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Original Research

Do you love your phone more than your child? The consequences of norms and guilt around maternal smartphone use

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Abstract

Previous research mainly linked smartphone use while parenting to adverse consequences. However, smartphones also offer helpful resources for parents, especially in stressful situations. We suggested that negative norms against maternal smartphone use and associated feelings of guilt may inhibit effective smartphone use for coping with stress. In a 1-week experience sampling study with mothers of young children ($N = 158$), we found that more negative injunctive but not more negative descriptive norms around maternal smartphone use were related to increased situational guilt around smartphone use while parenting. Increased situational guilt was, in turn, associated with decreased perceived coping efficacy but not with less stress decrease. Situational guilt—aggregated on the individual level—related to reduced satisfaction with the mother role. Our results show that positive and negative smartphone use effects are intertwined and that feelings around media use can impact media effects.

Keywords: parental smartphone use, social constructivism, experience sampling, coping using media, well-being

Introduction

In 2019, the Australian cartoonist Michael Leunig published a cartoon of a mother pushing a stroller while looking at her phone; the mother does not see that her baby has fallen out of the stroller. The cartoon was accompanied by a poem that ends with a line saying that the baby wished it was "loved like a phone" (Leunig, 2019). In a similar vein, a poster campaign was launched in Germany in 2018 asking parents whether they had already spoken to their child today (Drug Commissioner of the German Government, 2017). Also, media reports emphasized the dangers of "distracted parenting" (e.g., Christakis, 2018). Overall, it seems that parental phone use while being with their children has a rather negative image. Adverse effects of parental phone use on parental sensitivity and parent–child interactions are also supported by a growing body of research (Braune-Krickau et al., 2021; McDaniel, 2019).

However, besides having adverse effects, smartphones also incorporate many useful functions for parental everyday life (Lupton et al., 2016). Smartphones, e.g., facilitate access to coping resources when individuals are confronted with a stressful situation. Whenever and wherever needed, advisors, friends, information but also possibilities to escape stressful circumstances are easily accessible (Wolfers, 2021). Research has shown that parents use these resources (Radesky et al., 2016). In fact, because parents' opportunities to cope with stress while being with their children are limited due to their childcare responsibilities, the resources provided by smartphones might be of particular value (Wolfers, 2021).

The idea that (digital) media use can have negative and positive effects on our everyday life is not new and certainly not limited to the parenting context (Kraut et al., 2002; Kushlev & Leitao, 2020). However, so far limited attention was directed to the idea that negative and positive effects might be intertwined: The societal discussion around the dangers of digital media use might introduce feelings of guilt and thereby reduce, e.g., the efficacy of phone use for coping. Such effects might particularly occur in moral-laden contexts such as parenting, in which the public discussion mostly focuses on the negative effects of digital media use.

In the current article, we explore the role of norms and guilt around maternal smartphone use and its consequences for stress coping. As they are still the primary caregivers in most societies (Craig & Mullan, 2011), we exclusively focused on mothers. We conducted a preregistered mobile experience sampling study in Germany with over 150 mothers. Specifically, we tested whether social norms around parental smartphone use instigate feelings of guilt and whether guilt is related to a reduced coping efficacy when mothers use phones for coping. Moreover, we investigated the association of guilt around maternal smartphone use with long-term outcomes such as maternal role satisfaction. In the following, we will first introduce the model, which serves as the theoretical base of our work, the Social Influence Model of Technology Use (SIMT). Then, we will summarize previous research on parental smartphone use, before combining this research with the SIMT to derive our hypotheses about how norms and guilt related to phone use consequences.

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The social influence model of media use and media effects

An important model which explains how social norms impact how individuals perceive and use technology is the SIMT (Fulk et al., 1990). The SIMT has two main assumptions. First, it assumes that an individual's perceptions of technologies and technology use heavily depend on social influence (Fulk et al., 1990). For example, according to SIMT, an individual's perception about the "appropriate" use of technology is strongly influenced by what others in their social circles say about the technology and by their observation of others' technology use (Fulk et al., 1990). Perceptions around appropriate technology use are thus "socially constructed" (Fulk et a., 1990, p. 121). This social construction of appropriate technology use can be established via social norms (Fulk et al., 1990; Stephens & Davis, 2009).

Second, the SIMT assumes that the socially constructed perceptions around technology use impact whether we adopt a technology and the way we use it. Fulk et al. (1990) emphasized that these perceptions are important in addition to the more objective features of a technology (e.g., its size). Individuals will, e.g., use a technology for a certain task not only because of its objective ability to help with this task, but also because others told them about this kind of use and use it for this task as well.

In the present article, we extended the SIMT in two ways (for a similar approach see Wolfers et al., 2021). First, we argue that not only technology perceptions but also emotions concerning a technology use are socially constructed. For this purpose, we focus on the emotion of guilt which can be considered an important social-influence mechanism (O'Keefe, 2000). Guilt is a self-conscious emotion (Tracy & Robins, 2004) defined as the "dysphoric feeling associated with the recognition that one has violated a personally relevant moral or social standard" (Kugler & Jones, 1992, p. 318). Although it seems very likely that a transgression toward a norm around appropriate technology use (e.g., using a phone in a meeting even if this is against the organization's norms, see Stephens & Davis, 2009) can lead to feelings of guilt, the emotion of guilt as a socially constructed feeling has received only limited attention in communication science and has not been integrated into theoretical models so far (O'Keefe, 2000; Reinecke & Meier, 2020). We propose that, similar to the role of technology perceptions in the SIMT, socially constructed feelings of guilt around a certain technology use can impact how individuals use a technology.

