



Problematic social media use in childhood and adolescence

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ABSTRACT

At the time of writing, about 4.59 billion people use social media with many adolescents using their social media accounts across a myriad of applications and platforms. According to recent statistics, in 2022 individuals spent an average of 151 minutes on social media each day, illustrating the global relevance of social media (Dixon, 2022a,b). One of the pressing questions, internationally, is whether social media use is harmful and/or addictive. This question is of particular importance because many teenagers - and younger adolescents - spend considerable time on these platforms, which have increasingly become an integral part of their lives. Moreover, considering lifespan development, adolescents may be particularly vulnerable to specific features and advertisements shown to them on social media platforms. Growing prevalence of poor mental health in young people has led to recent recommendations in the United States to routinely screen for anxiety in 8-18 year olds, and for depression and suicide risk for adolescents between 12-18 years of age (US Preventive Services Task Force et al., 2022 a,b) – the conditions often accompanying problematic social media use. The present work not only provides insights into the current state of the literature but provides also recommendations.

One approach to gain a better grasp on the topic of problematic social media use is to understand how screen time on social media is linked to well-being. This research question has gained substantial interest and a meta-analysis suggests that the negative association between social-media-screen-time and well-being is very small (Huang, 2017). This finding, of course, does not mean that no users are experiencing decreased well-being or even adopting maladaptive behaviors due to their (intensive) social media use. Research implies that social media use appears to have negative consequences for some youth, but positive or no effects for others, suggesting the existence of person-specific effects (Beyens et al., 2020). Each adolescent is subject to unique dispositional, social, and situational factors that guide their social media use and,

thereby, determine its effects (Valkenburg et al., 2022).

A further problem in research is that most studies to date do not differentiate between general time spent on social media and problematic social media use (PSMU, further illustrations of PSMU can be found below), which is often assessed in the realm of an addiction framework with 'symptom classification' borrowed from substance use disorders. As general time spent on social media use and symptoms of PSMU are distinct, yet interrelated concepts, they should be studied simultaneously to prevent confounding effects and unsubstantiated conclusions (Boer et al., 2020a; Boer et al., 2021; Valkenburg et al., 2022; van den Eijnden et al., 2021). At best such research should also not only rely on cross-sectional designs (which often is the case) but should include

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multiple measurement waves to obtain a better understanding of the directionality (i.e., causality) between the relevant variables in social media research.

In the present work, we will focus on PSMU, which is generally assessed using addiction ‘markers’ such as loss of control, preoccupation, salience, mood modification, tolerance, experiencing withdrawal symptoms, relapse, conflict when one cannot use social media, and experiencing negative consequences due to social media use (Arrivillaga et al., 2022). Please note that new work suggests that some criteria are more relevant to capture psychopathological aspects of PSMU (in this work “mood modification, relapse, withdrawal, and conflict”, p. 6; Fournier et al., 2023). Such work is of importance, because researchers and practitioners alike need to abstain from “pathologizing common behaviours” (Kardefelt-Winther et al., 2017). Among the most commonly used self-report measures to obtain insights into the addictive features related to social media use are the *Bergen Social Media Addiction Scale*, which has been constructed against the background of Griffiths’ components model of addiction (Andreassen et al., 2012; Griffiths, 2005) and the *Social Media Disorder Scale* which is based on the nine DSM-5 criteria of Internet Gaming Disorder (Boer et al., 2022a; van den Eijnden et al., 2016). Both self-report measures are characterized by good psychometric properties (Watson et al., 2020).

