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DOI
10.1111/jcpp.13917

Publication date
2024

Document Version
Final published version

Published in
Journal of Child Psychology and Psychiatry

The Journal of Child Psychology and Psychiatry

Journal of Child Psychology and Psychiatry 65:8 (2024), pp 1108–1114 doi:10.1111/jcpp.13917

Commentary: Technoference or parental phubbing? A call for greater conceptual and operational clarity of parental smartphone use around children

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Introduction

Parental smartphone use while being with children has been widely problematized in recent years (Chokshi, 2019; Christakis, 2018; Davidovitch, Shrem, Golovaty, Assaf, & Koren, 2018). Several literature syntheses and reviews show evidence for associations between parental smartphone use and adverse outcomes such as decreased parent–child interaction quality, parental sensitivity, and increased problematic child behaviors (Braune-Krickau et al., 2021; Hood, Zabatiero, Zubrick, Silva, & Straker, 2021; Knitter & Zemp, 2020; McDaniel, 2019). These associations are explained by the smartphone's potential to distract parents from caring for and interacting with their children (Elias, Lemish, & Rovner-Lev, 2021; Hiniker et al., 2015; McDaniel, 2019).

Interestingly, along with the increased research interest in the impact of parental smartphone use on children, the number of concepts and operationalizations for this issue has grown. For instance, studies refer to "parental phubbing" (Hong et al., 2019), "technoference" (McDaniel & Radesky, 2018), "parental screen distraction" (Blackman, 2015), "co-present smartphone use" (Oduor et al., 2016), and so forth. The conceptual boundaries of these different terminologies remain elusive, making it unclear to readers to what extent concepts and their operationalizations overlap. In a recent article published in this journal, Modecki et al. (2020) describe this issue as a "labyrinth of measures, myriad operationalizations" (p. 855). Moreover, in a series of commentaries in the *Journal of Child Psychology and Psychiatry*, McCaleb, Champion, and Schluter (2021) and Modecki, Low-Choy, Vasco, Vernon, and Uink (2021) call for more rigorous scientific inquiries that clarify the role of parental smartphone use in children's development. They suggest doing this, among others, through a better understanding of the term "parental smartphone use" (McCaleb et al., 2021).

This article aims to respond to the call for greater conceptual cohesion and scientific rigor by disentangling the existing conceptual vocabulary and highlighting several considerations for future scholarship and practice. Both the use of different conceptualizations for a relatively comparable phenomenon and a resulting lack of rigor in their scientific investigation can make it difficult for scholars to develop a coherent conceptual framework. After all, a clear conceptualization of the variable of interest is at the very foundation of every scientific inquiry (Bringmann, Elmer, & Eronen, 2022), as incoherence influences the entire chain of scientific conduct, increasing the likelihood of erroneous conclusions. These erroneous conclusions, in turn, may misinform practitioners, public health, and policies relating to smartphone use in the presence of a child. It is currently not clear, for example, whether *any* smartphone use in the co-presence of children is problematic, or only smartphone use that directly interferes with parent–child interactions (Kushlev & Dunn, 2019). This lack of clarity may lead to the development of interventions that cannot target behaviors precisely and brand behaviors as problematic which are not actually a problem (Billieux, Schimmenti, Khazaal, Maurage, & Heeren, 2015).

In what follows, we will provide a discussion of the prominent issues in the current parental phone use literature, focusing predominantly on (a) inconsistencies in the application and the conceptualization of the phenomenon, (b) relevant differences in measurement and how these problematize our understanding of the phenomenon and the validity of findings.

Various and inconsistent conceptualization of the behavior

The associations between parental smartphone use and outcomes such as parenting behavior and child development have received ample attention in recent literature (e.g., Connell, Lauricella, & Wartella, 2015; Morris, Filippetti, & Rigato, 2022; Raudaskoski, Mantere, & Valkonen, 2017; Wolfers, Kitzmann, Sauer, & Sommer, 2020). In this literature, however, numerous different conceptualizations and terminologies are

Conflict of interest statement: No conflicts declared.

