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DISTRACTED PARENTING: HOW DO PARENTS' EMOTIONAL REGULATION AND PROBLEMATIC SMARTPHONE USE CONTRIBUTE TO THE INTERRUPTIONS OF PARENT-CHILD INTERACTIONS?

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Abstract: *This study aimed to examine the associations between parents' difficulties in emotion regulation, risk for smartphone addiction, and interruptions of parent-child interactions. The sample comprised 281 parents (80.9% mothers) who participated in the project "Digital technology in the family: patterns of behavior and effects on child development". Parents completed the Difficulties in Emotion Regulation Scale (DERS-16; Bjureberg et al., 2016) and the Smartphone Addiction Scale (SAS-SV; Kwon et. al., 2013). Additionally, parents rated how often they use and check their smartphones during parent-child interactions on a newly developed scale as an indicator of interruptions. The results show that parents with greater emotion regulation difficulty have a greater risk for smartphone addiction and report a higher frequency of using and checking their smartphones during parent-child face-to-face interactions. Thus, there is a significant indirect effect of emotion regulation difficulties, through risk for smartphone addiction, on interruptions of interactions between parents and children. The findings are further examined within the context of parents' characteristics that may be risk factors for the prevalence of interruptions of parent-child interactions.*

Keywords: *parents, interruptions of parent-child interactions, technoference, emotional regulation, smartphone use.*

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INTRODUCTION

There is no systematic research in Croatia on parents' smartphone use and its correlations, especially in the family environment. Parents' mobile device use is primarily explored in terms of how much they use mobile devices in general, the main reasons for their use while with children, how the use contributes to disruptions in their close dyadic interactions, and how the use can affect their parenting behaviour and child development. Parents use mobile devices while with children, especially smartphones, for different reasons, e.g., seeking relief from the stress or boredom of parenting, managing emotions as they deal with children and parenting, and facilitating various parenting tasks (McDaniel, 2020; Radesky et al., 2016). Mobile device use during parent-child interactions is linked to more distractions and interruptions of face-to-face interactions, known as technology interference, or technoference, in literature (McDaniel, 2019). The term specifies interruptions in interpersonal interactions caused by technology, namely smartphone use (e.g., McDaniel & Coyne, 2016; McDaniel & Radesky, 2018a). Numerous studies have confirmed the existence of technoference in caregiver-child interactions (e.g., Elias et al., 2021; Newsham et al., 2018; Radesky et al., 2014). These interruptions of direct interactions with children are related to less responsiveness towards children, less positive communication, and negative parenting behaviours (e.g., Elias et al., 2021; Hiniker et al., 2015; McDaniel & Radesky, 2018a). Evidence shows that greater parenting stress predicts greater technoference (McDaniel & Radesky, 2018a). In this study, the expression "technoference" refers to interruptions in parent-child face-to-face interaction due to parents' use of smartphones. Alternetively, the term "phubbing" is frequently used in the literature to refer to the interruptions in social interactions (Chotpitayasunondh, & Douglas, 2016). However, phubbing differs from technoference, as phubbing implies intentional use, while technoference encompasses the inadvertent influence of technology on communication, such as interruptions from notifications or unconscious device checking during conversations.

Current literature points to the theory that when parents frequently use smartphones during their time with children, they feel distracted and are less responsive as parents, which consequently has negative effects on child well-being and development (e.g., Dolev-Cohen & Ricon, 2022; McDaniel & Radesky, 2018a, 2018b; McDaniel, 2019; Merkaš et al., 2021; Stockadale et al., 2018). For example, more externalizing and internalizing problems, and lower social skills in children (e.g., Dolev-Cohen & Ricon, 2022; Knitter & Zemp, 2020; McDaniel & Radesky, 2018a, 2018b; Merkaš et al., 2021; Yang et al., 2023). A possible conceptual basis that might shed light on these patterns is the displacement hypothesis (Valkenburg & Peter, 2007). This hypothesis states that people while using technology, may displace other activities that are beneficial to their mental health, like face-to-face interactions with others (McDaniel, 2015). In other words, when parents shift signs of (non)verbal communication from face-to-face to technology devices, it can become a potential threat for some maladaptive outcomes in children (e.g., Hiniker et al. 2015, Radesky et al., 2014). In this way, parents miss out on opportunities to fulfill their child's needs, and children miss out on getting parental support when learning new behavioural patterns, like emotional regulation (Stockdale et al., 2018). Considering this, it seems important to examine whether any individual factors make parents prone to frequent, namely problematic smartphone use and a consequently higher incidence of technoference in parent-child interactions. Identifying

individual vulnerability factors for parents' frequent and problematic smartphone usage and experience of technoference cloud gives us important insights into where to do prevention and intervention.