Second, we argue that socially constructed perceptions and feelings toward a technology do not only affect media adoption and use but also alter media effects. When individuals use a technology that they perceive as valuable, it is likely that this use influences them differently compared to when they think it is not valuable (see e.g., a summary about similar effects for the use of news in Tsfati & Cohen, 2012). Similarly, a technology use that elicits guilt should lead to different technology effects compared to a use which does not elicit guilt (Reinecke et al., 2014; Reinecke & Hofmann, 2016).

In summary, by extending the SIMT, we propose that social norms around technology use impact feelings of guilt around technology use and that feelings of guilt alter technology effects. In the following, we will apply this Social Influence Model of Media Use and Media Effects to the context of maternal smartphone use and derive specific hypotheses for this context. As a first step, we will summarize previous research on parental smartphone use.

Parental smartphone use

Previous research on parental use of smartphones has mainly addressed two questions. First, researchers assessed how distraction caused by smartphones influences parent–child interaction (Braune-Krickau et al., 2021). For this kind of interference, the term technoference was coined, describing "everyday interruptions in interpersonal interactions or time spent together that occur due to digital and mobile technology devices" (McDaniel & Radesky, 2018, p. 100). Studies mostly focused on how parental smartphone use might negatively impact parent–child interactions and the parent–child relationship. Several studies, e.g., found that smartphone use while parenting related to decreased parental sensitivity or less parent–child communication (Lemish et al., 2020; Wolfers et al., 2020).

In a second research line which already started in the pre-smartphone era, researchers have assessed how parents use Internet resources and how this use influences parents themselves (Dworkin et al., 2013; Lupton et al., 2016). Studies found that parents described the different resources provided by digital media as sources of information and support and evaluated them as valuable and helpful (Dworkin et al., 2013; Lupton et al., 2016).

Smartphones make such media-based resources directly available in most situations (Lupton et al., 2016). However, research on the effects of parental smartphone use on parents is still limited. In an emerging line of research, the first studies looked at how parents use their phones to cope with stress (Radesky et al., 2016, Torres et al., 2021, Wolfers, 2021). Stressful situations are characterized by a disbalance between the demands placed upon an individual and the resources available (Lazarus & Folkman, 1984). Especially parents of younger children experience many stressful instances throughout the day (Crnic & Greenberg, 1990). Like other media, smartphones are coping tools and can be used to exercise different coping strategies such as social support, information seeking, or distraction (Wolfers & Schneider, 2021). A recent qualitative study has shown that parents experience their smartphones as overall helpful coping tools when faced with stress (Wolfers, 2021). We therefore chose to focus on maternal smartphone use in stressful situations as context of this study.

In summary, previous research showed that parental smartphone use is of particular importance when parents are faced with stressful situations. Moreover, the two research lines demonstrate that two perspectives are important when considering outcomes of parental phone use: Parental phone use can impact parents themselves and can impact the parent–child relationship. Third, while the two research lines have emerged rather independently, the investigated processes are certainly intertwined. If parents use their smartphones successfully to decrease their stress level, this is likely to be related to more positive parent–child communication. In addition, negative outcomes commonly associated with parental phone use could adversely affect the association between their smartphone use and parental outcomes by inducing guilt on side of the parent. This second process will be outlined in the following.

Social norms around maternal smartphone use and guilt

In the SIMT, Fulk et al. (1990) proposed that both, social pressure on how a technology should be used (i.e., norms) and the observation of how most others use a technology, impact an individual's technology perceptions. These processes can be connected to the concepts of injunctive norms, which include norms about "what others think should be done" (Chung & Rimal, 2016, p. 6), and descriptive norms, which represent an individual's perceptions about the prevalence of a behavior (Chung & Rimal, 2016, also Cialdini et al., 1990). Our extended version of the SIMT predicts that, as social influence mechanisms, both types of norms around technology use impact feelings of guilt around this technology use. Indeed, research showed that descriptive (e.g., Giguère et al., 2014) and injunctive norms about a behavior (e.g., Russell et al., 2022) relate to increased guilt.

Applied to the context of maternal smartphone use, descriptive norms represent the perceived prevalence of parental smartphone use, while injunctive norms indicate others' perceived moral judgments about parental smartphone use. Injunctive norms around parental smartphone use seem to be rather negative. In a qualitative study with parents in Germany, parents judged other parents who used their phones while being with their children very negatively (Wolfers, 2021), showing that phone use while parenting is not entailed in the societal norms around being a "good parent" or a "good mother." Also, the public discussion around parental use of smartphones has emerged mostly around its negative effects, as represented in the overall negative media coverage and campaigns against parental phone use (e.g., United States: Christakis, 2018; Germany: Drug Commissioner of the German Government, 2017, Australia: Leunig, 2019, China: Lisickis, 2020). This might have led to mothers perceiving that smartphone use while parenting is a norm-deviating behavior. In the motherhood context, guilt is frequently evoked in conjunction with behavior that is perceived as deviating from the societal or own standard of being a "good mother" (Sutherland, 2010, p. 310) suggesting that the perception of increased negative injunctive norms against parental smartphone use should be related to more guilt around smartphone use.

Descriptive norms seem to go in the opposite direction. In a survey with a representative sample in the United States, 68% of the parents reported that they at least sometimes feel distracted by their phone when spending time with their kids (Auxier et al., 2020). Similarly, observational studies found rather high prevalence rates of parental smartphone use while being with children, e.g., at playgrounds (e.g., 48%, Wolfers et al., 2020) or at mall visits (e.g., 82%, Ewin et al., 2021), suggesting that descriptive norms seem to be in favor of parental phone use. However, there is likely variation in the perception of descriptive norms in the parental context. Deviating from what most other mothers are perceived to do has been linked to increased guilt (Meeussen & Koudenburg, 2022). Therefore, we assume that mothers who perceive that fewer other parents use their phone while parenting (stronger descriptive norms against phone use) also experience more guilt around their smartphone use.

