

# Adolescents' Perception About the Relationship Between Self-Reported Smartphone Addiction and Emotional and Behavioral Problems During the COVID-19 Pandemic

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## Abstract

This study aimed at understanding the adolescents' perception about the relationship between Self-Reported Smartphone Addiction and Emotional and Behavioral Problems in the COVID-19 pandemic context. The qualitative research was conducted in Brazil with 16 adolescents aged from 15 to 18 years old classified as smartphone addiction by Smartphone Addiction Inventory scale. Data were collected through Focus Group meetings and prepared by means of Bardin's content analysis. The findings resulted in two categories that describe how adolescents escape from the reality imposed by the COVID-19 pandemic using smartphones and how they perceive the

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emotional and behavioral changes caused by this addiction. They develop this behavior seeking to alleviate negative emotions and to escape from reality, but this relief is momentary and ineffective, as this addictive relationship proves to accentuate emotional distress.

### **Keywords**

technology, mental health, adolescence, qualitative research

### **Introduction**

In adolescence, some individuals experience Emotional and Behavioral Problems (EBPs) that can affect their development and leverage of their potential resources (Theunissen et al., 2019). These problems are characterized by inability to establish satisfactory interpersonal relationships, by inadequate behaviors or feelings under normal circumstances, by a generalized unhappy or depressed mood, and by a tendency to develop physical symptoms or fears associated with personal problems (Laudrum, 2017). EBPs can be externalized through emotional symptoms, conduct and peer problems, hyperactivity and absence of prosocial behavior (Bøe et al., 2016), which are mental distress indicators.

The COVID-19 pandemic has threatened adolescents' mental health. In March 2020, COVID-19 spread throughout the world, causing several EBPs among adolescents since then. It is known that adolescents are particularly prone to anxiety and concern in the face of unexpected events (Wang et al., 2020). Furthermore, due to high transmissibility and severity of the disease, most countries have implemented school closures, home quarantine and physical distancing in order to mitigate its spread, resulting in substantial changes in the lifestyle of these subjects (Elhai et al., 2020).

The disease forced a large part of humanity to shut away in their homes, substituting human contact by virtual connections. This whole situation had negative repercussions, as many teenagers spent more time connected to their smartphones in an attempt to relieve the stress and anxiety caused by such circumstances (Király et al., 2020). The feeling of boredom experienced by the adolescents during the pandemic can be a predictor for dysfunctional smartphone use, as bored individuals tend to seek more pleasurable sensations in the device. In addition, depressed people tend to use the devices as a self-regulation resource to escape from life's negative experiences (X. J. Yang et al., 2020).

Seeking to alleviate their EBPs, adolescents tend to make excessive use of their smartphones, with the possibility of generating an addiction (Elhai et al., 2020). It is a behavioral addiction conceptualized by many scholars as

non-adaptive or obsessive-compulsive smartphone use, a state of immersion in uncontrollable use of the device to the point of suffering adverse consequences in everyday life (Yu & Sussman, 2020).

Even though most studies use the term “addiction,” some scholars are critical of this and there is no consensus among researchers in the area as to the most appropriate term for such condition (Panova & Carbonell, 2018; Ting & Chen, 2020). When the event is screened by self-reporting instruments, it is recommended to use the term Self-Reported Smartphone Addiction (SRSA) (Panova & Carbonell, 2018), which will be employed in this study.

SRSA can be characterized by the presence of withdrawal symptoms (anxiety, irritability and impatience), lack of control over use, longer use time than initially anticipated, tolerance symptoms, interferences in activities of daily living, positive anticipation and maintenance of use time despite negative consequences (Khoury et al., 2017).

It is emphasized that, after more than a decade of research on this phenomenon, there is a wide range of nomenclatures, definitions and classification criteria, being the study object of several scientific and clinical disciplines (Rich et al., 2019). Given its relatively recent emergence as a research area, definitions of the concept are still evolving (Busch & McCarthy, 2021), to the extent that the smartphone addiction diagnosis still remains controversial, as there are no widely shared criteria (Cerutti et al., 2021). This lack of clinical consensus poses a dilemma for professionals who are being asked to care for people in the smartphone era, in addition to rendering them invisible to the health system (Rich et al., 2019).

Behavioral addiction is understood as a habitual urge or compulsion to continue to repeat a given behavior despite its negative impact on well-being. Among them, smartphone addiction seems to be the most recent (Shin, 2019), in which subjects tend to prefer the virtual world on the device to the real one (D. Kim et al., 2014). Therefore, it may be related with EBPs, mental disorders and worse health-related quality of life (Buctot et al., 2020; J. Yang et al., 2020).