A little research examines parents' characteristics that may be related to technoference or could make them more prone to experiencing technoference. The small range of existing research still gives an important insight into parents' characteristics and smartphone use patterns that could relate to technoference. Research has shown that one of the main predictors of technoference in parent-child interactions is parents' general smartphone use (e.g., Dolev-Cohen & Ricon, 2022; Knitter & Zemp, 2020; McDaniel & Radesky, 2018a, 2018b; Merkaš et al., 2021; Yang et al., 2023). The more parents use their smartphones, regardless of their activities, the more disruptions in their interactions with children they will experience and the higher their risk of problematic smartphone use. Some parents may develop problematic smartphone use or smartphone-related addictive behavior, which can manifest as an excessive preoccupation with smartphone use, experiencing uncomfortable emotions when unable to engage with the smartphone, and facing personal and interpersonal challenges stemming from smartphone use (Csibi et al., 2021). This kind of use is complexly related to various mental health issues, such as negative affect and autonomy (Horwood & Anglim, 2019). This may suggest that individuals who struggle with excessive (i.e., problematic) smartphone use may perceive themselves as helpless and experience a lack of control over their own lives (McDaniel et al., 2023), but also lack of control over their social interaction and, more basically, their behaviour and emotions. This also may imply that these individuals have difficulties regulating their behaviour and emotions.

Difficulties in emotion regulation or emotional regulation difficulties are indicated by, for example, the inability to carry out purposeful actions during distress, struggles with controlling impulsive behaviours in moments of distress, restricted use of perceived effective emotion regulation strategies, and lack of emotional clarity (Bjureberg et al., 2016). The significant link between emotion regulation challenges and problematic patterns of smartphone use is mainly obtained from samples of adolescents and undergraduate students (e.g., Fischer-Grote et al., 2019; Horwood & Anglim, 2021; Wacks & Weinstein, 2021), and there are not many studies done with adults, especially parents. A rare study done by Giordano et al. (2021) showed that emotional dysregulation in parents is associated with their excessive smartphone use, measured using the Smartphone Addiction Inventory. Currently, the evidence points to a low to moderate positive correlation between emotional dysregulation and problematic smartphone use; the older the person, the weaker the link between these constructs is (Shahidin et al., 2022). The positive link is not surprising given that difficulties with emotion regulation underline various addictive behaviours and psychopathologies (Shahidin et al., 2022). So, parents who face difficulties while regulating their emotions may be more likely to become engaged in problematic or addictive smartphone use as an attempt to manage their feelings and current states, consequently becoming more distracted in parent-child interactions. On the other hand, certain studies indicate that elevated emotional stability, assessed as a personality trait in parents, has the potential to mitigate the adverse impact of technoference on children (e.g., Merkaš et al., 2021; Morris et al., 2022), but only at a low level of technoference (Merkaš et al, 2021). It seems that parental emotional regulation could be an important individual-level factor that is

linked to problematic smartphone use and technoference in parent-child interactions, but the literature lacks empirical evidence for the statement.

The Current Study

Up-to-date research has focused on how technoference in parent-child interaction negatively affects child development. From the perspective of preventing the negative effect, the question arises about what predicts technoference in parent-child interactions. We raise the question of individual vulnerability factors of parents that make them more sensitive to experience technoference when with children. Thus, in this paper, we are focused on individual characteristics of parents that could be related to technoference since this topic has not been explored enough, especially from the perspective of parents. More precisely, the focus is on difficulties in emotional regulation and the risk of smartphone addictions that are directly or indirectly related to technoference. Moreover, this study aims to investigate risk factors observed within the dyadic, parent-child relationship. Thus, this study aims to examine the association among parents' difficulties in emotion regulation, the risk for smartphone addiction, and technoference in parent-child interactions. Research in Croatia has mainly focused on children's use of smartphones (Jokić et al., 2022; Merkaš et al., 2021) and there are gaps in the literature considering parent's smartphone use in the family context. Rare studies in Croatia with parents of children aged 3 to 14 years show that technology interference due to parents' smartphone use may negatively affect a child's social competence but parents' emotional stability may buffer this effect (Merkaš et al., 2021). Furthermore, data from the longitudinal study conducted within the "Digital technology in the family: patterns of behavior and effects on child development" project show that higher technoference is associated with parents' estimates of higher incidences of parent-child conflict about the child's smartphone use time. Results also show that children's estimates of higher incidences of parent-child conflict over the time children use smartphones are related to children's lower life satisfaction and higher negative affect (Kotrla Topić et al., 2023). The findings point to the importance of parents' smartphone use during parent-child interactions and parent-child conflict over smartphone use for children's well-being (Kotrla Topić et al., 2023). There are no studies about the predictors of parental smartphone use during interactions with their children. It is important to examine these predictors, as they could be risk factors. Preventive and interventive actions on these risk factors could reduce the negative effects of interruptions in parent-child interactions.