Despite the existence and widespread use of these validated measures, there is ongoing discussion about whether all criteria borrowed from substance use disorder research can be transposed to behavioral addictions, which we examine here with a focus on PSMU. As the WHO in 2019 officially recognized Gaming Disorder as a distinct diagnosis, current discussions focus on whether the new Gaming Disorder diagnostic criteria should and can be transposed. If so, all four criteria - loss of control, increasing priority given to social media use, continuing use despite problems arising, and associated functional impairment (Montag, Schivinski & Pontes, 2021) - would need to be applicable to PSMU. It has been proposed that current evidence regarding PSMU as an independent diagnostic entity is still insufficient, in particular, if contrasted with problematic pornography use or compulsive buying disorder, where empirical evidence appears stronger (Brand et al., 2020). On the other hand, there is increasing evidence suggesting that PSMU might have negative consequences for the cognitive and mental well-being of adolescents, thereby underlining detrimental aspects of PSMU. For instance, longitudinal research suggests that adolescents who experience greater PSMU subsequently develop more attention and impulsivity problems (Boer et al., 2020b; Thorell et al., 2022), depressive feelings (Boer et al., 2021), and lower school grades and life satisfaction (van den Eijnden et al., 2018). Research has also posited that highly susceptible youth may be impacted more strongly by social media due to their heightened focus on peer behaviors and social feedback (Armstrong-Carter et al., 2023). Moreover, there is some evidence for subgroups of adolescents who experience these symptoms over a longer period (Boer et al., 2022b), reflecting continued use despite problems arising from it. PSMU remains a relatively young research area and it seems plausible that increasing empirical evidence will further substantiate the decision to regard PSMU (or not) as an independent diagnostic entity. In this context, additional neuroscientific work will be needed to substantiate the claim of PSMU being an addictive behavior or else (Montag et al., 2023; Moretta et al., 2022).

In the absence of agreement on the definition of PSMU and the criteria required - generally and especially among children and adolescents - meaningful prevalence estimates are difficult to determine. In a recent meta-analysis, higher prevalence was associated with younger age, specific classification schemes, and residing in collectivist nations (Cheng et al., 2021). Among all studies, prevalence in adolescent samples was highest (35%) compared to university students (23%) and community adult (19%) samples. However, results depended upon strictness of classification schemes with ranges between 5% and 25% for all samples.

In the context of the social media/well-being/addiction debate, we

propose to go beyond the screen-time discussion and to explore the *who-, why-, and how-questions* to better understand who and what kind of use is associated with PSMU (Kross et al., 2021; Montag, Yang, & Elhai, 2021). The *why-* and *how-questions* are particularly related, as discussed below. The *who-question* may help tackle issues around socio-demographic and personal factors involved in PSMU. The literature proposes that those who are of younger age (early adolescence), female (Dailey et al., 2020), more neurotic, less conscientious (Huang, 2022), have less self-control (Leijse et al., 2023), and more psychosocial problems (Boer et al., 2022b) are at greater risk for developing PSMU. Regarding the *who-question*, contextual factors may be important as well, particularly in the earlier phases of social media use (Leijse et al., 2023). Research, for instance, indicates that clear parental rules regarding social media use may help prevent adolescents’ PSMU (Koning et al., 2018), if these rules are communicated in a positive parenting climate before PSMU patterns evolve (Geurts et al., 2022a, Geurts et al., 2022b).

The *why-question* can be answered by studying use motives for social media, such as been put forward by the uses and gratification theory (Whiting & Williams, 2013). In the context of social media use, among others one could distinguish between categories such as hedonic, social, and utilitarian use motives. For instance passing time, which might belong to hedonic use, has been robustly linked to PSMU severity (Kircaburun et al., 2020). A motive related to all addictive-like behaviors, including PSMU, is the need to regulate negative emotions (Wartberg et al., 2021). More specific for PSMU is the motive to compensate personal needs not (fully) met, for instance the need to belong (Ostendorf et al., 2020), desire for approval or even admiration (Casale & Banchi, 2020), and the need to control relationships, content generation and impressions (Throuvala et al., 2019). Related to these social motives is the concept of fear of missing out (FOMO), which refers to the fear that others may have rewarding (social) experiences from which one is deprived (Elhai et al., 2021). A cross-sectional investigation further suggested perceived friends’ social media use to be associated with adolescents’ own use, which, in turn, may be associated with PSMU (Marino et al., 2020). Thus, in order to fulfill their social needs, to feel connected, and to alleviate negative feelings (e.g., FOMO), adolescents appear to use social media in a more compulsive way, increasing the risk of PSMU. The *why-question* could also be interpreted in the context of the compensatory model of Internet (and social media) use: Such an approach would not necessarily conclude that PSMU is of addictive nature. Instead, it seeks to understand alternative explanations for excessive social media use and explore healthier coping strategies than escaping reality in the online world to deal with ones’ problems (Kardefelt-Winther, 2014). But we also think that if overuse of social media becomes a common coping strategy for everyday problems, and these problems remain unresolved, some users might indeed face problems such as functional impairments due to their excessive online behavior. Such functional impairments are at the core of psychopathology around the Gaming Disorder diagnosis in ICD-11 (Montag & Pontes, 2023).

