Technoference in Parenting and Impacts on Parent–Child Relationships and Child Development

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1 Background

Technology use has become a dominant feature of modern parenthood. According to phone logged data, parents spend on average 5 hours per day using phones [1]. The presence and use of technology sometimes lead to distraction and interruptions in parenting and parent–child interactions. In this chapter, we refer to this technological interference as "technoference," [2–4] which has also been referred to as "phubbing" when interference refers specifically to phone use.

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Both self-report and naturalistic observation studies show that technoference (1) is quite common during parenting, (2) occurs across many different contexts (e.g., playtime, bedtime, mealtimes/feedings), and (3) sometimes consumes a substantial proportion of parenting time [1, 2, 5, 6]. For example, a recent phone tracking study found that parents used their smartphone during 27% of the time spent with their infant, with some ranging as high as 75% [1].

As will be highlighted in this chapter, technoference can be cause for concern, as research links it to a variety of potentially negative outcomes, such as decreased parent responsiveness and increased child behavior problems [5, 7–9]. Yet, technology use can also support parents through mechanisms such as stress relief or access to support or resources [10, 11]. Parents' feelings and experiences regarding device use during parenting are mixed, complex, and guilt-prone [10, 12]. Due to these complexities, it is not sufficient to focus solely on the potential for devices to interrupt parenting. The current chapter considers characteristics of families, children, and environments as we highlight: (1) the potential positives and negatives of parent technology use for parents, parenting, and child development, (2) areas for future research, and (3) recommendations regarding studying and intervening in parent device use and technoference.

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2 Current State

2.1 Potential Negatives of Device Use and Technoference for Parents and Parenting

Device use, especially if heavy or not managed intentionally, has the potential to change parenting behavior and parent–child interactions. Ethnographic and observational studies conducted across a variety of settings and activities have documented that parents who use smartphones around their children exhibit less appropriate, more negative, and less timely responses to children's bids for attention [5, 13–16]; engage in less joint play and conversations and have poorer quality engagement [7, 17, 18]; and exhibit lower sensitivity/warmth [9]. Additionally, technoference may sometimes make parents less aware of dangerous situations or injuries [14], and technoference is associated with less desirable parental feeding practices, including lower responsiveness to child hunger/fullness cues and greater use of food to regulate children's emotions [6, 19]. Yet, not all studies demonstrate the same negative pattern of results [7, 18, 20, 21].

Laboratory and experimental research has further demonstrated that smartphone use significantly decreases parent–child interaction quality via decreases in parental sensitivity, parent-child talk, initiation of interactions, and joint attention [21, 22]. Yet, laboratory studies have also demonstrated that the impact of technological distraction on the quality of parent–child interactions may not be inherently different from non-digital distraction [20]. Rather, the interactive nature and features of media may result in higher levels of absorption [13], which in turn reduces the quality of parenting [7]. For example, persuasive design features—such as autoplay, infinite feeds, reward loops, nudges—are incorporated into devices/apps. Also, device use is embedded in daily life, and many express a growing attachment to their devices. These features and feelings often lead to unintentional distraction and disruption [2, 4].

In addition to the impact on parent–child dynamics, parents report experiencing information overload, feeling less close to their child during interactions when technology is present, and feeling more cognitively fatigued due to multitasking between their phone and their child [10]. Associations between parent device use, stress, and well-being are complex. For instance, parents with greater depressive symptoms and greater stress report more device use around their child [23]; yet, parents also feel their device use can support their mental health and emotion regulation [10]. For example, parents report using their phones to calm down or stop from overreacting in stressful parenting moments [4, 11]. However, parents who report more problematic device use around their child also perceive they are parenting more poorly [23], and experiences of guilt are common, which could exacerbate potential effects on parenting and parent well-being [12]. Indeed, in a sample of 268 US parents, up to 80% desired to change some aspect of their phone use and likely experienced difficulties controlling their phone behavior [1].

2.2 Potential Negatives of Parent Device Use and Technoference for Children

Much of children's social, emotional, and cognitive learning occurs within the context of responsive caregiver–child interactions, and technoference may reduce the frequency and quality of these interactions [22].

