**Discussion and alternative recommendations**

Despite the thorough scientific work completed by the GDG, the current article shakes the Jenga tower of the WHO guidelines for (non-) screen use among children. In Block 1, we made a clear distinction between the overall framework of the guidelines (i.e., inactivity and obesity) and the topic at hand (i.e., sedentary screen time). Then, in Block 2, we illustrated the GDG’s major reservation that summarized the section on screens with the phrase: “strong recommendations, very low-quality evidence”. In Blocks 3 and 4, we delved into the two “moderate quality” studies and showed that they suffered from troubling methodological issues and that they were not relevant to the WHO guidelines. In light of the fact that the 33 studies examined a wide range of outcomes, of which many resulted in null or even favorable outcomes of screens, Block 5 challenged the assumption that a consistent pattern can be extracted to begin with. Finally, the meta-analysis conducted in Block 6 showed that the overall psychological effect of screens is negligible, and Block 7 lends evidence that the entire field suffers from a publication bias. Altogether, these seven blocks undermine the scientific evidence of the WHO guidelines and the news headlines, which only escalate the heavy guilt that parents are already feeling.

In the past decade, parents have been "bombed" with allegedly scientific warnings about the [lasting consequences of screens for the child brain](https://time.com/5514539/screen-time-children-brain/) and [mental health](https://time.com/5437607/smartphones-teens-mental-health/). Fortunately, some of the studies that triggered these warnings have been critically challenged (Ophir, Lipshits-Braziler, & Rosenberg, 2019) but the current WHO guidelines suggest that public opinion is still biased toward the dark side of screens. Indeed, the new era of screen technologies raises complicated parenting challenges. Yet, the present meta-analysis on pre-school children suggests that the main challenge is not 'screen time' per se. This conclusion is supported by other scientific reviews that have been conducted on older children (adolescents) and on adults. A critical review on adolescents (Orben & Przybylski, 2019) and a meta-analysis on adults (Vahedi & Zannella, 2019) yielded similar findings to the current meta-analysis on pre-school children, according to which the negative cognitive and psychosocial effects of plane 'screen time' are negligible.

A review of the cognitive implications of smartphones, the most popular screen technology (citation), among adults does not lend support to the long-term negative consequences of screens (Wilmer, Sherman, & Chein, 2017). Wilmer and colleagues conclude this review with a statement to the effect that further studies are critically needed to clear some of the myths associated with smartphone use. Similar conclusions were made in a systematic review of four decades of research on the links between new media screen time and attention disorders among children and adolescents (Beyens, Valkenburg, & Piotrowski, 2018).

Correspondingly, a systematic review of the psychosocial outcomes of Facebook use, an extremely popular social network screen technology (Statista, 2019) suggests that the associations between mental health issues and screen use should not be seen as an injective function (i.e., screen time → mental health problems) (Frost & Rickwood, 2017). Several studies on adolescents and adults have challenged the direct negative relationship between screen use and psychosocial distress (e.g., Baker & Algorta, 2016; Jelenchick, Eickhoff, & Moreno, 2013). Similar to the current article, some researchers documented null results, and some even showed that the use of social media screen technologies may actually contribute to the user's well-being (Frost & Rickwood, 2017).

We therefore argue that further research is needed to achieve a more balanced and scientifically-grounded perspective on this topic. Instead of focusing on direct relationships, empirical studies should search for the third, mediating variable between screen use and negative psychological outcomes. This recommendation for scholars follows contemporary research efforts documenting these complex relationships, in which screen technologies have been linked to negative psychological outcomes indirectly, through mediating variables such as the personal characteristics of the user (Feinstein et al., 2013; Steers, Wickham, & Acitelli, 2014) and the violent or sexual specific content of the screen use (citation). In the meantime, until a more evidence-based integrative picture arises, we offer here five alternative, evidence-based recommendations for parents.

**1. Directing educational efforts away from screen time toward healthy habits.** As shown in the current meta-analysis on pre-school children, as well as in previous works on adolescents and adults, the psychological effects of plane 'screen time' are negligible. Therefore, parents should direct their educational efforts away from 'screen time' and toward developing healthy screen habits in their children. This statement does not pertain to pathological overuse of screens (see next).