These predictions align with the assumption of the extended version of the SIMT assuming that social influence mechanisms can increase guilt around technology use. Guilt is evoked in direct response to a behavior. We, therefore, measured guilt directly in a situation. Perceived norms are rather stable as they are based on observations of the social environment. We, thus, measured norms on the individual level, leading to the following hypothesis:

> **H1**: Participants who report stronger negative (a) descriptive and (b) injunctive norms about smartphone use while parenting report more situational guilt about phone use for coping while parenting.

In the next sections, we will focus on the effects this situational guilt reaction might in turn have. We first look at the immediate relationships between feelings of guilt around maternal smartphone use and coping efficacy as well as perceived technoference. Afterward, we focus on the long-term consequences of aggregated levels of guilt around smartphone use.

The immediate consequences of maternal guilt around smartphone use

Our extended version of the SIMT predicts that feelings of guilt associated with the use of a technology lead to altered media effects. Guilt is an unpleasant emotion (Kugler & Jones, 1992). It seems therefore likely that experiencing guilt around technology use can worsen the media use experience and lead to adverse immediate effects for the media user. Indeed, guilt about entertainment media use has been shown to cause mitigation of potential positive consequences of media use (Reinecke et al., 2014; Reinecke & Hofmann, 2016). Reinecke et al. (2014), e.g., showed that appraising entertainment media use as a form of procrastination increased feelings of guilt related to this media use. Feelings of guilt, in turn, reduced the recovery from the stress that participants experienced (Reinecke et al., 2014).

Applying our extension of the SIMT to the context of maternal smartphone use, we predicted a similar altered media effect, when mothers use their phones in stressful situations: Guilt could reduce the benefits received from phone use and thus reduce coping efficacy, defined as the successful dealing with stress (see e.g., Tennen & Affleck, 2002). Moreover, guilt can be seen as a stressor (Denson et al., 2009). Thus, feeling guilty about using the phone could also introduce additional stress, reducing overall coping efficacy.

> **H2**: Situational guilt about smartphone use while parenting is associated with lower situational coping efficacy.

It seems furthermore likely that guilt about using the smartphone while parenting also relates to perceived technoference (i.e., perceiving smartphone use as interfering with the mother–child interaction). Guilt is conceptualized as being tied to a specific behavior that is incongruent with social or individual standards (Tracy & Robins, 2004). Having good interactions with their children is part of the standard of being a good mother which mothers try to adhere to (Collins, 2021). It seems therefore likely that increased guilt is related to mothers' perception that their phone use has interfered with the interactions with their child.

> **H3**: A greater technoference perception is related to higher situational guilt.

Long-term consequences of maternal guilt around smartphone use

While experiencing moderate levels of guilt was previously found to be associated with positive consequences such as future norm adherence (e.g., Baumeister et al., 1994), experiencing guilt on a regular basis is a recognized feature of mental health disorders such as depression (Ghatavi et al., 2002). To test the relationships of guilt with more long-term consequences, we thus looked at guilt on an aggregated individual level, i.e., how intensely a mother experiences feelings of guilt around her smartphone use on average. This way we were able to test the extended version of the SIMT also for more long-term media effects.

We expected that mothers who frequently experience more intense guilt reported lower satisfaction with their mother role. We defined role satisfaction as the degree to which a mother feels satisfied in her mother role and to which she feels satisfied with how she performs her mother role (sometimes also named self-efficacy, Johnston & Mash, 1989). While this degree certainly fluctuates throughout different situations, we were mainly interested in how the frequent experience of more intense guilt relates to a more stable maternal role satisfaction.

Studies have supported that maternal guilt shapes a mother's self-evaluation (Collins, 2021; Liss et al., 2013). Also, studies from the breastfeeding context have shown that a frequent experience of feelings of guilt due to a deviation from the behavior of the supposedly "ideal" mother can relate to a more general self-evaluation of being a bad mother (see Jackson et al., 2021 for a review). Similarly, in the context of family–work conflicts, a diary study showed that feelings of guilt surrounding combining work and family on 1 day related to mothers being less satisfied with how they combine work and family and to lower happiness a day later (Aarntzen et al., 2019). These findings suggest that a frequent experience of more intense guilt while using a phone around children might be associated with a lower overall satisfaction with the mother role, matching the argumentation of the extended SIMT. We, therefore, assumed:

> **H4**: A higher guilt (aggregated on the individual level) about smartphone use is related to lower satisfaction with the mother role.

Regarding relational variables, we looked at the relationships between guilt around smartphone use and the perceived mother–child relationship quality. There are two reasons to assume a negative relationship between maternal feelings of guilt and the maternal evaluation of the mother–child relationship quality. First, qualitative and quantitative studies have suggested that maternal guilt shapes how mothers see themselves (Collins, 2021; Liss et al., 2013). It seems likely that this negative self-evaluation transfers to the maternal perception of her relationship with her child. Second, negative maternal emotions have been associated with more harsh and dysfunctional parenting behaviors (Dumas & Wekerle, 1995; Lorber & Slep, 2005), which might also apply to the negative emotion of guilt. Parents who reported higher parental burnout, including the "feeling that you are not good enough as parent," also reported showing more anger toward their child (Prikhidko & Swank, 2020, p. 283). The extended SIMT proposes that these more general associations also transfer to the specific context of parental guilt around smartphone use. We therefore tested the following assumption:

> **H5**: A higher guilt (aggregated on the individual level) about smartphone use is related to lower perceived mother–child relationship quality.