Based on the literature, we postulated two paths from emotion regulation difficulties to higher technoference in parent-child interactions, one direct and one indirect. We hypothesize that (a) higher emotion regulation difficulties will be directly associated with a higher incidence of technoference in parent-child interactions (direct path); (b) higher emotion regulation difficulties will be associated with a higher risk of smartphone addiction, which will be related to an elevated incidence of technoference in parent-child interactions (indirect path).

If the evidence supports the hypotheses, parents' difficulties in emotion regulation and problematic smartphone use, could be labeled as individual parents' vulnerability factors for experiencing higher technoference in parent-child interactions. This could shed light on a

space where prevention of technoference in parent-child interactions could firstly take place by strengthening parents as individuals.

METHODS

Sample

The sample comprised 270 parents (80.9% were mothers; average age 43 years (M = 43.41, SD = 4.8) of children (59.8% were girls) aged 10 to 15 years (M = 12.23, SD = 1.207) who participated in a longitudinal study (the first wave) within the project "Digital technology in the family: patterns of behavior and effects on child development". In terms of education, most fathers (58.7%) and mothers (49.1%) had completed high school, while a significant portion of fathers (37.3%) and mothers (48.4%) held higher degrees. A small percentage of fathers (4%) and mothers (2.5%) had only completed elementary school. Regarding employment, most of both fathers (80.1%) and mothers (73.1%) were employed full-time, while a small percentage of fathers (5.1%) and mothers (14.2%) were unemployed. Some fathers (11%) and mothers (11.6%) worked part-time, and a small percentage of fathers (3.7%) and mothers (1.1%) were retired. Most are two-parent families (85.6%) in the sample. Most of the parents have two children (50.2%), 13.4% have one child, and 36.5% have more than two children. The monthly income for most families (66.9%) was below 730.00 EUR per family member, while one-third of families (33.1%) had a monthly income above this amount. The range of monthly household income per person ranged from below 199.08 EUR (1.2%) to above 1260.87 EUR (10.8%). To summarise, most families included in the study belonged to families from the middle to upper socioeconomic classes.

Measures

Emotion regulation difficulties in parents were examined with the Difficulties in Emotion Regulation Scale (DERS-16; Bjureberg et al., 2016). The scale includes 16 items (e.g., "When I am upset, my emotions overwhelm me"). DERS-16 assesses dimensions of emotion regulation difficulties: nonacceptance of negative emotions, inability to engage in goal-directed behaviours when distressed, difficulties controlling impulsive behaviours when distressed, limited access to emotion regulation strategies perceived as effective, and lack of emotional clarity. Parents rated the extent to which each item applies to them on a 5-point scale from 1 (almost never) to 5 (almost always). Factor analysis revealed a one-factor solution, with the percentage of explained variance by one factor being 39.56%. The reliability of this scale, as examined by Cronbach's alpha coefficient, is $\alpha = 0.91$. The score on DERS-16 is calculated as the mean of all the items, with a higher score indicating greater difficulties in emotion regulation.

The risk for smartphone addiction was measured with the Smartphone Addiction Scale (SAS-SV; Kwon et al., 2013), which consists of 10 items that measure the extent to which a smartphone interferes with daily activities (e.g., "I miss planned obligations because of smartphone use"). Participants respond to each item on a scale ranging from 1 (strongly disagree) to 6 (strongly agree). Exploratory factor analysis showed a one-factor solution consistent with expectations (Kwon et al., 2013). The percentage of common variance by one

factor was 31.35%. The reliability of the questionnaire was assessed using Cronbach's alpha coefficient, which was 0.79. The score is determined by averaging all items, and a higher score suggests an increased risk of smartphone addiction.