## **Previous Studies: Overview**

Research on the relationship between EBPs and SRSA is incipient, focusing on isolated problems and in the quantitative analysis. EBPs have already been positively correlated with the time spent playing games, with the frequency of text messages sent, with the self-reported duration of smartphone data traffic, and with the time spent using the device and making and/or receiving calls (Roser et al., 2016).

Regarding other emotional symptoms, a relationship was found between SRSA and low emotional regulation (Ali Yıldız, 2017), stress (S. H. Jeong et al., 2016), aggression (S.-Y. Lee et al., 2018), depressive symptoms and anxiety (Emirtekin et al., 2019; S. G. Kim et al., 2019). A study investigated potential risk components for SRSA in a sample of Chinese students and reported high levels of perceived stress and severity of emotional symptoms as illness predictors (Long et al., 2016).

As for behavioral problems, it is considered that adolescents with SRSA are more likely to perpetrate aggressions, to have criminal records (Yang et al., 2010) and to engage in delinquent behaviors (H. H. Kim & Chun, 2018). A number of studies suggest lower self-control levels (Jahng, 2019; Kwak et al., 2018) that can influence adolescents' behaviors. Furthermore, many scholars claim that these adolescents present significantly higher impulsiveness levels (H. Lee & Kim, 2018; Sun et al., 2019) and attention difficulties (S.-Y. Lee et al., 2018).

Regarding peer relationship problems, subjects with SRSA tend to have relationship conflicts with peers (Kwak et al., 2018; H. Lee & Kim, 2018) and to experience a feeling of loneliness (Yayan et al., 2019), with impairments in social engagement (Ihm, 2018; Savci & Aysan, 2017).

It is possible that smartphones serve as a way to escape EBPs, which might produce a relieving effect, thus favoring the emergence of addiction patterns (Demirci et al., 2015; B. Jeong et al., 2020). Furthermore, it has been reported that addiction symptoms can trigger retroactive emotional symptoms (Cha & Seo, 2018; H. Lee et al., 2017). This was also confirmed in a more recent systematic review study, where the authors identified that EBPs are the most frequently identified consequence in subjects classified as with SRSA. However, further studies are required to determine whether these changes are SRSA precursors or consequences, especially considering other research methods in addition to the cross-sectional design (Busch & McCarthy, 2021).

A Brazilian study found that smartphone use was negatively related with psychological well-being (Fortes et al., 2021), while another identified a relationship between SRSA and Common Mental Disorders in adolescents (such as depressive symptoms, anxiety states, irritability, fatigue, insomnia, difficulty with memory and concentration and somatic complaints) (Nunes et al., 2021), although prior to the COVID-19 pandemic. In view of this, it is necessary to investigate the relationship between SRSA and EBPs among adolescents in the COVID-19 pandemic context, in order to better understand the phenomenon, especially considering their perspective in such an atypical period of this century.

## Theoretical Background: What Motivates Smartphone Use in Adolescents?

In 2016, a number of researchers proposed the Compensatory Satisfaction Theory (CST) to explain the role of satisfaction in pathological Internet use. Transposing this conception, smartphone use would serve as a compensatory method to meet the individuals' socio-emotional needs. Furthermore, the Compensatory Satisfaction Theory suggests that satisfaction of online psychological needs might compensate for non-satisfaction of offline psychological needs, thus becoming a priority choice for the adolescents' self-satisfaction, therefore increasing the SRSA risk. Consequently, adolescents who are dissatisfied with their current real life conditions are more likely to develop SRSA, as online interactions can compensate their dissatisfaction (Q. X. Liu et al., 2016).

Among their needs, autonomy, information, expression, identity and friendship among adolescents stand out. Adolescence is a period when individuals seek to find themselves, to very intimately know the person they have become, and to strive to continually develop the person they will be. Adolescents become sensitive to themselves and their surroundings. The results of their perceived needs and satisfaction are very helpful in finding an appropriate way to meet their psychological needs and understand their problem behaviors (Q. X. Liu et al., 2016).