Table 1 Terminology applied in research on copresent mobile phone use by a parent

Term	Definition	Device of reference	Operationalization	Example publications
Parental phubbing	Parental distraction by their mobile phone device in the presence of their children.	Mobile phone, smartphone	Parental Phubbing Scale (Pancani, Gerosa, Gui, & Riva, 2021; Roberts & David, 2016)	Hong et al. (2019), Liu et al. (2019)
Technoference	Technology-based interruptions (in the parent–child interactions).	Smartphone, TV, computer, tablet, iPod, video game console	Technology Device Interference Scale (McDaniel & Coyne, 2016)	Elias et al. (2021), McDaniel and Radesky (2018)
Parental screen distraction	The moments in which parents and caregivers are distracted from performing parenting behaviors due to engagement with a screened device.		Screen Time Questionnaire (Olszewski, 2015)	Blackman (2015), Elias et al., 2021, Gaudreau, Hirsh-Pasek, and Golinkoff (2022), Kildare and Middlemiss (2017)
Co-present mobile phone use	The use of mobile devices in the presence of others at home.	Smartphone	Diary methods (qualitative)/ observational	Knitter and Zemp (2020), Oduor et al. (2016)
Parental phone use while parenting	The use of a mobile phone by a parent while taking care of their children.		Observational	Lemish, Elias, and Floegel (2020), Wolfers et al. (2020)

used to refer to the phenomenon of parental smartphone use while being with children. The most common terms appear to be "parental phubbing" (Hong et al., 2019), "technoference" (McDaniel & Radesky, 2018), "parental screen distractions" (Blackman, 2015), and "co-present smartphone use" (Oduor et al., 2016) (see Table 1).

While these conceptualizations seem to concentrate on *the same thing at the surface*, we argue that they capture *different angles* of parental smartphone use (i.e., the definitions strongly overlap but are somewhat distinguished by subtleties; see Hagger, 2014, for a commentary on the "déjà-variable" phenomenon). This may carry risks, as application of multiple terms to study a seemingly identical behavior has been identified as contributing to hampering research progress and theory crisis (Bringmann et al., 2022). Indeed, given that these various conceptualizations further inform the design of studies and determine how the phenomenon is measured, this provokes questions regarding the real consequences of parental smartphone use, as the effects found in studies may not always be comparable.

Co-present smartphone use is a broad umbrella term that describes any type of mobile phone use in the presence of others, and it accommodates all types of social relationships. For the parent–child dyads, hence, the term *parental smartphone use while parenting* as used by Braune-Krickau et al. (2021) seems the broadest concept used, comprising any type of engagement with a mobile phone done by a parent while being in the presence of the child.[1] However, the term *parental smartphone use* does not necessarily indicate any disturbance in communication between the child (or their needs) and the parent using the device, although such active disturbances and interruptions of the parent–child interactions are naturally included.

While the neutral term *parental smartphone use* leaves up to interpretation if there has been an actual disruption of social interaction due to smartphone use, the definitions of the terms *parental phubbing*, *technoference*, or *parental screen distraction*, imply a more direct effect of the device usage—respectively, a snub, interference, or distraction—as its inevitable immediate outcome. Unlike *parental phone use while parenting*, which can be strictly interpreted as a behavioral measure, terms such as *phubbing*, *technoference*, or *parental screen distraction*, thus actively refer to the causal mechanism inflicting a (mostly assumed to be negative) impact.

While the applied terms to describe parents' mobile phone/technology use in the child's presence may have distinct definitions (as reported in Table 1), in practice they are often used interchangeably. This is unfortunate for at least three reasons: First, it may contribute to "fuzzy terminology," a problem that some (e.g., Davidson, Shaw, & Ellis, 2022) claim is all too common in empirical studies of new technology-related activities. Second, it risks blurring theoretically relevant nuances regarding the different, potentially concurrent pathways linking parental phone use to outcomes. Third, fuzzy conceptualization risks trickling down into fuzzy operationalization, an issue that we tease apart further below, discussing (a) problems with validity, and (b) disentangling cause, mechanism, and effect.