2.2.1 Social-Emotional Development

Cross-sectional studies show that technoference is associated with greater child negative affectivity [6, 19] and greater child internalizing (e.g., anxiety, withdrawal) and externalizing (e.g., tantrums, acting out) behavior [3]. Additionally, laboratory studies where parents are instructed to withdraw from a free play interaction with their infant to engage with their mobile devices demonstrate that infants notice and react negatively to technoference by increasing negative affect, social bids for their parents' attention, and self-comforting behaviors, as well as decreasing positive affect [24, 25]. While these findings may

represent negative impacts of technoference on child behavior, studies have demonstrated that parents who perceive their children's behaviors to be more challenging are also more likely to use mobile devices as a coping mechanism [8, 10], which poses questions regarding the directionality of effects. Longitudinal research has started to parse out potential bidirectional mechanisms in which technoference negatively impacts children's early behavior, which in turn increases parenting stress, and subsequently increases parental technoference over time [8]. In addition, some studies report that children of mothers with greater habitual device use are less impacted during interactions and that mothers may adapt how they split their attention during technoference [21], suggesting the parent–child dyad may adapt to parent device use over time.

2.2.2 Cognitive Development

Technoference can interfere with language learning and cognitive outcomes. For example, a study of 2-year-olds in Sweden demonstrated an association between parent media use during child routines and children's lower vocabulary [26]. Research also shows that brief interruptions via a phone call can significantly disrupt language learning [22]. However, another study found that brief interruptions via a text may not significantly disrupt imitation learning [21]. Finally, technoference may also disrupt the development of attention. In a longitudinal study, higher levels of household media usage (including maternal mobile usage and background television) at 18 months predicted worse infant attention at 22 months [27]. Similar to the effects of technoference on parent–child interaction quality, different types of digital interruptions may have differential effects on child developmental outcomes. It is likely there are other contextual and parenting factors mediating these outcomes that merit further scrutiny.

2.2.3 Technoference in Adolescence

Much research has focused on technoference in parents of young children, although there is a growing focus on adolescence [28]; indeed, technoference occurs across the developmental continuum. Adolescence is a particularly relevant developmental period to study technoference since most adolescents have their own devices. The research to date suggests that technoference is associated with poorer parent–adolescent relationship quality and adolescent mental health problems (e.g., depression) [29]. Similar to the bidirectional mechanisms in early childhood technoference, it is likely that technoference between adolescents and parents is bidirectional.

2.3 Potential Positives for Parents and Parenting: Can Technoference Be Adaptive?

Many assume that technoference is universally negative; however, research suggests that parent device use can be adaptive or even beneficial in certain circumstances. Parenting young children can be exhausting and time-consuming. Technology allows parents to connect with the outside world, gain support from family and friends, find parenting information and resources online, engage in hobbies or work, escape from parenting stress, and regulate mood [10, 11]. Indeed, although many parents express struggles with device use [1], most find their personal devices to be helpful, necessary, and an integral part of their lives. For example, Coyne et al. [30] found that 100% of mothers in their sample used cell phones at least occasionally while feeding their infant. While many expressed guilt, they also highlighted benefits—such as distraction that helped them persevere through challenging periods of breastfeeding, finding parenting resources, connecting with others, and staying awake during nighttime feedings. This is merely one of many examples of how parent device use can simultaneously constitute technoference and potentially be beneficial to both parents and children.

3 Future Research

- *Is limited or mindful device use a good strategy to counter technoference, and how much agency do parents have over their device use?*
  - A pertinent question for future research is whether parents should limit their device

use during parenting. Parents and children may sometimes naturally implement digital disconnection strategies, such as banning phones from dinner tables and bedrooms. Such awareness over when and where to consciously disengage from technology use while parenting may form a central component of mindful parenting. More evidence is needed to ascertain whether these disengaging or mindful practices mitigate the negative effects of technoference and lead to higher well-being among parents and children.

  - Smartphone use is known to be especially difficult to control [1] given the embedded persuasive design features (e.g., autoplay, nudges) and the normative expectations to be digitally responsive [31]. As such, current calls for "being mindful" or to "limit use" may not suffice and could cause parents to experience guilt and harm by overemphasizing the need for willpower, control, and responsibility, while failing to acknowledge the responsibilities of the tech industry and one's social environment in contributing to increased technology use and technoference. Moreover, given the many positives of device use for parenting, calls for "control" may sometimes exacerbate unwarranted moral panic over technoference [4, 12]. Future research is needed to determine whether interventions focusing on self-control and mindful media use are effective, culturally responsive, and/or elicit negative side effects such as stronger stigmatization of parents.