A previous study found that online satisfaction of basic psychological needs played a mediating role in the smartphone addiction tendency among Chinese adolescents (Lin & Liu, 2020). In this sense, adolescents who experience EBPs in the COVID-19 pandemic context can use smartphones seeking to satisfy their needs, such as relieving boredom, loneliness or frustration in search of emotional elevation. Using the devices gives them fun and a sensation of less distress, so they can divert their attention from other problems in life. Such behavior may temporarily help adolescents feel relieved and provide them with an escape from problems, but it is not beneficial in the long-term, as the problems remain unsolved. Instead, it will increase the likelihood of developing smartphone addiction as a way of solving psychological problems (Alhassan et al., 2018; Ting & Chen, 2020).

Moreover, the Uses and Gratifications Theory (UGT) (Ruggiero, 2000) has also been recently employed as a theoretical framework to examine motivations for technology use during the COVID-19 pandemic. The theory also provides a relevant framework for examining indiscriminate smartphone use and the potential importance of the COVID-19 pandemic as a contextual factor influencing use and adoption. A number of researchers have identified that the effects of the pandemic on people's lives seem to influence interest in

virtual technology as a means of meeting various needs. Therefore, the pandemic has influenced the number of electronic devices acquired by people. Ultimately, it appears that people are using them to fulfill a diverse range of gratifications during the pandemic (Ball et al., 2021).

## **Study Context**

We employed a qualitative approach in this study, which was part of a larger project that aimed to (a) analyze the prevalence of self-reported smartphone addiction by adolescents and its relationship with socio-digital, emotional, behavioral aspects and lifestyle and (b) explore adolescents' perception of self-reported smartphone addiction and its relationship with socio-digital, emotional, behavioral aspects and lifestyle in the face of the COVID-19 pandemic. The project was carried out through a partnership with 21 public institutions and four private schools in Cuiabá, a capital city of the Brazilian Midwest region, whose managers authorized development of the research (de Freitas et al., 2022).

It is noted that, during the data collection period, all public schools were in the Emergency Remote Teaching modality and only a few private ones had already resumed face-to-face teaching, although with some students in the remote modality according to the parents' preference.

## **Purpose**

The objective of this study was to understand the adolescents' perception about the relationship between Self-Reported Smartphone Addiction (SRSA) and emotional and behavioral problems (EBPs) in the COVID-19 pandemic context.

## **Methods**

### *Participants Recruitment*

Participants were High School students, aged between 15 and 18 years old, recruited for a larger project (de Freitas et al., 2022) who investigated SRSA through Smartphone Addiction Inventory for Brazil (SPAI-BR) (Khoury et al., 2017). It is attributed a score of 10 (total "Yes" answers) as ideal cutoff point to classify the adolescents regarding SRSA, as it was the value that achieved the best sensitivity (79.87) and specificity (78.15), thus being adopted in this study (Andrade et al., 2022). Then, of the 270 adolescents classified with SRSA in the larger study (de Freitas et al., 2022), 16

participated through selection by intentional according to their availability. Due to the nature of the qualitative research and based on Information Power, a small sample size was targeted for the qualitative portion of this study (Malterud et al., 2016).

### *Data Collection*

We collected qualitative data in July 2021. Initially, 24 adolescents classified as with SRSA for a larger research (de Freitas et al., 2022) were selected and invited to participate in this study through Focus Group meetings. We chose Focus groups for being a technique that collects information on a given topic through participatory discussion among the participants, gathered in the same place and for a given period of time. This is fundamental for the emergence of points of view and meanings among the participants and for success of the necessary discussions (Kinalski et al., 2017).

We defined four focus groups with six adolescents each. However, despite confirming their participation, some adolescents did not attend the virtual meetings on the scheduled date and time, resulting in five participants in the first meeting, two participants in the second and third, and four participants in the fourth. Thus, to reach Information Power, we scheduled a fifth meeting, with the addition of another six guests, although only three of them attended it. After the fifth meeting, Information Power was achieved and, consequently, recruitment was ended with 16 participants. It should be noted that Information Power is a pragmatic model that assists in defining the limits of participants in qualitative research. We consider it achieved when reaching the following dimensions: study objective, sample specificity, theory, dialog quality and analysis strategy (Malterud et al., 2016).

We carried out the focus groups by a nurse with previous experience in this type of data collection (moderator) and by a Nursing student with prior training (reporter). The sessions were held by means of a video call in an instant messaging app, consisting of the following key moments: opening of the session, welcoming of the participants, clarification about the participatory discussion dynamics, definition of the setting, debate, synthesis and closure of the session (Kinalski et al., 2017). It is noted that, already during the invitation to participate in the research, the adolescents were asked to choose fictitious names for them to be called during the focus groups, in order to preserve their anonymity. The sessions lasted between 51 and 106 min and were guided by a semi-structured script available in Table 1.