Operationalization, a.k.a. A Labyrinth of Measures

As already identified above, issues related to the conceptualization of a phenomenon may trickle down into issues with its operationalization. The definition of what is to be scientifically studied by default dictates the means to collect and analyze the relevant data and what kind of conclusions will be

drawn from the inquiry (Bringmann et al., 2022). In relation to the phenomenon of interest, Modecki et al. (2020) point in that regard to a "labyrinth of measures" (p. 855) imposing limitations on a general understanding of existing findings.

Validity. The first problem with operationalization is that of limited face validity. Face validity is high when the measurement of a phenomenon informs directly how the target construct becomes part of the information/data subject to analyses, interpretations, and conclusions (Bornstein, 1996). In other words, there is face validity when the applied instrument measures *what it is said to be measuring*, as per the conceptualization of the phenomenon.

However, sometimes instrument operationalizations do not seem to fully match the conceptualization. For instance, some studies focus on phubbing as an intentional act of ignoring but have items that reflect more neutral behavior that do not suggest any mobile phone use activity, but merely imply that the mobile is present in the interaction setting. For instance, the MPhubbing and FPhubbing Scale (Mother and Father Phubbing, respectively; Geng, Lei, Ouyang, Nie, & Wang, 2021; Pancani et al., 2021) includes the item "She/he places her/his smartphone where she/he can see it when we are together."

Also, sometimes it is not entirely clear from the information provided how concepts were operationalized. Pancani et al. (2021), for instance, report in the methods section (p. 442) of their article on parent phubbing that they included the item "My mother/father get distracted when we do something together," suggesting they included an item that does not refer to phone use at all. But upon closer scrutiny of the supplementary materials, it becomes clear that the respective item as used in their scale does refer to the smartphone ("She/he get distracted by the smartphone when we do something together"). This may inadvertently confuse readers about what constitutes parental phubbing.

Another scale, the Technoference in Parent–Child Relationships scale (McDaniel & Radesky, 2018), does clearly operationalize technoference as the frequency with which various technological devices interrupt the time spent with their children. However, from the article it seems the Authors calculated mean scores across a variety of specific devices (e.g., TV, mobile phone, tablet, computer, etc.), risking crucial information concerning individual devices and the total interruption frequency resulting from them to have gotten lost. For example, when a mobile phone *frequently* interferes with the interaction but the remaining devices (e.g., a tablet, a TV) do not *interfere* at all, an aggregated mean score might be inappropriately low depending on how frequently interference in the social interaction occurs.[2] Such ambiguity reflected in the aggregated score may also be perceived as a validity issue (e.g., Nevo, 1985). In another minor example, the measuring instrument utilized by Modecki et al. (2020) state that it measures "family displacement by technology use," though the items, adapted from a smartphone dependence scale (Lin et al., 2014), focus exclusively on smartphones rather than technology more generally. This example shows how constructs can be conflated by a confounding language, that is, when a construct name does not correspond to the actual construct measured.

All in all, the above examples represent perhaps nontrivial threats to face validity. They illustrate the general importance of being attentive to whether scale measurements (and how they are presented to the reader) match with corresponding conceptual definitions. This implies thinking about, among others, whether to focus on one media device versus a more generalized notion of media technologies (plural), and whether to assess perceptions of behavior, perceptions of *intentions* of behavior, and/or (emotional) responses to perceived behavior. As we discuss below, the latter question is especially important to ask because it calls for a clearer focus on what is cause, mechanism, and effect.