Technoference in parent-child interactions, meaning interruptions of parent-child face-to-face interaction due to parents' use of mobile phones, was measured with a newly developed scale constructed for the purposes of this project. Parents rated how often they check their mobile phone during a family meal, use their mobile phone while they are talking to their child, check their mobile phone if it rings even if they are talking to their child, and use their mobile phone while with a child (e.g., during play, joint-free time) on a 5-point scale from 1 (never) to 5 (always). All four items were loaded onto one factor according to the factor analysis, which explained 48.72% of the variance, and the Cronbach alpha coefficient was 0.767. The overall score was determined by averaging the scores of all items, where a higher score indicated a greater level of technoference in the parent-child relationship.

Procedure

The research was carried out within the framework of a project "Digital technology in the family: patterns of behavior and effects on child development" that has ethical permission from the Ethical Committee of the Catholic University of Croatia and the permission of the Ministry of Science and Education of Croatia for the conduction of the study in schools. Elementary schools from the city of Zagreb and Zagreb County, Croatia, were contacted by the research team. Information and materials were sent to the schools via e-mail, including an invitation letter for the principal, a project approval form, informed consent forms for parents and children, copies of the questionnaire, and a protocol for school associates. Data was collected between December 2021 and March 2022. A total of 22 schools were contacted, and six schools agreed to participate in the study. The school associates, specifically school psychologists, provided the number of children in the 5^{th} to 8^{th} grades, and each school received sets of research materials based on that number. A total of 1096 sets were provided, each containing informed consent forms for parents and children, a questionnaire for parents, and the first part of the questionnaire for children in sealed envelopes. The children took the envelopes home, and if both they and their parents agreed to participate, they returned the envelopes with the completed materials to the school. The participation rate was 25.7% of all the contacted children and parents. Due to the length of the questionnaire, it was divided into two parts for the children, so children who participated in the first part of the study later completed the second part during regular school classes. The questionnaires were administered by school psychologists, and the group administration took approximately 20 minutes. Every participating child and parent received a coupon for the local zoo as a token of appreciation.

Data Analysis

Data for this research were processed using the SPSS program and Mplus program version 8 (Muthén & Muthén, 2020). Prior to statistical data processing, checks to identify any extreme values and outliers in the data that could potentially skew the results were calculated. Additionally, internal consistency coefficients and distributions of scores on the utilized

scales were examined. Internal consistency coefficients are satisfactory and exceed the reference values in the literature.

Concerning the normality of the distribution of results, the skewness and kurtosis values of the variables fell within the range of +1.5 and -1.5 (Kline, 2011). The correlation between variables in the study was examined using Pearson's correlation coefficient. To address the research question related to checking the mediating effect, Mplus program version 8 (Muthén & Muthén, 2020) was employed. To assess the fit of the data with the model, parameters such as the $\chi 2$ test, the values of the incremental indices CFI (Comparative Fit Index) and TLI (Tucker-Lewis Index), RMSEA (Root Mean Square Error Approximation), SRMR (Standardized Root Mean Square) were calculated (Hu & Bentler, 1999).

RESULTS

Descriptives and correlations between study variables

On average, parents report low levels of difficulty with emotion regulation, and low levels of risk for smartphone addiction. Parents reported, on average, that they rarely use and check mobile phones while interacting with children. Within the study, the frequency of parents' responses to technoference-related questions was analyzed. The results, based on the combined responses of "usually" and "always", revealed that approximately 3.2% of parents admitted to checking their phones during family meals, while 4% of parents acknowledged using phones during conversations with their child usually and always. Around 17.5% of parents stated that they check their phone when it rings even if they are talking to their child "at the moment", and 6.1% use a smartphone while they are with their child usually and always.

The correlations in Table 1 show that difficulties in regulating emotions among parents are directly correlated with an increased likelihood of smartphone addiction and the occurrence of technoference in parent-child interactions. There is also a positive correlation between the likelihood of smartphone addiction and the occurrence of technoference in parent-child interactions.