For a figure of the assumed relationships, see Supplementary Appendix A. Our hypotheses and research questions were preregistered (meaning that we described hypotheses, study design, and analysis plan prior to data collection) at https://osf.io/2xypw/?view_only=7ed8f7fa18f54366bdd75c8caa5c59e5. To strengthen the focus of the article on guilt and norms, the results for some of the preregistered hypotheses and research questions were moved to Supplementary Appendix B. All study materials including two additional pre-registrations, which are the basis for two other papers based on this study, and a table explaining deviations from the preregistration as well as the data can be accessed here: https://osf.io/926hq/?view_only=a0f9ea74c59b45368e28ca3e23564183.

Methods

Procedure and sample

Procedure

To test our hypotheses, we conducted an experience sampling study with German mothers in November 2020. In experience sampling designs, participants answer several short questionnaires each day over at least several days (Schnauber-Stockmann & Karnowski, 2020). We used the smartphone application movisensXS version 1.5.8 (movisens GmbH, 2020) which was developed for the Android operating system, which in 2020 had a market share in Germany of about 81% (Kantar Worldpanel, 2021). Mothers interested in participating were directed to a Qualtrics survey with detailed study information. Mothers who gave their consent then received a step-by-step guide about how to install the app on their smartphones. After filling in a presurvey, participants received four daily questionnaires for 7 days (maximum of 28 questionnaires per participant). In the end, participants answered a postsurvey. Participants received up to €48.80 for completing the study.

We aimed at capturing stressful situations while mothers were with their children. We used a quasi-experience sampling design (Schnauber-Stockmann & Karnowski, 2020) with surveys at fixed time points, which is recommended for concrete, infrequent events (Scollon et al., 2003). We asked participants to report about a stressful situation from the last 2 hr to minimize recall errors. Reminders for the daily surveys were sent at predefined time points at 9:00 a.m., 12:30 noon, 4:00 p.m., and 7:30 p.m. Participants could delay answering surveys by up to 35 min. The ethics committee of the Leibniz-Institut für Wissensmedien Tübingen approved the study (LEK 2020/047).

Participants and situations

We recruited mothers whose youngest child was born on or after January 1, 2014, via various channels (social media posts and advertisements, personal contacts, snowball sampling, mailing lists of daycare centers, notices at supermarkets). Overall, 234 mothers downloaded the app and participated in the presurvey. We collected 4,965 daily questionnaires resulting in an overall compliance rate of 76% (range: 0%–100%). In 2,038 instances (41%), stressful situations were reported. Participants reported being with their

children while experiencing stressful situations in 1,659 instances (33% of all reported situations). Six of these questionnaires were incomplete and thus excluded. A phone was used in 483 (29%) stressful situations, in which the children were present which is the situational sample that we will use in the following analyses.

Of the 234 mothers who downloaded the app, we excluded 5 participants who only filled in the presurvey, 11 participants who did not report on any stressful situation while being with their children, and finally, 60 because they did not report on a stressful situation while being with their children which included phone use (see Supplementary Appendix D for an overview of the differences between the excluded participants and the final sample).

The final sample used in this analysis thus contained 158 mothers. They were on average 33.05 years old ($SD = 4.35$) and had between 1 and 5 children ($M = 1.71$, $SD = 0.90$). The youngest child was on average 1.75 years old ($SD = 1.56$, range: 0–6). The sample was well-educated, with 61% holding at least a Bachelor's degree (cf. 31% for women aged 30–35 in the German population, Autorengruppe Bildungsberichterstattung, 2020). The majority (90%) of mothers lived together with the parent of (at least) one of their children. A small proportion of mothers were single mothers (9%) or lived with other family members or a partner who was not the parent of their child (4%; choices were not exclusive). About half of the sample (46%) were on parental leave or stayed at home full time and about a third (33%) worked part time. About 10% were in an educational program and 7% worked full time (13% for mothers with a child under 6 in a representative German sample, Keller & Kahle, 2018). All participants indicated using their smartphones more often than once per day.

Measures

Supplementary Appendix C contains a document with the results of confirmatory factor analyses, additional information on all constructs' validity, and wording of all items used in this article.

Presurvey measures

Norms about parental phone use

Descriptive norms about phone use while parenting were measured by asking participants how many of the parents, who are important to them, use their smartphone often while they are with their children or will use their smartphone in the next week while being with the children on a scale from 1 (*none*) to 7 (*all*; White et al., 2009). Both items were combined ($M = 5.43$, $SD = 1.14$, $r_{items} = 0.64$).

Injunctive norms about phone use while parenting were measured with a semantic differential as in Paek (2009). We asked how mothers think other people who are important to them would judge phone use while parenting on a 9-point scale, using four word pairs (negative/positive, bad/good, harmful/helpful, inappropriate/appropriate). Because of a low fit of a confirmatory factor analysis (see Supplementary Appendix C), we excluded the item negative/positive. The remaining items were combined to a mean index ($M = 3.61$, $SD = 1.28$, $\alpha = 0.84$). Lower values indicate more negative evaluations of phone use while parenting.

General smartphone use frequency

As a control variable, we measured general smartphone use frequency by asking respondents in the presurvey how often they use their smartphones on a scale from 1 (*never*) to 5 (*all the time*, $M = 4.03$, $SD = 0.78$).