Disentangling behavior, mechanism, and effect. As mentioned above (see Table 1), some concepts used to describe the phenomenon under study focus on smartphone use behavior as the root cause of the problem (e.g., smartphone use while parenting), while others already focus on downstream implications of that behavior, such as interference (cf. technoference), ignoring or feeling ignored (cf. phubbing), or distraction (cf. parental screen distraction; see also Table 2). We decomposed these terms in Table 2 to demonstrate that each of those terms refers to a *mechanism* that already assumes a direct *causal* assumption between a *behavior* and its subsequent *effect*.

The conflating of behavior with its immediate consequence has been previously noticed by Wolfers et al. (2020). In their example, the Authors distinguish between the *act* of using the mobile phone while parenting, and its two potential immediate outcomes: distraction and interruption, which represent the mechanisms leading to harm. However, studies often do not consider this distinction, and focus only and immediately on these mechanisms, that is, they do not measure the observable behavior (it being smartphone use while parenting), but rather

Table 2 Separating behavior from harm mechanism

	Phubbing	Technoference	Parental screen distraction
Behavior	Phone use	Technology use	"Screen" use
Harm mechanism	Feeling ignored/ignoring	Interference	Distraction

perceptions of its effect. This is not necessarily problematic, as these perceptions likely represent the mechanisms causing further negative effects on outcomes such as parental responsiveness and child development. There is a risk, however, that by not clearly disentangling the behavior from its potential outcomes, *all* parental co-present mobile phone use becomes villainized (see Billieux et al., 2015, for a commentary on overpathologizing everyday life). Arguably, parental phone use while parenting might not always, and in all circumstances, trigger adverse consequences regarding the quality of parent–child relationships and child development. We posit that leaving this nuance unquestioned, opens the doors to potentially unwarranted moral panic.

Subjective experience and intentionality. Finally, two related sets of assumptions, namely assumptions about (a) the subjective experience of children and assumptions about (b) the intentionality of behavior further complicate things. With respect to the first, we observe that some concepts do not consider the subjective experience of children, but rather indicate straightforward behavioral observations. For instance, the interference of technological devices (*technoference*) could be objectively measured by a third-party observer, whether it be the length or intensity of the action and the way technology interferes. Similarly, distraction may also be objectively measured, provided that it is precisely specified what kind of *distraction* is measured: distraction as a result of *parental task switching* (i.e., *sequential* multitasking; David, Kim, Brickman, Ran, & Curtis, 2015; González & Mark, 2004), that is, temporary disengagement from one action to focus on the mobile phone, or distraction as a *co-occurrence* of the mobile phone use where this does not suspend the activity the parent is doing with the child (i.e., *concurrent* multitasking).

However, whether a child is or feels ignored because their parent favors their mobile phone (*phubbing*), indicates a rather subjective experience, one that may tap into psychological and cognitive mechanisms, for example, perception of responsiveness and behavioral attribution (e.g., Frackowiak, Hilpert, & Russell, 2022). This subjective experience, moreover, has two potential perspectives – parents using their phones and feeling they thereby ignored their child and children who feel their parent is ignoring them by using their phones. It is crucial to clarify which perspective is the decisive one for a construct and align measures accordingly. In that endeavor, the question of whether very young children (i.e., babies and toddlers) can experience this state and, if so, how they express or give meaning to it, becomes a relevant empirical query that has received little attention thus far.

There are at least two reasons why the former distinction between objective behavior and subjective experience requires greater attention. First, while it is theoretically feasible to disentangle more "objective" behavior from more "subjective" experiences, studies currently often use terms interchangeably (e.g., mixing the term technoference with phubbing, e.g., Bai et al., 2020; Lapierre & Zhao, 2022; Meeus, Coenen, Eggermont, & Beullens, 2021). This not only complicates the public and researchers' understanding of what is being studied, but also potentially cause–effect incongruency, as there may be meaningful differences in operationalization that result in different effects being found.