Table 1. Means (M), standard deviations (SD), and correlations between study variables

	M	***Sd***	***min***	***max***	***med***	**1**	**2**	**3**
1. DERS	1.73	0.53	1	5	1.69	-	.404**	.255**
2. SAS	1.99	0.65	1	6	1.9		-	.373**
3. TECH	2.03	0.71	1	5	2			-

Note: *p < .05; **p< .001; DERS – Difficulties in Emotion Regulation Scale; SAS – Smartphone Addiction Scale; TECH - Technoference in parent-child interactions due to parents' use of smartphone

Testing the effect of difficulties in emotional regulation and risk for smartphone addiction on technoference in parent-child interactions

Based on the literature and the hypotheses, a theoretical model was developed and tested (Figure 1). According to the model, (a) higher emotion regulation difficulties will be directly related to a higher incidence of technoference in parent-child interactions (direct path); (b) higher emotion regulation difficulties will be related to a higher risk of smartphone addiction, which will be related to a higher incidence of technoference in parent-child interactions (indirect path).

The path analysis was used with variables being represented as observed variables, meaning that the mean scores on each variable were taken into analysis. To assess the impacts, an ML estimator was applied, and bootstrap confidence intervals (CI) for the effects were derived from 1000 samples. The model was tested using the Mplus program version 8 (Muthén & Muthén, 2020).

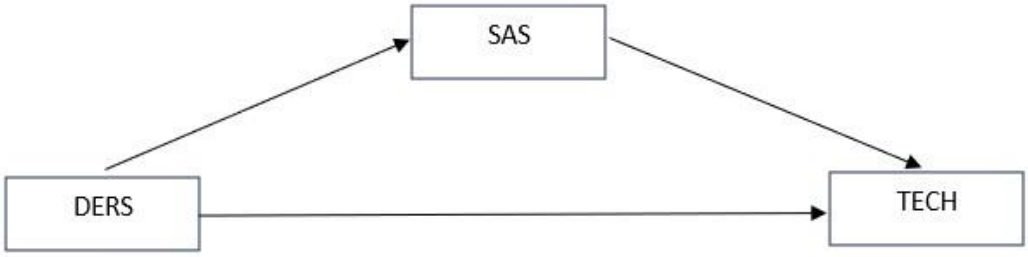

Figure 1. A theoretical model of the relationship between difficulties in emotion regulation (DERS), risk for smartphone addiction (SAS), and technoference in parent-child interactions due to parents' use of smartphones (TECH)

We first tested for the measurement model. The conducted analysis showed adequate goodness of fit statistics of the measurement model. Specifically, the following values were obtained: $X^2 = 94.842$, df = 3, $p < .001$; CFI = 0.979; TLI = 0.938; RMSEA = 0.084 <0.000 - 0.204>; SRMR = 0.032. All correlations between the variables in the model were significant.

In the second step, the model (Figure 1) with the hypothesized direct and indirect effect of emotion regulation difficulties to technoference was tested. Fit indexes for this model were: $X^2 = 94.842$, df = 3, $p < .001$; CFI = 1.00; TLI = 1.00; RMSEA = 0.000 <0.000 - 0.000>; SRMR = 0.000. Given that the proposed effect from emotion regulation difficulties to technoference in the parent-child relationship is not significant ($\beta = 0.106$, $p > 0.05$), we omitted it from the model and tested the full mediation model that examines the assumption that emotion regulation difficulties only indirectly (through addictive smartphone use) contribute to technoference in the parent-child relationship. The results demonstrated an adequate fit for the full mediation hypothesized model, so this model was accepted. Indices of fit for the full mediation model were: $X^2 = 94.842$, df = 3, $p < .001$; CFI = 0.979; TLI = 0.938; RMSEA = 0.084 <0.000 - 0.204>; SRMR = 0.032. Furthermore, the indirect effects were assessed using the bootstrapping method (1.000 bootstrap resamples). The statistical significance of the examined indirect effect was evaluated through 95% confidence intervals. The indirect effect is considered significant if the confidence interval of the unstandardized mean beta weight does not include the value of zero (Preacher & Hayes, 2008). Results show

a significant indirect effect of risk for smartphone addition in the relationship between emotion regulation difficulties and technoference in the parent-child relationship (0.169, $p < .001$; CI: <0.068 - 0.258>).