Postsurvey measures

Role satisfaction

To measure role satisfaction, we used items from the Parenting Satisfaction and Efficacy Scale by Johnston and Mash (1989) in the German translation of Kabakçı-Kara (2009). Mothers indicated how much they agreed with eight statements on a scale from 1 (*do not agree*) to 5 (*fully agree*; $M = 3.47$, $SD = 0.61$, $\alpha = 0.74$). An example item is: "I honestly believe I have all the skills necessary to be a good mother to my child."

Mother–child relationship quality

Mothers indicated their agreement with 10 items from the maternal perspective scale of Müller and Achtergarde (2018) on a scale from 1 (*do not agree*) to 5 (*fully agree*). Based on the results of a confirmatory factor analysis, we excluded two items (see Supplementary Appendix C). The remaining items were combined to a mean index with higher values indicating a better relationship quality ($M = 4.21$, $SD = 0.51$, $\alpha = 0.81$). Items included statements such as "I believe my child trusts me" or "My child and I have many conflicts." We asked about mother–child relationship quality for one of a mother's children. If mothers had more than one child in the age range of 3–7 years, they were instructed to report on the child between 3 and 7 whose birthday was most recently. If mothers did not have a child between 3 and 7, she reported on her oldest child under 3. Mothers reported on a child who was on average 2.86 years old ($SD = 1.94$).

Situational questionnaires

Procedure

In situational questionnaires, participants first reported if they experienced a somewhat stressful situation in the last 2 hrs. To be able to capture the diversity of stressful situations happening in everyday life, participants were told that we were also interested in situations that only were "a bit stressful" and that stressful situations can be caused by different stressors such as conflicts, time pressure, bad sleep quality, or illness. When they indicated to have experienced a stressful situation, participants were asked about stress, emotions, stressors, and situational characteristics (i.e., urgency, importance, control). Then, they indicated how they coped, whether they used their smartphone during the situation, and how they felt about using their phone. In the end, they reported on coping efficacy and if the smartphone interfered with the interactions with their children.

Phone use in stressful situations

We measured phone use in stressful situations using a dichotomous variable (*yes/no*) by asking participants whether they have used their phone during the stressful situation. Mothers were asked to only answer *yes* if they used their phones themselves, so that giving their phone to their child to cope with stress was omitted.

Guilt about phone use

Guilt about using the phone was measured with three items on a scale from 1 (*does not apply*) to 5 (*does fully apply*; $M = 2.24$, $SD = 1.01$, $\alpha = 0.78$; based on Halfmann et al., 2021; example item: "I had a bad conscience"). For

aggregation on the individual level, we built a mean score of all situations for which the item was answered for each individual ($M = 2.23$, $SD = 0.60$, range 0–3.67).

Perceived coping efficacy and stress change

For measuring coping efficacy, we used two instruments, perceived coping efficacy and stress change. Perceived coping efficacy was measured by asking: "Did what you have thought or done in the situation make you feel better?" on a scale from 1 (*it did not help*) to 5 (*it did help a lot*; $M = 3.05$; $SD = 1.18$). Stress change was calculated by subtracting stress intensity during the situation from reported stress intensity after the situation had ended, each on a scale from 1 (*not at all)* to 5 (*very much*). Negative values indicate a stress decrease. If the situation had not ended yet, participants were asked to rate how stressed they feel at the moment ($M = -0.92$; $SD = 1.14$, range −4 to 2).

Perceived technoference

Perceived technoference was measured with one item. Mothers indicated if their smartphone use had a negative impact on their interaction with their child(ren) during the situation ($M = 2.05$; $SD = 1.14$, $r = -0.18$) on a 5-point scale from 1 (*do not agree*) to 5 (*fully agree*). After a pretest suggested that our surveys could make mothers more aware of potential negative phone use consequences, we added an additional item on positive phone use influences regarding the parent–child interaction ($M = 2.69$; $SD = 1.27$) to avoid evoking guilt with our study. It was, as preregistered, not used in the analysis.

Analysis

For situational dependent variables, we focused on the sample of situations in which a stressful situation was experienced, children were present, and the phone was used to be able to assess guilt around phone use (483 situations of 158 individuals). To account for the nested structure (time points nested within individuals), we used multilevel regression modeling, including a random intercept. We used a hierarchical procedure. We first introduced the random intercept and the control variables. Next, we introduced the independent variables of interest. We tested hypotheses based on model comparisons with and without the respective predictor variable in the respective step using a likelihood ratio test with a $p < .05$ significance level using Full-Maximum-Likelihood estimation (ML). The final model was estimated based on the more robust restricted maximum likelihood estimation (see Zuur et al., 2009). We used a $|t| > 2$ for a predictor in the final models as additional criterium for hypothesis support (Gelman & Hill, 2007). Building on Enders and Tofighi (2007), we group-mean centered time point-level variables (Level 1) and grand-mean-centered individual-level variables (Level 2). We used R (version 4.0.3, R Core Team, 2020) and the package lme4 (version 1.1.26; Bates et al., 2015). For dependent variables on the individual level, we used multiple linear regression modeling. For these analyses, we aggregated situational variables to the individual level. For results on model assumptions see OSF.

Ethics statement

This research was approved by the ethics committee of the Leibniz-Institut für Wissensmedien, Tübingen, Germany (LEK 2020/047). All participants received an informed consent about participation in the study and agreed to the sharing of their anonymized data.