The *how-question* is linked to the *why-question* because personal motives (and related needs) to use social media ultimately must be fulfilled by *how* a platform is used. Studies have investigated if social media users access online platforms in more active versus passive ways (Escobar-Viera et al., 2018). Active could mean posting and interacting with others (perhaps more fulfilling needs for bonding or exerting power; Sariyska et al., 2018); passive could mean browsing and watching contributions from others without further engagement (perhaps more being linked to distracting hedonic use). Despite the fact that many users show mixed behavior including active and passive use, the more passive form appears to be linked to a greater risk of PSMU (Escobar-Viera et al., 2018) (for complexities in this field when linking active/passive social media use to well-being, see Verduyn et al., 2021). In general, studying the *why-question* could reveal factors explaining for whom which consequential effects of (social) media can be observed (in the work by Valkenburg & Peter (2013) these are emotional, cognitive

and excitative responsive states). To better understand the relationship between SMU and mental well-being, more elaborate research is needed that comprehensively investigates specific social media uses that are positively and negatively related to adolescents' mental well-being. Investigating such specific use would, at best, also consider the quality versus quantity aspects of the online interactions on social media (e.g. focusing on the felt emotional closeness due to the online communication (Boursier et al., 2023), rather than solely focusing on the number of online interactions).

We also have to face the problem that studies investigating PSMU in the youngest user group (i.e., children) are comparably scarce (Rega et al., 2023), even if this does not surprise us. Most social media-centric products are restricted to use for those 13 years and older, a developmental phase which in normal child development coincides with puberty. However, younger children have been observed to be avid consumers of social media as well (Common Sense, 2021). The tech industry has a keen interest in introducing adolescent-targeted (and expanded platform feature) products such as Instagram Kids or Facebook Kids to the market, with the goal of harvesting new-and presumably lifetime-users, while also attempting to maintain a stronghold against the increasing number of competitors in the social media applications space. The idea of soliciting children to social media platforms has incited a vociferous outcry from experts (Satariano & Mac, 2021) who fear that vulnerable user population groups, (such as children with lower intellectual disabilities and autism), would prematurely engage with social media, exacerbating negative consequences later in life. Research on social media use would also benefit from including young users suffering from various clinical conditions to go beyond what is known in the literature when focusing on rather healthy study participants. The current led debate, of course, does not only touch upon PSMU, but also other social media-based threats such as cyberbullying, cyber-grooming, cyber-victimization, and exposure to either inappropriately graphic online material or specious images of peers, all of which could provoke pressure, insecurity, and distress on young minds and still developing brains (for a recent review on PSMU and links to several problems in childhood/adolescence see Bozzola et al. (2022)). A hyperfocus on body image is associated to body dysmorphia, eating disorders or obsessive eating practices (i.e., orthorexia), and poor sleep hygiene have also been reported as key consequences of problematic social media engagement (Boniel-Nissim et al., 2023; Vandebosch et al., 2022; Padín et al., 2021).

Recommendations

Although research is scarce, we share the opinion that social media – as constructed today and with the data business model behind it – should not be put into the hands of children and young adolescents¹ under the age of 13 (in line with age barriers put forward by most companies behind the social media products to offset adverse consequences for younger users). This also means that the age of use eligibilities established by the industry and regulators need to be better monitored - and enforced - by the platform providers, because an increasing number of younger people happen to use social media despite the existing restrictions. This said, children will likely gain access to social media prior to puberty, so we argue more precisely that they should not have their own social media account before the age of 13 (for further insights see also a review on problematic media use in children by Rega et al., 2023) - given the susceptibility to risk behaviors and high impulsivity, determined by the still-developing prefrontal cortex accounting for functions such as decision-making and critical thinking ability (Blakemore & Choudhury, 2006).