Table 2. Model results for testing the indirect effect of parents' emotional regulation difficulties on technoference in parent-child interactions

	β	S. E.
DERS → SAS	0.421**	0.052
SAS → TECH	0.401**	0.058
DERS → TECH	0.106	0.087
DERS → SAS → TECH	0.169**	0.034

Note: **p < .001; DERS – Difficulties in Emotion Regulation Scale; SAS – Smartphone Addiction Scale; TECH - Technoference in parent-child interactions due to parents' use of smartphone

DISCUSSION

The study aimed to examine the association among parents' challenges in emotion regulation, the risk for smartphone addiction, and technoference in parent-child interactions. The current study shows that in the sample of parents in Croatia, parents' emotion regulation difficulties do not directly contribute to technoference in parent-child interactions but indirectly. Parents' greater difficulties in managing emotions are related to a higher risk of smartphone addiction, which is then associated with a higher incidence of technoference in parent-child interactions.

Individuals who face challenges in managing their emotions may escape from some unpleasant emotions in the immersive world their smartphone offers. Emotion dysregulation can occur during efforts to alleviate uncomfortable emotions or enhance comfortable emotions as indicated by Gross (2015). The results of this study are in line with the previous studies indicating that higher emotion regulation challenges are associated with a higher risk for smartphone addiction in parents (e.g., Giordano et al., 2021; Squires et al., 2021). In this research, the DERS-16 (Bjureberg et al., 2016) was used, a measure explicitly designed to evaluate difficulties in regulating unpleasant emotions. So, the findings of this research indicate an association between dysfunctional efforts to alleviate uncomfortable emotions and increased smartphone use. This result aligns with the impulse pathway outlined in a model of problematic smartphone use proposed by Billieux (2012). Following Bilieux's model, unpleasant emotions may contribute to the internalization of ineffective emotion regulation strategies, ultimately resulting in excessive smartphone use as a means to distract attention from unpleasant emotional states. Several other theories and models (e.g., Brand et al., 2014; Kardefelt-Winther, 2014) propose that individuals who face difficulties in emotion regulation often resort to using smartphones as a means of distraction from unpleasant feelings.

Furthermore, the current study shows that parents who are more prone to develop smartphone addiction patterns experience more technoference in in-person interactions with their children. The reported outcome aligns with prior research findings, indicating that parents demonstrating problematic smartphone use or being at a heightened risk of smartphone addiction tend to avoid detachment from their smartphones (Cho & Lee, 2017). Smartphone addiction often involves compulsive use and constant attention to the device

(De-Sola Gutiérrez et al., 2016). Thus, parents might be easily distracted by their smartphones and are prone to engage in activities on their smartphones for an extended period of time even during in-person interactions with their children (e.g., McDaniel & Radesky,2018; Newsham et al., 2020; Sundquist et al., 2020).

This study further shows that the risk of smartphone addiction is the significant mediator in the relationship between emotion regulation difficulties and technoference in parent-child interactions. Parents with greater challenges in emotional regulation may be more prone to develop some maladaptive and excessive smartphone use to handle their unpleasant feelings and psychological states. As a result, those parents may become more interrupted during face-to-face interactions with their children, namely because of using and checking their phones. The intrusion of technology devices (e.g., smartphones) can disrupt and hinder meaningful parent-child interactions, as the parents' attention and focus are diverted towards their smartphones rather than being fully engaged in the interaction with their juveniles (e.g., Abels et al., 2018; Kushlev & Dunn, 2019 Valkenburg & Peter, 2007). The results obtained suggest a significant association between challenges in parents' emotion regulation, smartphone use, and the potential adverse effects on the quality of interactions between caregivers and children. In the context of the Differential Susceptibility to Media Effects Model proposed by Valkenburg and Peter (2013) difficulties in emotion regulation in parents can be considered as personal factor that influence media selection and responsiveness to digital technology use. Namely, Valkenburg and Peter (2013) suggest that there are some personality traits or dimensions (such as gender, temperament, personality traits, cognitions, attitudes, beliefs, motivations, and moods) that are crucial in understanding the effects of digital technology use. Emotional dysregulation related to negative affect can be seen as a personal factor that shapes parents' problematic and addictive use of phones during face-to-face parent-child interactions. So, parents with higher emotional dysregulation may tend to use their phones for regulation of negative affect. Consequently, this pattern of behavior may translate to parent-child interactions and interrupt face-to-face interactions.