Results

Descriptive results

Looking at the descriptive results on norms and guilt, most mothers perceived that other parents use their phones frequently while being with their children ($M = 5.43$, $SD = 1.14$). The mean for the injunctive norms indicated that mothers perceived others to judge phone use while parenting as inappropriate ($M = 3.61$, $SD = 1.28$, scale midpoint is 5). Only a small proportion of mothers (7%) perceived that people who are important to them judge parental phone use as positive. At least some feelings of guilt about phone use (values > 1, *does not apply*) were reported in 85% of situations that involved phone use. In 19% of the situations, mothers reported a higher amount of guilt (values > 3 on the 5-point Likert scale).

Explaining situational guilt

Turning to the hypotheses, H1 stated that individuals who reported stronger (a) descriptive and (b) injunctive norms against using phones while parenting also reported higher situational guilt for using their phones. Contrary to H1a, we did not find a significant influence of descriptive norms: The model including descriptive norms did not explain additional variance compared to the model including the control variables ($\chi^2 = 0.05$, $p = .818$, for coefficients of the final model see Table 1). H1b, however, was supported: stronger perceived injunctive norms significantly predicted higher situational guilt ($\chi^2 = 7.77$, $p = .005$).

Explaining situational coping efficacy and perceived technoference

H2 predicted that higher situational guilt about phone use is associated with lower situational coping efficacy. In support of H2, for situations in which the smartphone was used, situational guilt about phone use was a significant negative predictor of perceived coping efficacy ($\chi^2 = 15.56$, $p < .001$). For

Table 1. Multilevel linear regression analysis on situational guilt for phone use (final model)

	Fixed effects		
Parameters	**Estimate**	***SE***	***t***
Individual level			
Intercept	2.24	0.07	34.32*
Age	−0.02	0.02	−1.38
Youngest child age	0.04	0.04	0.91
Education	0.02	0.14	0.18
Phone use frequency	0.13	0.08	1.60
Descriptive norms[a]	0.01	0.06	0.24
Injunctive norms[a]	−0.14	0.05	−2.76*
R^2 (marginal/conditional)	0.05/0.42		
Random intercept	$SD = 0.062$		

Note. Four hundred and eighty-three observations of 158 individuals.
[a] A higher level indicates higher use/acceptance of phone use among important others. Individual-level predictors are grand mean centered, situation-level predictors are group mean centered. Model formula: guilt.phoneuse ~ 1 + (1|participant) + age.mother + age.youngest.child + spu.general + educ.mother + norm.desc + norm.inj. SPU indicates general smartphone use.
* $|t| > 2.0$, indicating a significant effect Gelman and Hill (2007).

Table 2. Multilevel linear regression analysis on coping efficacy, stress change, and perceived phone influence on parent–child interactions (final models)

Dependent variable	Perceived coping efficacy			Stress change			Negative influence on parent–child interactions		
	Fixed effects			Fixed effects			Fixed effects		
Parameters	Estimate	*SE*	*t*	Estimate	*SE*	*t*	Estimate	*SE*	*t*
Individual level									
Intercept	3.05	0.07	44.43*	−0.91	0.06	−14.71*	2.01	0.07	27.77*
Age	0.00	0.02	0.02	0.00	0.02	0.31	−0.01	0.02	−0.31
Youngest child age	−0.00	0.05	−0.10	−0.03	0.04	−0.79	0.03	0.05	0.61
Education	0.10	0.14	0.70	−0.12	0.13	−0.91	0.34	0.15	2.21*
Phone use frequency	0.04	0.09	0.43	0.04	0.08	0.54	0.20	0.09	2.10
Situational level									
Stress T1				−0.57	0.06	−9.66*			
Guilt about phone use	−0.30	0.07	−3.98*	0.06	0.07	0.94	0.33	0.06	5.28*
R^2 (marginal/conditional)	0.03/0.23			0.15/0.32			0.07/0.42		
Random intercept	*SD* = 0.54			*SD* = 0.47			*SD* = 0.68		

Note. Four hundred and eighty-three observations of 158 individuals. Individual-level predictors are grand mean centered, situation-level predictors are group mean centered. Model formula: DV ~ 1 + (1|participant) + age.mother + age.youngest.child + spu.general + educ.mother + guilt. SPU indicates general smartphone use.

* |t| > 2.0, indicating a significant effect Gelman and Hill (2007).

stress change, H2 was not supported. Descriptively, situational guilt was associated with less stress decrease, but the association was not significant ($\chi^2 = 0.88$, $p = .348$). Table 2 shows the estimates of the final models.

In the next step, we looked at the associations of situational guilt and situational technoference perceptions. We predicted that higher guilt about phone use is related to a higher perceived technoference (H3). In line with H3, in situations in which mothers felt more guilt around their phone use, they also perceived that the phone use impacted mother–child interactions more negatively ($\chi^2 = 26.82$, $p < .001$, see Table 2).

Explaining satisfaction with the mother role and mother–child relationship quality

On the individual level, we assessed the relationship of aggregated guilt with satisfaction with the mother role (H4). We found a significant negative association of aggregated guilt with role satisfaction ($\beta = -0.18$, $p = .026$), supporting H4. Mothers who reported more guilt around phone use on the aggregated level reported less role satisfaction with their mother role. For mother–child relationship quality, we did not find a significant relationship: Contrary to H5, aggregated guilt about phone use was not significantly related to relationship quality ($\beta = -0.01$, $p = .935$). Table 3 shows the results of the final models.

Discussion

In this article, we built on an extension of the SIMT and investigated the interplay between norms around parental smartphone use, associated feelings of guilt, and mothers' phone use during stressful situations while being around their children. Using an experience sampling design, we found that the more mothers perceived others disapproving phone use while parenting (injunctive norms), the more they felt guilty about using their phones. Increased guilt around phone use, in turn, was related to lower perceived coping efficacy. Moreover, our data revealed that, on the individual level, more intense feelings of guilt around phone use related to a lower satisfaction with the mother role. Feelings of guilt around parental smartphone use were also related to stronger perceived technoference but did not predict an adverse mother–child relationship quality. These results suggest that negative norms around phone use can have negative consequences for families. In the following, we will discuss the findings in more depth.