**2. Monitoring pathological overuse of screens.** Like all other human behaviors, overuse of screens can be maladaptive, both for children and for adults. Contemporary studies specifically distinguish between general use and pathological overuse of screens. Different terms are mentioned in the literature to describe this pathological use (i.e., addiction, dependency, compulsive, and problematic use) (Kardefelt-Winther, 2014) but they all share a common ground. Children and adults engaging in pathological overuse of screens experience a compulsory need to use the screen-technology (e.g., social media, gaming, etc.) and painful withdrawal symptoms when they are deprived from it. A systematic review of adults' pathological use of screens found small to medium effect sizes, according to which problematic overuse of screens has been linked to depression and anxiety (Elhai, Dvorak, Levine, & Hall, 2017). To prevent this addictive behavior, parents should monitor two troubling signs: a severe emotional distress triggered by screen usage/deprivation and a significant decrease in other healthy daily behaviors (see next).

**3. Monitoring healthy daily behaviors instead of screen time.** A previous critical review of a large study on screens implied that the risk of depression among screen users may be moderated by other positive and constructive daily behaviors, such as exercising or interacting with friends (Ophir, Lipshits-Braziler, et al., 2019). Parents should therefore direct their efforts to the supervision of these positive behaviors. This recommendation actually corresponds with the general framework of the WHO guidelines that focuses on sleeping and physical activities. Similar to the previous point on pathological overuse, screen time can become maladaptive if it happens at the expense of healthy daily habits. Monitoring for quality sleep, physical activities and social/community activities can serve as a buffering factor against possible negative outcomes of screens, as long as the consumed content is age-appropriate (see next).

**4. Monitoring negative and inappropriate content of screens.** With the understanding that screen time does not lead to negative consequences per se, parents can direct their educational efforts away from screen time toward matching the content of the screens to the child’s age. As illustrated in Block 3, the content presented on the screens matters (Kostyrka-Allchorne, Cooper, Gossmann, Barber, & Simpson, 2017). Content deemed to be inappropriate, violent (citation) or hyper-sexual (citation) was found to have harmful psychological outcomes and should therefore be monitored. In later childhood periods, special attention should be paid to cyberbullying. Recent systematic reviews found that victimization of cyberbullying is consistently associated with suicidal and self-harm behaviors (John et al., 2018; Kowalski, Giumetti, Schroeder, & Lattanner, 2014). Nonetheless, other, age-appropriate positive content may actually contribute to the psychological development of the child (see next).

**5. Making educational lemonade from screen technologies.** While many scholars warn against the negative effects of screens, others point out the positive outcomes of screen use among children (for an updated review, see in Ophir, Rosenberg, in press). Children can use screen technologies to perform healthy developmental tasks: pre-school children can acquire literacy and mathematical skills (citation) and older children can maintain constructive interpersonal relationships with family and friends (Valkenburg & Peter, 2011). Moreover, adult caregivers can leverage the new technologies for early detection of distress in their children (Ophir, Asterhan, & Schwarz, 2017, 2019). An integrative review of fascinating advances in computational psychology suggests that the new media screen technologies offer unprecedented opportunities for early detection of mental health conditions (Guntuku, Yaden, Kern, Ungar, & Eichstaedt, 2017). Finally, adult caregivers, such as teachers and youth counselors, can provide children with ongoing emotional support through screen-based technologies (Ophir, Rosenberg, Asterhan, & Schwarz, 2016; Rosenberg, Ophir, & Asterhan, 2018). Parents are therefore recommended to leverage screen technologies for positive psycho-educational use, just like for other sedentary behaviors that involve positive activities such as 'listening to a story'.

Indeed, the above list of alternative practical recommendations is longer and somewhat more complex than the WHO document. Yet, we believe that they offer a more balanced, more accurate, and most importantly less terrifying, set of guidelines for parents. The authors of the WHO guidelines actually leave room for changes in their original document. They state that: "The recommendations will be updated within ten years, unless further research in the area provides additional evidence to warrant an earlier update" (page 16). We take the position that we should not wait ten years before we correct the current version of the guidelines. The current version is based on poor quality science and this critical review and meta-analysis shows that the scientific evidence supports neither the clear-cut recommendations nor the troubling headlines on the negative outcomes of screens.

להכניס לרשימת מקורות

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