On the other hand, this study suggests that challenges in emotion regulation that parents face do not directly contribute to technoference in parent-child interactions. The results obtained align with findings from earlier studies conducted in Croatia (Merkaš et al., 2021) according to which at a low level of technoference in parent-child relationships, as observed in the current study, emotional stability as a personality trait can mitigate the negative impact of technoference. Additionally, the obtained result may also suggest that parents who regulate their unpleasant emotions using some adaptive strategies and through means other than using smartphones (e.g., cognitive reappraisal) during active face-to-face interaction moments (e.g., discipline, bedtime, conversation with child) may not frequently use smartphones while with child.

This study concentrated on examining the association of certain caregivers' attributes associated with smartphone usage in interactions between parents and children. Research on the topic of technoference in parent-child interaction due to caregivers' smartphone use suggests that such disruptions may have numerous adverse effects on children's mental health (McDaniel & Radesky, 2018a, 2018b; Merkaš et al., 2021). These effects are most explained by the displacement hypothesis (Valkenburg & Peter, 2007) in the literature, according to which excessive smartphone use can contribute to communication breakdown in the family. When parents are focused on smartphones, effective communication with their children may

suffer as well as daily routines and boundaries, hindering the development of a strong parent-child bond. Interventions focused on embracing and learning adaptive emotional regulation strategies, primarily negative emotional states, can not only reduce the risk of smartphone addiction but also contribute to creating a richer and more focused environment for parent-child interactions. Hence, in the light of prevention, it is important to explore predictors and risk factors for technology interference in the family context.

Limitations and future directions

While the present study offers valuable insights into the association between emotion regulation challenges, the risk of smartphone addiction, and technoference in parent-child interaction, it is important to acknowledge several limitations.

Firstly, this study is conducted with a sample of Croatian parents who willingly took part in the study and were invited to participate. Derived from the sociodemographic attributes of parents and children, the conclusions from this study predominantly pertain to families belonging to the middle to upper socio-economic strata. In such settings, technology interference, as reported by parents, occurs rarely, indicating a context where familial interactions are less disrupted by smartphones. This highlights the necessity for future exploration of the observed effects in families with varying levels of functionality and diverse socioeconomic backgrounds. What is more, considering that most of the sample in this study consisted of mothers (80.9%), a recommendation for future research is to include more fathers in the sample.

Second, in the current study, the DERS-16 (Bjureberg et al., 2016) was used, specifically designed for assessing difficulties in regulating unpleasant emotions. As a suggestion for future research in this field, it would be interesting to incorporate additional aspects of emotion regulation, such as maladaptive internal and external strategies, the use of adaptive strategies of emotion regulation, etc.

Third, while our initial hypothesis and examination focused on the indirect effect of the risk of smartphone addiction, it would be prudent to explore potential mediating roles of some other characteristics, such as parenting styles or dimensions of parenting in future research. It is also probable that certain characteristics in children, such as challenging children's temperament, may influence parents' mobile use. So, future research should include some dispositional traits of both children and parents given that a child's development is shaped by the interplay between the child and their environment, including parents.

CONCLUSIONS

The findings of the study support the hypothesis about the mediating role of the risk of smartphone addiction in the relationship between difficulties in emotion regulation and technoference in parent-child interactions. Parents, mainly mothers from middle to upper-socioeconomic families, who experience higher emotion regulation difficulties are at a higher risk of smartphone addiction. This, in turn, is associated with more frequent interruptions of

parent-child interactions. The study results indicate that difficulty in emotion regulation does not have a direct effect on technoference in parent-child interactions.

IMPLICATIONS FOR RESEARCH, APPLICATION, OR POLICY

The ubiquity of smartphones every day has resulted in disruptions in social interactions, transforming what was once considered an occasional interruption into a socially acceptable norm (Stockdale et al., 2018). As smartphones become more pervasive within family environments, problems may arise, especially in households where these interruptions occur frequently (Meeus et al., 2021; Stockdale et al., 2018). The normalization of these disruptions poses a question on the long-term effects on familial relationships and underscores the importance of establishing clear boundaries for digital device use to maintain healthy relationships. To address the latter question, a proposal for future research is a longitudinal examination of the specificities of family functioning in the context of technoference and its associations with mental health outcomes in parents and children.

Research on technoference in parent-child interaction due to parents' smartphone use suggests that such disruptions have numerous adverse effects on children's mental health. This research focuses on parents' difficulties in emotion regulation and problematic smartphone use in the context of technoference in the parent-child relationship. Prevention activities focused on embracing and learning adaptive emotional regulation strategies, can not only reduce the risk of smartphone addiction but also contribute to a richer environment for parent-child interactions.

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