¹ Of note, according to WHO formulations, adolescent age describes 10-19 year olds https://www.who.int/health-topics/adolescent-health#tab=tab_1 (link accessed on 8th February 2024).

Age of first use also has been correlated to addiction, with the earlier an individual is introduced to an addictive substance or behavior the more likely they are to develop struggles, with greater long-term vulnerability identified for specific conditions. It is further recommended that intervention strategies should target prevention prior to adolescence, specifically before the age of 13. Thus, we would support children and parents first together (earlier than the age of 13) exploring the world of social media, so that teens (and their parents) will be more informed and prepared for what to expect once turning 13 years of age. Recent research highlights the importance of parents setting clear rules before children or adolescents obtain their own smartphone. These rules can best be communicated in a positive parenting atmosphere, where parents explain why these rules are important and leave sufficient room for their children's views and opinions (Geurts et al., 2023; Király et al., 2020).

Moreover, caregivers should set and model exemplary behavior. By overly engaging with their devices (and social media) themselves, caregivers may pave the way for children to emulate and adopt similar behaviors (Geurts et al., 2022a; Gong et al., 2022). In consultation with teachers and caregivers, the objective should be to find an agreement on what behavior is permissible and adaptive and then model positive device use. The challenge here is that caregivers often benefit in multiple ways from providing children with digital devices (e.g. by having time for themselves; Geurts, Koning, Vossen, & Van den Eijnden, 2022b). If half the class is watching a screen instead of focusing upon the instruction being delivered, it is very tempting to mimic this inappropriate behavior. Storing devices away during lesson time for example, with clear rules around smartphone usage (i.e., allowing use at specific times during the school day or not all (see current smartphone ban in France, China, etc.) would allow for a distraction-free learning environment (Montag & Elhai, 2023a). We therefore recommend that academic leadership and instructors create a firm set of policies on smartphone use in the school environment, which would apply to students, faculty, and staff. Such school policies should be accompanied by media and emotional literacy programs in schools starting from early years to encourage reflective dialogue about healthy use accompanied by parental seminars to help mitigate risky behaviors (i.e., exposure or participation to challenges encouraging self-harm; Throuvala et al., 2021a, 2021b).

For the user group of adolescents aged 13 years or older, recommendations become even more complicated. From our view, social media per se should not be labelled simply 'good' or 'bad'. As put forward in an in-depth analysis of adolescents and social media use (Weinstein & James, 2022), it becomes apparent that social media provides teens with abundant opportunities to self-express, gain new social and cultural awareness, build relationships, create reliable alliances and trust, receive otherwise unattainable support from like-minded others, explore vulnerabilities, and get valuable feedback from their peers to see where they stand within their peer group. Hence, social media generates new possibilities for identity construction and development. The problem we see is that creating and interacting via social media platforms is likely to bring young users in contact with unforeseen problems (e.g., cyber-mobbing, etc. – see above). Complicating matters further for the still-developing brain is that young minds interact with platforms designed via so-called AB-testing specifically designed to prolong online use with the aim of harvesting the maximum digital footprint (Montag et al., 2019). Via their platform design, the data business model seeks to target, lure in users, and then keep them engaged with a particular platform as often and for as long as possible (Montag & Elhai, 2023b). In addition, the coding design of many online platforms and applications - including social media - purposely leverages the limbic system and variable rewards vulnerability (Westbrook et al., 2021), similarly activated in both substance-based and other processes of addictive behaviors, to entice repeated and prolonged use. Also similar to the predispositions of substance abuse, adolescent risk factors for PSMU include lack of parental supervision, emotional instability,

poor social skills, peer pressure, and availability of access, among other factors (Leijse et al., 2023). At the same time, resisting push-notifications and the unpleasant FOMO can be particularly hard for young brains to navigate or negotiate (Rozgonjuk et al., 2021). Consequently, prevention and (early) intervention measures with regards to PSMU need to be developed and validated according to effectiveness.