**Table 1.** Semi-Structured Script of the Study.

Triggering questions
1. How have you been feeling during the COVID-19 pandemic?
2. Do you have any feelings or behaviors that you didn't have before and started to present during the COVID-19 pandemic?
3. Tell me what you think about the relationship between intense smartphone use and your feelings and behaviors.
4. Is there any situation arising from the COVID-19 pandemic that led you to spend more time connected to your smartphone?
5. What do you search for when using your smartphone?
6. How do you feel when you are connected in the smartphone?
7. Which are the effects of this intense smartphone use on your emotions and behaviors?
8. How were your relationships during the pandemic?
9. Has intense smartphone use interfered with your relationships?
10. Tell me about your positive attitudes during this pandemic.

### *Data Analysis*

We transcribed these sessions in full, later organized by codes and submitted to Bardin's content analysis (Bardin, 2016). We carried out the pre-analysis first, seeking to establish contact with the documents to be analyzed and to know the transcribed text, allowing to be flooded by impressions in a phase called "floating reading." Sequentially, the documents were selected for analysis according to the research objectives.

Then, we explored the material, with organization of the content in codes through a new reading. Afterward, we classified the codes into two categories, grouping the data considering what they had in common. We performed the encoding and categorization processes by one of the researchers with the aid of the Atlas.ti 9.1.5.0 software, and discussed with another two for proper grouping of citations according to the categories that were generated. For each of the categories, we produced a synthesis text expressing the most varied meanings present in the analysis units (Bardin, 2016). We presented the participants' statements with fictitious names, their age and the score obtained in SPAI-BR.

### *Ethical Considerations*

The study was approved by the Research Ethics Committee under opinion No. 4,661,013 and followed the recommendations of the Brazilian National



**Table 2.** Codes Extracted for Each Category.

Codes	Category
<ul style="list-style-type: none"> <li>• Using the smartphone to forget about the problems arising from the COVID-19 pandemic.</li> <li>• Smartphone use in search of gratification, to meet personal needs.</li> <li>• Immersion in a parallel virtual reality.</li> <li>• Losing notion of time and screen usage.</li> <li>• Lack of interaction with the real world.</li> <li>• Virtual alienation.</li> <li>• Constant distraction.</li> </ul>	<p>Escaping from the reality imposed by the COVID-19 pandemic using their smartphones</p>
<ul style="list-style-type: none"> <li>• Relief from feelings of sadness and boredom.</li> <li>• Smartphone use for social interaction.</li> <li>• The smartphone as a friend.</li> <li>• Seeking distance from bad thoughts.</li> <li>• Harmful smartphone uses after the pandemic.</li> <li>• Lack of meaning in life when staying away from the smartphone.</li> <li>• Not being able to do without the smartphone.</li> <li>• Existential emptiness.</li> <li>• Feeling of sadness due to the consequences of smartphone addiction.</li> <li>• Distancing from friends due to smartphone use.</li> <li>• Difficulty in face-to-face social interaction.</li> <li>• Difficulty controlling device use.</li> <li>• Immersion in a state of apathy with the smartphone use.</li> <li>• Feeling of boredom when connected to the smartphone for a long time.</li> <li>• Difficulty enjoying the present.</li> <li>• Need to always be producing something.</li> <li>• Physical symptoms of anxiety and hyperactivity due to intense smartphone use.</li> </ul>	<p>Perceiving the emotional and behavioral changes caused by SRSA in the COVID-19 pandemic context</p>

Health Council for research involving human beings. We obtained the authorization and support to conduct the research from the Mato Grosso State Education Department and from the schools, as well as from the participants and their parents or guardians.

## Findings

The analysis process of the Focus Group meetings resulted in two categories that reveal how adolescents are “Escaping from the reality imposed by the

COVID-19 pandemic using their smartphones,” as well as “Perceiving the emotional and behavioral changes caused by SRSA in the COVID-19 pandemic context.” Furthermore, Table 2 displays codes extracted for each category.