Second, when defining phubbing as ignoring one's interaction partner by facing the device and turning the gaze away (Solecki, 2022, p. 211), this calls into question whether there is an underlying assumption over the *intentionality of the* behavior. Especially when looking at parental smartphone use in the co-presence of children, this notion of intentional ignoring does not always seem to correspond with reality. In fact, research identifies various reasons for which parents use mobile phone in the presence of children (e.g., see McDaniel, 2019 for a review; Radesky et al., 2016). For instance, prompts may feed into the pressure to respond to notifications (Flayelle et al., 2023; Mangan, Leavy, & Jancey, 2018; Radesky et al., 2018) or become a strong habit or addiction. In their overview or early evidence, McDaniel (2019) summarized that parents may be pressured to respond to work-related notifications or may be simply drawn to the device while expecting a reward coming from an instant engagement with the device (e.g., young mothers reporting the sensations of feeling that there is life beyond their children, Radesky et al., 2016). Thus arguably, the use of a mobile phone in the presence of a child may be nothing more than a reactive compulsive-behavioral component, not necessarily indicative of intentionality. Note that one cannot tap into intentionality of behavior without bringing up the effect of behavior (as discussed above), since the child's interpretation of parental acts may occur irrespectively of parental intention. And again, the subjective experience of intentionality can be grounded in the parent (as the phone user) or can be inferred by the child, emphasizing clarifying a construct's perspective on a conceptual level.

Concluding remarks

There is an upsurge in research on parental smartphone use while parenting, fueled by societal and scholarly concerns over its impact on children's healthy development. Although it is commendable that these concerns drive the implementation of scientific inquiry, a hasty implementation may slow down the process of theory building (cf. theory crisis; Bringmann et al., 2022) by employing (a) fuzzy terminology and (b) suboptimal operationalizations. In response to the previous calls from scholars to explore the nuances of how the usage of technology in

daily parenting could translate to child's development with greater scientific rigor (e.g., Al-Saggaf, 2022; McCaleb et al., 2021), this article addresses those two key features that researchers ought to mind.

To conduct meaningful research on the impact of smartphone use while parenting, researchers must define precisely what they intend to measure. For this, they must consider aspects such as the devices they are interested in (e.g., smartphone vs. overall screen use), the cause for the use (external or internal), the behavioral mechanisms of interest (distraction vs. interruption), and the consequences of the behavior (e.g., the child's perception of the behavior and emotional response). Once researchers have decided what aspects they would like to focus on it is crucial that they imply the proper terminology, which will then also inform their operationalization. The measuring instruments, in turn, should fit the investigated phenomenon accordingly, so as not to cause problems with face validity. The phenomenon tends to be measured using materials which imply the behavior and its direct consequence, which may lack clarity about what is being studied. We suggest that in future scientific inquiries, researchers distinguish between objectively observable behaviors and subjective experiences. Measuring behaviors with observations (e.g., with tracking, McDaniel et al., 2023, or by observers, Wolfers et al., 2020) and comparing these with measures collected via self-report (e.g., in questionnaires) could then be one way of improving alignment between conceptualization of objective behavioral constructs and measurements.

Only if researchers adhere to such a process can research in this field create a solid theoretical foundation that allows for future research to build upon each other's findings, contributing to a deeper understanding of the potential impact of smartphone use while parenting. These findings could then in turn be used to inform the public adequately on the potential consequences of smartphone use while parenting with a low risk of false information or overpathologizing.

Acknowledgements

The aim of this commentary was not to criticize other Authors, but reflect on common and current research practices, and examine if there is potential to improve research in the future. Furthermore, we understand that the content of referenced articles may have been affected by reviewers' suggestions.

Endnotes

1. One could debate whether a parent being in the presence of a child is enough to warrant the label *parenting*. In other words, the term 'parenting' may also be a fuzzy term, as conceptual boundaries of the contexts and behaviors constituting parenting can be argued to be equally unclear. We thus recommend future researchers to also carefully define and operationalize this construct in research on the effects of parental smartphone use and beyond.
2. In the original article, the Authors acknowledged that there may be variability in the level of interference caused by different devices. Still, from the text it seems the aggregated score was used in the analysis.

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Accepted for publication: 15 October 2023