Despite the growing number of studies available in the PSMU field, it is difficult to generate empirically grounded rules on when children/teenagers safely can start using social media. Our recommendation not to have one's own social media account before the age of 13 is based upon several observations. First, the international HBSC data from 29 countries, using representative samples as well as the same instrument to measure PSMU, show prevalence rates ranging approximately between 3-14% among adolescents aged 11-15 years, with an average of 7.38% (Boer et al., 2020a). These prevalence rates underline that a substantial number of adolescents experience problems linked to their social media use and that this needs to be considered when providing recommendations for youth social media use. Further, robust associations between PSMU and attention problems, impulsivity, depression, anxiety, self-harm, and stress have been observed, suggesting that overuse of social media is linked to lowered self-control, maladaptive behaviors, and emotional problems. Negative social media use outcomes linked to cyberbullying, cybergrooming, cyber-victimization, early contact with age-inappropriate content, and problems around privacy only increase our concerns regarding unrestricted social media exposure to adolescents, and lack of parental education and monitoring surrounding it. Social stress has also been posited as a variable to consider in the relationship between PSMU and peer-victimization experiences among early adolescents, with investigation outcomes indicating that PSMU was associated with higher levels of peer-victimization via higher levels of an adolescent's psychological insecurity (Feng et al., 2023). Although our recommendations are still preliminary, we advocate at best for no social media use in childhood (and if engaging with it then only when supervised by a parent or adult caregiver) - at least in our current digitally captivated culture and age of surveillance capitalism (Zuboff, 2015), in which the prime objective of platforms is to prolong online engagement of users. If we were to see improved social media models in the future, focused upon strengthening users' rights and demonstrating a greater commitment to user health and well-being, our recommendations should be revisited.

Conclusions and Future Directions

- Progress in the field of PSMU research is impeded by the lack of agreement on assessment criteria. Research is needed to strengthen the evidence base of PSMU within frameworks like DSM-5 or ICD-11. We welcome generally accepted criteria for PSMU to streamline research in this area.
- The field of PSMU research is often impaired by cross-sectional studies, hence we need more study designs to be able to disentangle causes and consequences of PSMU.
- More research is needed aimed at the prevention of PSMU and clarifying which parenting behaviors, school and governmental policy measures, as well as other contextual factors (e.g. friends, family, leisure activities) do and do not help prevent PSMU among children and adolescents. Longitudinal studies will be of relevance in this context.
- More research on risk factors and risk profiles for PSMU is needed. Such research should be supplemented by studies carving out the mechanisms underlying the development of PSMU.
- Funding for interdisciplinary and translational research is required to capture findings at a policy level and monitor the modification of harmful business models.
- A closer collaboration for the development of academic, pediatric and clinical research on presenting problems in child and adolescent

mental health services could help shape a more accurate research agenda and guidelines on PSMU and its complexities.

- Measures to prevent PSMU must be developed and tested empirically. The same applies to early intervention and treatment options tailored to children and adolescents.
- Much of what happens on social media currently is a black box. In order to better understand how adolescents behave on social media platforms, further empirical research is vital but at the moment is hampered by closed Application Programming Interfaces on some of the platforms (Montag, Hegelich et al., 2021).
- The data business model behind social media applications needs to change to create healthy online environments (Montag & Hegelich, 2020). If we would need to decide who ultimately is responsible for reducing online time (again not the critical variable to understand PSMU), we opt for the industry and not the users (Montag et al., 2022).

CRedit authorship contribution statement

Christian Montag: Writing – original draft. **Zsolt Demetrovics:** Writing – review & editing. **Jon D. Elhai:** Writing – review & editing. **Don Grant:** Writing – review & editing. **Ina Koning:** Writing – review & editing. **Hans-Jürgen Rumpf:** Writing – review & editing. **Marcantonio M. Spada:** Writing – review & editing. **Melina Throuvala:** Writing – review & editing. **Regina van den Eijnden:** Writing – original draft.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

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