4.00$, $p < .001$), and they are more likely to report that they struggle to enforce the rule because their child "*Can't Put it Down*" if they are trying to enforce a context constraint ($Z = 6.40$, $p < .001$). There were no significant differences between activity and context constraints with respect to any other enforcement challenges. A Bonferroni correction was applied to all comparisons.

Rules and Expectations for Parents

Separately, we examined both child and parent reports about the rules or expectations about technology use that they believe are appropriate for parents. We found that these differed substantially from the expectations families set for children. We report separately on children's and parents' expectations for parents.

Challenge	Description: Example
None (57%)	Parents reported having no challenges enforcing this rule: "Not many [challenges]. He always comes and talks to me when he thinks he may be doing something questionable."
Hard to monitor (12%)	Parents feel unable to monitor their child's technology use: "I can't be with him all the time when he's using electronics, nor can I control what happens at other people's houses."
Can't put it down (7%)	The child is unable to disengage from technology: "She always wants it. She never wants to put it down."
Extrinsic motivation (7%)	Children only comply if faced with rewards and punishments: "Sometimes he doesn't listen until I take the device from him."
Ideology (6%)	Children disagree about whether these rules should be in place: "[She] wants to follow her own rules, she thinks she knows very well to take her own decisions."
Peer influence (4%)	Children's friends make it difficult to comply with rules: "She sometimes hears about things from her friends and thinks it's ok."
Work-arounds (4%)	Children have found ways to obviate parent monitoring: "Deleting history of sites visited."
Time-bound (2%)	Forgets the rules: "He forgets to shut down."
Technology influence (1%)	Features of the technology encourage children to ignore rules: "Even if she tries not to pay attention to the phone it is always beeping with texts and she finds difficult to control the urges to text back."

Table 5. Enforcement challenges reported by parents

Children's Expectations for Parents

Of the 249 children in our sample, 43 (17%) reported that they believe adults should not be held to any rules or expectations about their technology use, saying things like "*they are adults, they can do whatever they want*." Of the remaining 203 children, 29 only described one rule or expectation. Thus, children described 383 rules for parents. Of these, 42 (11%) were not specific enough to be meaningful ("*No inappropriate stuff*"), 8 discussed technology but did not describe a rule, and 7 described a rule that was not technology-specific. This left 326 specific rules for parents. Of these, 92% fell into one of 7 major themes or 5 minor themes. The major themes are described in Table 6. The minor themes (which each composed less than 3% of all reported rules) were Time-bound (3%), Not at Night (2%), Be Kind (2%), No Sexual Content (2%), and Responsibilities First (2%). An additional 22 rules about technology use (7%) were unique and fell outside the themes listed above. These one-off rules varied widely (e.g., "*Type with two thumbs*," "*Play games with me*," "*Always check news media*"). However, the overwhelming majority of rules were thematic and fit within a small set of major themes.

Parents' Expectations for Other Parents

Parents and children reported similar views on the types of technology use that are appropriate for parents. Of our 249 parent participants, 5 felt that parents should not be held to any rules while 9 described only one rule or expectation, and 2 chose not to respond. Thus, our participants reported 475 rules for parents. Of these, 49 were not specific enough to be meaningful and another 14 either did not apply to parents, did not apply to technology, or did not describe a rule or expectation. Of the 412 meaningful rules, 91% fell into one of 10 themes: Be Present (25%), Supervise (21%), Privacy (9%), Moderate Use (7%), No Oversharing (7%), Model appropriate use for children (7%), Time-bound (5%), Not while Driving (3%), Be Kind (3%), and No Sexual Content (3%).

Adult responses surfaced 8 of the same themes that children reported, and the most common theme among children's expectations for parents, "Be Present," was also the most common expectation among parents. Like children, adults said that they believe parents should: "*Put all technology down when eating meals and talking with the kids*," "*Not be on social media when you can be spending time with family*," and "*When you're spending time with family you should not be on electronics.*"

While adults' and children's perspectives were largely aligned, the frequency with which they reported certain rule types differed significantly ($\chi^2(13) = 158.5$, $p < .001$). Post-hoc contingency-table analysis revealed that adults were more likely than children to state that parents should establish rules for their children's technology use ($Z = 5.50$, $p < .001$), less likely than children to denounce oversharing ($Z =$

Be present (19%)	No technology at all in a certain social context: "Pay attention/put down the phone when your child is trying to tell you something important"
No oversharing (18%)	No sharing information about children without explicit permission: "Don't post anything about me without asking me"
Child autonomy (11%)	Allow children to make their own decisions about their technology use: "Let kids have their private time on social media without their interference."
Moderate use (10%)	Use technology in moderation and balanced with other activities: "Don't spend all your free time on this stuff."
Supervise children (7%)	Establish and enforce technology-related rules for children: "I think parents should check out websites before kids my age use because there are a lot of bad people out there."
Not while driving (6%)	"Don't text at red lights."
No hypocrisy (6%)	Parents should follow the rules they set for children: "Practice what they preach, stay off internet during mealtimes."