### *Escaping From the Reality Imposed by the COVID-19 Pandemic Using Their Smartphones*

In the face of the “chaotic situation” imposed by the COVID-19 pandemic, the adolescents expressed feelings of sadness, despair and melancholy when facing a “world on fire.” The powerlessness generated in the face of this context made them seek an escape from reality using their smartphones. With this flee of thoughts, marked by access to various contents and apps, they intended to alleviate the negative feelings arising from the repercussions of the pandemic:

*When everything is in chaos outside, the world's on fire, I'm on my cell phone, because that's where I can be whatever I want, I'm going in, I'm going to watch a video, I'm going to watch a movie and, for a moment, I'm going to imagine myself having the high school of my dreams, you know? Then I think that it changed a lot and, at the same time, that it's very grim. . . it brings about very deep melancholy (Angelina, 15, SPAI-BR 13).*

*I think one thing that kind of helped a lot for this whole process, at least mine, of wanting to escape from reality was the pandemic situation, the situation, kind of, of chaos that really set in and it was really an escape, because I think that if it hadn't been for the pandemic, I would probably have continued using it, but I don't think I would've sunk as much as I did, you know? (Pedro, 18, SPAI-BR 19).*

In this sense, the adolescents stated living a parallel virtual reality. The smartphones kept them connected for long hours, which generates certain loss of the notion of the time and reality in which they live. They let to interact with the real world and felt that they only “exist” in a state of virtual alienation:

*I see myself as an observer, as if I got out of the actions of a functional person to become someone who's there only watching something, which is happening on the screen in this case. I think that, also for this reason, I have this sensation that, kind of, time only flies by, because I really lose all notion of what's going on around me. And it's literally being a mere observer, as if, kind of, I wasn't*

*there, I don't interact with the world, I just go fleeing, fleeing [ . . . ]. As I become a mere observer, I stop feeling things (Pedro, 18, SPAI-BR 19).*

*I'd say that it's kind of as if I'm alienated from reality (Apolo, 17, SPAI-BR 12).*

The adolescents stated that they felt anxious, depressed, stressed and shut away in their homes. In addition to that, there was a feeling of social pressure when having to choose a profession, pass admission tests and enter higher education. This demand in relation to their academic and professional future ended up “suffocating them.” Therefore, they used their smartphones to seek distraction and also to alleviate these negative feelings. They had wished for the pandemic to end and stated that they “want all of this to end soon”:

*It's distraction too, a lot of things happening there and we want a little distraction. I think it's all those pressures that they put on us, you know? It ends up suffocating us, we want to seek something that distracts us [ . . . ](Ísis, 15, SPAI-BR 19).*

*I generally use the cell phone for that, to alleviate some things, get distracted. [ . . . ] Ah, I think it's more the willpower that I don't have, to get up, sometimes I'm sad, then I stay in my room, fiddling with my cell phone or sometimes studying, things like that, then I barely go out, and I stay more time in bed (Liana, 17, SPAI-BR 19).*

The adolescents often mentioned the feeling of boredom associated with this period, stating that they feel impatient with idleness and couldn't wait, they were uncomfortable with their own presence and sought to occupy themselves with their devices to “kill boredom.” The difficulty dealing with boredom rendered them incapable of entertaining themselves without their smartphones. However, these adolescents did have it clear that such attitude was not always effective:

*Being bored in the pandemic, then it's what I do to kill boredom [ . . . ] (Luiza, 16, SPAI-BR 19).*

*I felt bored, you know? [ . . . ] it's more to kill that feeling of boredom, and sometimes when I'm not OK, to avoid thinking too much about something, but it's not always very effective (Marco, 15, SPAI-BR 11).*

They also reported the experience of an existential crisis when facing the implications of the COVID-19 pandemic in their plans for adolescence. There was a sensation of “loss of youth” when they see their adolescence go

by without being able to experience all their expectations from this life phase. They became reflexive, exhausted, confused and powerless in the face of this scenario. This is because there was a “lifelong wait” for this moment, and then they felt trapped in their homes and unable to fully enjoy adolescence and, therefore, spent more time connected to their smartphones to avoid thinking about it:

*I also think too much about the universe things, you know? I don't know if it's an existential crisis, I don't know. Then I try to get distracted to stop thinking for a while (Marco, 15, SPAI-BR 11).*

*I have the sensation that I lost my youth. [ . . . ] (Pedro, 18, SPAI-BR 19).*

*Then the pandemic came and we all stayed stuck at home, I really thought that it'd be incredible, right?, kind of going out, I'd be able to do several things, only that I couldn't, right? (Jaqueline, 16, SPAI-BR 13).*