- *Does technoference have a lasting and long-term impact?*
  - Research is needed to assess whether technoference shows an accumulated effect on long-term cognitive, emotional, or relational problems. There is some early evidence that technoference predicts child externalizing behavior several months later [3, 8]. Yet, if a parent is otherwise responsive in many situations, this may buffer the child from negative outcomes of moderate parent media use and technoference. There may also be cumulative, unseen, and currently unmeasured longitudinal risks and protective factors. Longitudinal studies should capture behavioral interactions on different time scales and metrics (e.g., passive sensing of phone use, ecological momentary assessment of daily activities, audio recordings, and longitudinal burst designs) to better understand patterns of technoference and their impacts over time.
- *How much is too much technoference and when is technoference okay?*
  - Absolute measures of technology use and technoference may be insufficient if they do not consider broader patterns within the family media ecology. For example, parents often differ in their motivations for digital technology (such as for support, coping, etc.) and their levels of absorption around their children. Additionally, some parents may be able to use devices during parent–child time while also adequately attending to their children's needs, decreasing the likelihood that technoference would lead to detrimental outcomes. More sophisticated measurement of parent device use in the moment, beyond simple amount used, is needed (e.g., apps used, content and context of parents' interactions on the device, parents' levels of cognitive distraction, multitasking strategies, etc.). It is possible that some types of phone behavior (such as support seeking) may reduce parental stress and enhance parent–child interactions in that moment [4]. Moreover, the broader context of use matters. For example, device use for work at home may allow a parent to spend more time with their child; yet, simultaneously, the quality of that time may or may not be impacted depending on how the parent manages their use. Passive monitoring of smartphone use, paired with more dynamic measurements of parent–child interactions, may provide answers to these questions.
- *Can families and children habituate to and compensate for technoference?*
  - In the context of parent–child interaction, children may adapt to their parents' pat-

terns of technoference, for example, by learning that a smartphone is a signal that their parent is unlikely to be responsive and therefore to bid for attention only when their parent is not using their phone. How might technoference change family interactions and developmental trajectories long-term, and is this truly a problem, or do parents and children compensate in other ways and at other times? Also, given that norms may differ across families, a pertinent question is whether responses to family technoference generalize beyond the family context (such as to school, work, friendships, or romantic relationships).

- *Are children differentially susceptible to technoference?*
  - Although prior research on technoference has not deeply examined differential susceptibility, it is likely that individual differences (e.g., age, temperament) may make children more (or less) sensitive to technoference, with some children more likely to experience negative effects on their behavior, emotions, and mental health or to develop problematic media use patterns. Parent characteristics (e.g., gender) and other family characteristics may also alter how children react to technoference. Similarly, parents may differ in their motivations, behaviors, and awareness surrounding technoference. Comprehensive longitudinal studies that track the family media ecology and consider individual differences in children are needed. Moreover, examination of these processes within more diverse samples and with a deeper understanding of cultural, socioeconomic, racial, and geographic diversity is much needed.

4 Recommendations

The evidence points toward an effect of technoference on family well-being and child developmental outcomes and therefore warrants public health concern. At the same time, the issue should not be oversimplified. It should not be assumed that *all* parent device use in the presence of *all* children across *all* contexts is detrimental to parenting quality and child development. It is important that researchers and practitioners avoid fueling moral panic when communicating about technoference [4, 12, 30]. Moreover, a multi-stakeholder approach is needed to tackle the potential problems associated with technoference.

4.1 For Practitioners and Educators

- Educate yourself about both the adaptive and harmful sides of technology use and technoference, so that you can provide anticipatory and appropriate guidance to parents.
- To alleviate the guilt that parents express in managing their own and family media usage, share that developing healthy media practices is a challenge that all families face.
- To assist parents with technoference, suggest helpful strategies such as creating intentional screen-free times together, making eye contact during interactions, communicating to children what parents are doing on the device and the reason for use (as children may not understand), and so forth (see McDaniel [4] for more on working with parents).
- Recommendations, programs, and interventions should not make exaggerated statements of effects and should be tailored and contextualized to the parent's and family's lived experiences, as well as the potential utility and satisfaction parents derive from use.

4.2 For Policymakers

- Support other key stakeholders in their efforts by funding researchers, practitioners, and intervention scientists in the creation of media literacy programs discussing technoference and interventions designed to empower individuals in understanding and developing healthy media use.

- Regulate the technology industry, targeting the reduction of persuasive design features (e.g., autoplay, infinite feeds, etc.), which are often embedded to increase time spent on media.

4.3 For Media/Tech Companies and Industry

- As your primary responsibility, regulate the use of persuasive design patterns.
- As a secondary responsibility that also presents an opportunity for socially responsible entrepreneurship, develop products/services designed to increase parental intentionality and mindfulness related to technology use. However, focusing on developing products/services to address the problematic aspects of media use, without also addressing the design features that create the problems, is insufficient and remiss.

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