Table 6: Taxonomy of Technology Rules for Parents

-4.27, $p < .001$), were not concerned with differentiated rules for children and for parents (which children perceived as hypocritical) ($Z = -4.91$, $p < .001$), were more likely to bring up the importance of modeling appropriate technology use for children to emulate ($Z = 4.77$, $p < .001$), and were less concerned with respecting children's technological autonomy ($Z = -6.75$, $p < .001$). A Bonferroni correction was applied to all comparisons.

DISCUSSION

Our results demonstrate that a well-defined set of common concerns govern the rules and expectations around modern technology use within families. Children and adults are largely in agreement about the expectations that are most salient, and they independently report the same types of household rules. Though children and adults report similar pictures of the world, the rules they describe for children and the rules they describe for adults are quite different. We discuss each of these sets of expectations in turn.

Rules for Children

Reported rules for children were divided roughly evenly between activity constraints, which limit the behaviors children can engage in when using technology, and context constraints, which limit the contexts where technology use is permitted. Thus, for our families, defining the bounds of appropriate use means both characterizing what children do with technology as well as when they do it.

This is consistent with prior work demonstrating that household rules about technology are driven by its effect on the family social system [46]. Historically, this has led to rules that focus primarily on the content children consume and the total amount of time they spend with technology (e.g., television, video games, desktop personal computers) [12,37,66] with less emphasis on the context in which it is used. Today, families appear to be equally concerned with the content and social context of children's technology use, a difference that might be explained by the more portable and personal nature of technology today that makes context more important (e.g., texting at the dinner table) [27].

Our results show that child buy-in predicts compliance irrespective of rule type, and giving children input into the rule-setting process was strongly correlated with children's ability to follow rules. The fact that this relationship was mediated by children's perceptions that these rules are fair suggests that establishing this sense of fairness could play a causal role in increasing children's compliance.

This data is consistent with the intuition that collaborative rule-setting with children is an effective mechanism for engendering perceptions of fairness [15]. Given the mediating influence of fairness on child input, these results are also consistent with the possibility that other mechanisms that build up children's perceptions of fairness and establish ideological consistency between parent and child could be similarly effective in increasing compliance. Our data suggest that discussing the reasoning behind rules, holding parents to similar standards when appropriate, and applying rules consistently may all be successful approaches for increasing child compliance.

Recent work implementing technological supports for family rule-setting touched on these relationships between child input, fairness, and compliance by proactively including children in the rule-setting process [23]. Our results support this approach and lay the groundwork for creating a predictive model of rule-setting practices, child beliefs, and rule-compliance. Future work is needed to develop these findings into formal theory that could be used to guide the creation of such tools.

Regardless of whether children believe rules are fair, our results repeatedly show that it is more challenging for them to abide by context constraints than activity constraints. Children reported that they were less likely to follow such rules and that they were working harder to follow them. This difficulty persisted even after controlling for age, gender, academic grades, parent-child relationship, the child's perception of the fairness of the rule, and whether the child had input into setting the rule.

Adults agreed; they reported that they expend more effort enforcing context constraints than activity constraints and that children are less likely to comply with such rules. When discussing context constraints, parents were more likely to say that their greatest challenge was that their child just cannot seem to disconnect, and they were less likely to report having no enforcement challenges at all.

These results suggest that not only is the context in which technology is used a concern that now accounts for roughly half of all family technology rules, it is also the largest source of technology-related non-compliance and disagreement between parents and children. Though parents reported no difference in children's awareness of family expectations of context constraints as compared to activity constraints, the inability to unplug makes this type of rule particularly challenging for children and a source of tension for families.

A large body of prior work outside family contexts has shown that it is difficult for adults to set aside technology, even when they believe continued connectivity is inappropriate or unnecessary [21,29,40,43]. Our results suggest that this theme extends to children as well, and that this draw is so powerful that resisting the urge to check in is more difficult than complying with any other kind of technology-related boundary.