*You wait your entire life to be there and enjoy life's High School Musical. And. . . (silence) I'm missing all that! (Angelina, 15, SPAI-BR 13).*

The participants also mentioned the feeling of loneliness caused by physical and social isolation. Therefore, in the face of that, adolescents resorted to their smartphones in the search for company and social belonging. The devices allowed them to access the social networks and looked for new friends. Moreover, in some cases, the smartphone was considered as a preferred “friend” to the detriment of people:

*I think that the issue of feeling lonely too, kind of fiddling with the cell phone, anyway. . . (Ísis, 15, SPAI-BR 19).*

*It came all of a sudden, it affected, kind of, most of us and I even lost many friends, kind of, in all this time. . . dear God! But it's complicated, complicated! [ . . . ] We obviously run after meeting people, I mainly have friends in other states (Gabriel, 17, SPAI-BR 12).*

*I prefer to stay with my cell phone than with people [ . . . ], it's my friend, kind of like that, my virtual friend [ . . . ] (sad voice) (Júlia, 15, SPAI-BR 16).*

Therefore, when resorting to their smartphones to escape from reality, adolescents felt in a better mood, happy, calm, unstressed and entertained. The device was seen as a shelter, distancing them from the “bad feelings.” It allowed its users to stay in a “small world of good things,” away from the

problems inherent to human existence. However, this distraction was considered temporary, “because it actually doesn’t end”:

*The cell phone cheers me up [ . . . ]. I’m calmer when I’m with the cell phone (Antônio, 15, SPAI-BR 11).*

*The cell phone is a shelter for me, and hiding behind it, right? [ . . . ] it distances you from the bad thoughts [ . . . ] (Mary, 17, SPAI-BR 13).*

*You go looking for something that makes you happy, [ . . . ] something and so you stay there in your small world with the good things that only you like, with the positive things and all that (Emily, 17, SPAI-BR 14).*

*I only get distracted from it for a while (laughs). Because it actually doesn’t end (Ísis, 15, SPAI-BR 19).*

### **Perceiving the Emotional and Behavioral Changes Caused by SRSA in the COVID-19 Pandemic Context**

In this category, we better explore how adolescents perceived the emotional and behavioral changes caused by SRSA in the face of the pandemic. Certain emotional dependence on the device was verified, when they stated that “they don’t survive without it.” They perceived that, with the arrival of the COVID-19 pandemic, this constant need to use the smartphone was intensified and that it was “more than usual.” They missed the uninterrupted company provided by the smartphone, marked by the presence of an existential “void,” and showed certain strangeness to these feelings:

*After the pandemic started, I began to fiddle a lot with it, more than usual, everywhere I go I need to have my cell phone with me, even to be with someone obviously, also to hide the shame, it’s my shelter, I can’t live without my cell phone any more. [ . . . ] if I don’t use the cell phone there’s something missing, I feel that my day has a hole, you know? I start asking what I’m doing with my life, I spend the whole day with the cell phone and, when I’m not with the cell phone, I miss it, it’s strange, very strange. . . (Emily, 17, SPAI-BR 14).*

*It’s like she said, kind of, you feel a void, you know? You spend the whole day sometimes. I don’t know, you start studying a little, then you miss using the phone, seeing something that is happening (Jaqueline, 16, SPAI-BR 13).*

This behavior established with the smartphone exerted a direct impact on their studies, impairing the adolescents' focus. There were reported of lack of will power and sadness, for they found it difficult to "sit to study," as they ended up "not paying attention" and "getting distracted" with the device. This generated uncertainty in relation to passing admission tests, for not dedicating themselves as they should. Such situation was influenced by the need for Emergency Remote Teaching during the pandemic, which was often performed in the smartphone itself:

*[. . .] not paying attention, getting distracted with other things, with messages, because it's no use studying without being connected to the Internet. Then, kind of, anything that comes in I end up getting distracted, [. . .] I end up sad because I'm not able to study and there's always that pressure of not knowing if I'm going to pass [the admission test] (Liana, 17, SPAI-BR 19).*

*I stay with the cell phone all the time and that takes a lot of my time, then when I go to look, I stop to think, should I be studying, do you understand? Then I feel bad (Mary, 17, SPAI-BR 13).*

As they had spent more time connected to their devices, the adolescents got distanced from people, which had repercussions in their interpersonal relationships. They understood that this relationship established with the smartphone interfered in their dealings with their peers and increased their social isolation:

*After this pandemic started, I stopped talking to all my friends and started to spend more time on the cell phone, and it's hard, because the longer I stay on the phone, the more I get away from people (Antônio, 15, SPAI-BR 11).*

*There were times when people would talk, right?, to get off the phone a little, talk more, right?, but I didn't let go (Mary, 17, SPAI-BR 13).*

The adolescents described that, to alleviate the negative feelings caused by the COVID-19 pandemic, such as sadness and boredom, there was a bidirectional relationship in which this incessant use of the device kept them in a state of apathy and boredom. Even so, they perpetuated this behavior because they felt unable to deal with idleness without the smartphone:

*I was in a real state of apathy, of inertia, it was, kind of, the cell phone that helped me to continue in that state (Pedro, 18, SPAI-BR 19).*

*Ah, it depends, sometimes I like to be fiddling with it, but there are others that I get bored (Antônio, 15, SPAI-BR 11).*

*Sometimes when I'm bored, I kind of get sick of the cell phone, but then I stay with it because there's nothing else to do (Ísis, 15, SPAI-BR 19).*

As a result of this intense smartphone use, hyperactivity was noticed when they pointed out that they could not “enjoy the present” and needed to be “occupying the mind with something” because they felt “unproductive” otherwise. They needed to be always connected and doing something, even due to the difficulty dealing with boredom, as already mentioned. Paradoxically, they showed feelings of anxiety when they kept using their smartphones, as presented below.

*There's that sensation that, kind of, you can't manage to enjoy the present to do something, you have to occupy your mind with something, you know?, because you feel unproductive otherwise. So, even if you reproduce unproductive things for your mind, you have to be busy with something, it's more or less this situation. Of not being able to stand still and do nothing (Pedro, 18, SPAI-BR 19).*

*When [I don't have my smartphone], sometimes I have a crisis like this in the day, then the next day I have a headache sometimes and also the tremors like those tics of moving my legs, moving my hand, my arm like this, I have these tics sometimes (Jaqueline, 16, SPAI-BR 13).*

## Discussion

The current study contributes to understanding the relationship between SRSA and EBPs from the perspective of adolescents. The findings revealed that, faced with the emotional difficulties arising from the COVID-19 pandemic, the adolescents became more deeply involved with their smartphones in an attempt to escape from the reality imposed, to live a parallel virtual reality that generates bonuses, as suggested by the Compensatory Satisfaction Theory (CST) (Q. X. Liu et al., 2016) and by the Uses and Gratifications Theory (UGT) (Ball et al., 2021).

The adolescents faced an unprecedented pandemic moment, in which the measures adopted to reduce dissemination of the virus, such as school closures and widespread lockdowns, resulted in physical isolation, fear and uncertainty about the future. With this, they started to use digital media for many hours as a compensatory mechanism to meet their socio-emotional needs, resulting in a highly harmful behavior (Q. X. Liu et al., 2016; Potas et al., 2022). Stress due to COVID-19 was related to feeling of loneliness and

depression, mainly in the adolescents that spent more time connected to the social networks through their smartphones (Ellis et al., 2020).

It is worth noting that, in Brazil, although the answers have varied according to state or municipality, schools and higher education institutions were generally closed from March 2020; and, by mid-2021, some of them were gradually reopening. According to the Organization for Economic Co-operation and Development (OECD), the country presented the longest period of time with its schools completely closed in 2020, when compared to all OECD member countries (Organization for Economic Cooperation and Development, 2021).

This population segment may consider technology as a resource to escape from the stressors in their lives and/or use it to increase their social interaction and integration, as well as to satisfy the need for socialization (Potas et al., 2022), as evidenced in this study and pointed out both by the CST (Q. X. Liu et al., 2016) and by the UGT (Ball et al., 2021).

The alienation, that is, difficulty acting and thinking for themselves, mentioned by adolescents in the findings has already been investigated by other researchers, with a positive correlation with SRSA (Lian, 2018; Q. X. Liu et al., 2016). Highly alienated individuals are more likely to express negative feelings, partially due to the lack of positive psychological resources. Smartphones are sometimes used to reduce the negative emotions, escape, feel better or enhance the feelings of belonging (Lian, 2018; Q. X. Liu et al., 2016).