The higher impact of injunctive norms compared to descriptive norms is in line with previous work, which, e.g., showed that people anticipated feeling more guilty in response to higher injunctive norms compared to higher descriptive norms when they violated a workplace norm (Jacobson et al., 2020). However, research on phubbing found that descriptive norms showed a stronger influence on phubbing behavior compared to injunctive norms (Leuppert & Geber, 2020). Bringing these different findings together, injunctive norms might be related to *feelings* associated with a behavior, while descriptive norms might be related to engaging in the *behavior* itself. A constellation of descriptive norms in favor of (parental) phone use but injunctive norms against (parental) phone use, thus, could lead parents but also other users to use their phone often but also to constantly feel guilty about it. Given that a potential protective effect of norms against adverse phone use effects consequently does not occur and feelings of guilt could diminish the positive effects of phone use, this state might be overall undesirable. This constellation could also show that phone use is associated with high rewards and high costs (in the form of feelings of guilt). If many parents choose smartphone use and tolerate feelings of guilt, descriptive norms could also be the consequence of the experienced benefits rather than the smartphone use being influenced by descriptive norms. We cannot say which of these explanations holds but we think that the constellation of negative injunctive and positive descriptive norms in the context of technology use opens many interesting new questions for future research.

Our results suggested that maternal feelings of guilt around their phone use might be related to negative consequences for the mother herself. On the situational level, guilt surrounding

Table 3. Linear regression analysis on role satisfaction and parent–child relationship quality

Dependent variable	Role satisfaction					Parent–child relationship quality				
Parameters	***b***	***SE***	***t***	***p***	***β***	***b***	***SE***	***t***	***p***	***β***
Individual level										
Intercept	5.43	0.50	10.89	<.001	0.01	5.13	0.41	12.59	<.001	0.00
Age	−0.03	0.01	−2.64	.009	−0.22	−0.02	0.01	−1.91	.058	−0.16
Youngest child age[a]/age of child on which was reported[b]	0.01	0.03	0.18	.856	0.02	−0.07	0.02	−3.09	.002	−0.27
Education	0.05	0.10	0.44	.659	0.04	−0.01	0.09	0.06	.953	0.00
Phone use frequency	−0.10	0.06	−1.52	.132	−0.12	0.01	0.05	0.11	.910	−0.01
Number of stressful situations	−0.02	0.01	−1.50	.131	−0.12	−0.01	0.01	−1.01	.315	−0.08
Guilt about phone use	−0.21	0.09	−2.25	.026	−0.18	−0.00	0.08	−0.06	.951	−0.01
R^2 (multiple/adjusted)	0.12/0.08					0.13/0.09				

Note. One hundred and fifty-one individuals. Model formula: outcome ~ 1 + age.mother + age.youngest.child (or age.reported.child) + spu.general + educ.mother + guilt.agg + phone.use.frequ + number of stressful situations + guilt.agg + phone.use.frequ. SPU indicates general smartphone use. For parent–child relationship quality additionally + perc.in.p-c-i.agg.

a For role satisfaction.

b For parent–child relationship quality.

phone use was related to lower perceived coping efficacy implying immediate negative consequences for the mother. It is, however, still unclear if this results from a mitigation of positive phone use effects. It is also possible that increased guilt is related to reduced coping efficacy regardless of the efficacy of phones as a coping tool. While the former would correspond to a moderation effect, the latter would be demonstrated by a main effect of guilt on coping efficacy. Both processes fall under our extension of the SIMT in which we assume that media perceptions alter media effects. Differentiating these kinds of effects was not possible in our design because guilt for using phones requires phone use, making both variables inherently dependent. For future work on the extension of the SIMT, differentiating between the potential moderation and direct effect would be valuable in order to test the different potential mechanisms with which media perceptions alter media effects.

We did not find a significant relationship between guilt and stress change. This result might imply that guilt is more strongly related to subjective, (meta-)cognitive outcomes such as perceived coping efficacy while more emotional and direct outcomes are impacted less intensively. However, as experience sampling studies are most of the time cross-sectional, answering questions about stress before and after a situation retrospectively is difficult. Thus, this measure might include more errors than the perceived coping efficacy item. As this cannot be judged conclusively based on the present study, it should be tested in future studies.

Our finding that guilt aggregated on the individual level related negatively to overall satisfaction with the mother role shows that more frequent guilt around phone use might have negative consequences for the mother beyond situational circumstances. As we did not control for an initial level of maternal role satisfaction, it would, however, also be possible that mothers who in general feel less satisfied with their mother role feel more guilt around their parenting behaviors directly in a situation. Future work should explore the causal relationship between guilt around smartphone use and maternal role satisfaction. It would also be interesting to investigate how maternal feelings of guilt around smartphone use relate to other behaviors deviating from the "good mother" norms.

Looking at relational variables, we found that an increased perceived technoference related to more feelings of guilt around phone use. It should not be surprising that own behaviors which are perceived to having caused negative consequences are related to guilt—as this is entailed in most conceptualizations of guilt (e.g., Tracy & Robins, 2004). Our data cannot speak to whether this maternal technoference perception is objectively observable as well. If the subjective perception mirrors objective technoference evaluations, feelings of guilt around smartphone use might be considered as appropriate form of guilt. If subjective and objective technoference does not match one can see experienced guilt as rather inappropriate. Generally, "appropriate" guilt is usually connected to positive effects while "inappropriate" guilt is often related to negative consequences for the well-being of the person experiencing the guilt (Kim et al., 2011). It thus might be a particularly interesting goal for future studies to study subjective and objective technoference in combination with assessing guilt.