Finally, these results suggest that all-or-nothing approaches to mediation are currently easier to maintain than more nuanced positions. Our child participants found it easier to follow rules that prohibited them from owning smartphones or using social networking sites than rules that required them to put away smartphones and refrain from social networking in specific contexts. This suggests that designing to support

context-specific use could improve families' experiences enforcing context constraints and facilitate family rules that limit, rather than ban, various technologies.

Rules for Parents

In most respects, expectations for adults differed from expectations for children. Adults were censured for using their phones while driving, modeling inappropriate behaviors for children, failing to live up to the family-wide rules they set themselves, and sharing content about children without permission, none of which emerged as common concerns about children.

Though parents and children surfaced many of the same themes about appropriate adult use of technology, there were several ways in which their perspectives differed. Children were twice as likely to report that adults should not "*overshare*" by posting information about children online without permission. Children were also significantly more likely to report that adults should be held to the same rules as children and that adults should respect children's autonomy with technology. Adults were significantly more likely than children to say that parents should supervise their children's use of technology and model appropriate usage behavior.

While most of these discrepancies are consistent with tensions over shifts in authority that characterize adolescence, children's frustrations with parents' oversharing stands apart as a challenge that transcends existing power dynamics. Child participants reported that they find this content embarrassing and feel frustrated that parents publicly contribute to their online presence without permission. Prior work has shown that teenagers have such concerns about their peers as well and establish contracts within friend groups, such as agreeing not to tag one another in photos or doing so only with explicit consent, to mitigate this challenge [28]. Our results suggest that children's need to control their online image is undermined by the common parent practice of sharing information about children online, a result that echoes recent works suggesting that parents feel other parents overshare as well [72].

Prior work has shown that adults routinely share information about their children on social network sites during infancy and early childhood [31,45] and that these parents worry about how children will perceive such posts in the future [72]. Our data suggest that older children do indeed have concerns about this practice, and further, that a discrepancy exists between the extent to which children and parents find it problematic. This data calls for future work to understand how families negotiate the terms of acceptable information-sharing, whether adults feel this behavior is appropriate, and the long-term effects, if any, of routine oversharing. Future work is also needed to explore how children's perspectives change with age.

Despite the differences in rules for parents and rules for children, the most commonly reported expectation for both groups was that they put all technology away in certain social contexts, such as family meals or during conversations, indicating that this concern applies to family members of all ages. Parents and children alike feel that all family members should be expected to set aside devices during dedicated periods of time. Children say that parents should be responsive, initiate family time, and follow their own rules about banning devices at the dinner table, despite the fact that these same children report struggling to follow such rules themselves.

Our results suggest that families are wrestling with an unresolved challenge of how to live up to their own ideals about contextually appropriate technology use, consistent with prior work suggesting that parents struggle to pay attention to physically present family members while using technology [25,40,53]. Our results further suggest that families are aware that technology compromises their attention and that they are actively holding one another accountable for this divided attention. Both adults and children report that they 1) value parents' ability to attend to their physical surroundings, 2) believe that adults should set technology aside when the social context demands it, and 3) hold these expectations for both their own family members and for parents generally.

CONCLUSIONS AND FUTURE WORK

Our results indicate that families in the U.S. struggle with common challenges around technology use. Children find it difficult to comply with requests to disconnect, parents share more information online than their children are comfortable with, and the most salient concern among both parents and children is the desire for all family members, regardless of age, to pay attention to one another when in one another's company. Our results also indicate common patterns of harmony within families and common tools for improving tension over technology use. Parents report less difficulty enforcing rules about the content children can access, and rule-setting processes that involve children are associated with improved ideological agreement between parent and child as well as increased commitment to abiding by rules.

This work suggests a need for future investigation to examine the source of the discrepancy between complying with activity constraints and context constraints. Though parents reported that, for children, this struggle stems from the fact that they just "can't put it down," we did not probe which technological and social affordances of children's technologies (e.g., texting, selfies, social media sites) make context constraints uniquely challenging. Further work in this area promises to inform the design of technologies that facilitate contextually appropriate usage. Today, commercially available supports for family technology rules, such as Net Nanny or iOS Restrictions, primarily address activity constraints. Our results show that a design opportunity exists to address context constraints, rules that children and adults alike report are a struggle for families.

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