We did not find an effect of aggregated guilt on parent–child relationship quality. Given that for perceived technoference the causal order might rather be in the opposite direction (perceived technoference causing guilt), this might imply that guilt is rather impacting the maternal well-being and less the mother–child relationship quality. Studies have shown the importance of maternal well-being for the quality of mother–child interactions (e.g., Reissland et al., 2003). Thus, if guilt around smartphone use is one factor contributing to a lower satisfaction with the mother role, this could also indirectly relate to adverse mother–child relationship outcomes. However, this goes far beyond what the current 1-week study can test. It should be noted that, on the situational level, we did not differentiate between interactions of a mother with her different children. However, we asked mothers to report on one of their children to assess parent–child relationship quality. Thus, null effects for parent–child relationship quality could also be caused by the fact that mothers reported negative phone influences on the interactions also based on their other children.

To summarize, our findings have two important implications. First, on a theoretical level, our findings support the value of the application of the SIMT to media effects. The extended SIMT emphasizes that not only media use itself can have effects, but that also an individual's socially constructed perceptions and feelings around use can evoke effects. The associations of guilt with perceived coping efficacy and role

satisfaction support that the application and extension of the SIMT add important layers to studies looking at the effect of digital media use, i.e., by theoretically differentiating between perceptions and feelings around use and the use itself. An individual's phone use in a specific situation includes potentially objectively measured variables (such as time spent with the device), but also perceived use and feelings about the use. These different concepts need to be disentangled and tested for their unique influences. Such a differentiated view allows for evaluating whether users have to reduce their media use or whether individual or societal perceptions and norms around digital media have to be rethought.

Our study, moreover, demonstrated that social norms are related to feelings around media use such as guilt. This finding implies that, in support of the SIMT, the social context in which individuals use media impacts how individuals judge their media use and, in turn, how their media use influences constructs such as stress and role satisfaction which are related to an individual's overall wellbeing. Our study was focused on the particularly value-laden maternal context. Therefore, the extension of the SIMT we propose must be tested in other contexts as well to test its general applicability. A particularly interesting context for further study might be smartphone use in other relational settings (e.g., phubbing).

Second, our findings imply that campaigns and a one-sided public discussion against parental phone use not acknowledging potential phone use benefits could introduce stress into families. Thus, campaigns and media reports should inform about parental phone use in a more differentiated manner.

Our study has limitations and leaves some open questions. An important question that remains open is the question of causality. It is possible that individuals only feel more guilt around phone use if their phone use decreased coping efficacy, implying a reversed direction of influence. To properly test causality, experimental research is necessary. Also, for the outcomes we labeled as long-term consequences, the direction of influence cannot be tested with the current study but requires a longitudinal study over a longer period of time.

Another limitation of our study is the convenience sample, which led to an underrepresentation of less-educated mothers. Maternal guilt was discussed as an experience mostly associated with the life of modern middle-class women (Sutherland, 2010), which could also apply to guilt around phone use. Future studies are needed that use nationally representative samples or focus primarily on less-educated mothers. Moreover, our sample did not include fathers and is limited to the context of Germany. It is important for future work to explore whether these findings transfer to fathers and other cultures as well.

The aggregation of guilt on the individual level can also be seen as a limitation. Aggregating variables from the situational to the individual level was judged differently in the literature (e.g., Foster-Johnson & Kromrey, 2018; Scollon et al., 2003). Our analyses provided mixed results concerning the validity of the aggregated guilt measure (see Supplementary Appendix C). For the individual analyses, also the small sample size is a limitation. As we only included mothers who used their phones for coping at least once, in many analyses, only a sample of around 150 individuals remained. For an experience sampling study, our sample size was comparably large. However, taken together, the associations on the individual levels should be interpreted with caution and need to be replicated using larger samples.

Lastly, we only looked at the phone use itself and did not focus on phone content or phone use motivations. Torres et al. (2021) showed that the way a phone is used influences feelings around phone use. Thus, taking phone content into account and also for which coping strategies a phone is used, is important for future studies.

Conclusion

The present article shows that the effects of phone use on everyday lives are complex and that the positive and negative effects of phone use can be intertwined. Supporting the value of extending the SIMT to media effects, our results show that future studies on digital media effects should consider socially constructed feelings around media use in combination with measures of digital media use to build a more holistic view on digital media effects in daily life. Such a holistic view allows judging what the focus of prevention efforts should be: changing parents' phone use, changing parental perceptions on their phone use, or changing societal norms around parental phone use. Given the current state of research, it is probably too early to make specific recommendations for mothers other than to encourage mothers to reflect on their feelings of guilt about their phone use. We hope that with our study we can initiate further research that will eventually make concrete recommendations possible.

Supplementary material

Supplementary material is available online at *Human Communication Research* online.

Data availability

Supplemental material, data, and code for this article are available through OSF (https://osf.io/926hq/?view_only=35c4f0caa05942438c4efff039f52cad). The study has been preregistered at https://osf.io/2xypw/?view_only=7ed8f7fa18f54366bdd75c8caa5c59e5.

Open science framework badges

Open Materials
The components of the research methodology needed to reproduce the reported procedure and analysis are publicly available for this article.

Open Data
Digitally shareable data necessary to reproduce the reported results are publicly available for this article.

Preregistered
Research design was preregistered.

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