Emotional symptoms were exacerbated in the COVID-19 pandemic, as evidenced in the qualitative findings, especially due to home quarantine and school closures. Therefore, seeking to alleviate those symptoms, the adolescents classified with SRSA resorted to their smartphones for distraction and to avoid facing reality. The scientific literature revealed that the prevalence of depression clinical symptoms in adolescents was higher after the COVID-19 outbreak (Duan et al., 2020). Corroborating the findings presented, some researchers emphasized that High School students might be thinking about the uncertainty of being admitted to university and regretting the loss of typical events of adolescence (Ellis et al., 2020).

The feeling of boredom increased considerably with the COVID-19 pandemic and, with this, there was also greater involvement by the adolescents with their smartphones. These adolescents had difficulties dealing with idleness and sought to mitigate it with their smartphones, developing various activities that satisfied them, as also suggested by the CST (Q. X. Liu et al., 2016) and by the UGT (Ball et al., 2021). However, being constantly connected does not seem to be an efficient solution, as it ends up generating more boredom and apathy later on. The tendency to boredom is a known vulnerability factor for



SRSA, with depression acting as an important mediator (X. J. Yang et al., 2020). Thus, strategies aimed at improving the degree of tendency to boredom may be essential to reduce smartphone use and, consequently, the risks of maladaptive behavior.

Conduct problems are expected in a pandemic context, such as impatience, aggressiveness, disobedience and bad mood. In the findings, impatience was the most evident, not least because the pandemic exerted a negative impact on the adolescents' plans, who expressed a feeling of loss of youth, with mixed emotions and impotence in the face of reality.

When faced with negative feelings, the adolescents accessed their smartphones in search of pleasurable sensations, as described by the Compensatory Satisfaction Theory (Q. X. Liu et al., 2016). This is recognized by the search for new experiences, even if assuming risks. An interaction is perceived between withdrawal, search for sensations and SRSA, which has repercussions in the combination between them (Turgeman et al., 2020).

According to the findings, the pandemic generated anxiety in the investigated adolescents. Consequently, to alleviate it, they get involved with their smartphones. However, the device-addiction behavior resulted in more anxiety, agitation and inattention in their studies. Consequently, they felt powerless and discontent with their academic performance.

It is known that anxiety symptoms are the most common clinical diagnoses among adolescents in the face of the COVID-19 pandemic and may act as a risk factor for other psychiatric disorders (Duan et al., 2020). Furthermore, the anxiety levels are significantly higher among the students who perceive that their academic performance has been affected by the pandemic, when compared to those who do not share this perception (Jiang, 2021). In this sense, interventions that promote mindfulness improve the adolescents' emotional state and, according to some researchers, it is a promising alternative for preventing and reducing the addiction levels, as mindfulness acts as an important mechanism to allow individuals to detach from automatic thoughts and risky behavior patterns (Li & Hao, 2019).

In this research was possible to notice that Peer problems were also accentuated in the pandemic, like loneliness, lack of good friends, not feeling included and loved, and being victims of bullying. With the closure of schools and leisure spaces, the adolescents under study distanced from their peers and manifested feelings of loneliness and sadness. Thus, according to researchers, they increased their smartphone use in search for social belonging, company and relief from negative feelings as a way of compensation (Q. X. Liu et al., 2016).

In the light of the UGT, a number of researchers found that social interactivity is an essential factor for the adoption of virtual reality. In fact, the

prospect of interacting with others through screens was considered a crucial factor when examining the adoption of electronic devices during the pandemic (Ball et al., 2021). Study identified an increase was found in adolescents-teachers/peers relationships, while adolescent-parent relationships remained unchanged and strong. When adolescent-peer relationships were stronger, the cyber-perpetrating/victimization were lower (Eden et al., 2023).

In a qualitative study carried out with 24 American adolescents, it was found that they reported greater reliance on network technologies as their unstructured time increased during the lockdown. Using multilevel growth modeling, it was found that the overall time adolescents spend with technology has less influence on daily fluctuations in well-being than on the satisfaction and meaning they derive from technology use. Finally, adolescents felt that online communication could not replace face-to-face interactions. Adolescents explained the inadequacy of online peer interactions by pointing to the fact that their pre-pandemic online interactions were fundamentally grounded in their shared, in-person experiences (Pitt et al., 2021).

As verified in this study, another research pointed out that SRSA-related symptoms and behaviors lead to changes in the adolescents' responses to adverse life experiences, also resulting in negative mood and affects, such as depression, low self-esteem, anger, anxiety and stress (de Freitas et al., 2021; Hou et al., 2021). However, these issues also explain smartphone use and SRSA; therefore, it is necessary to better define and determine how these core factors and concepts are related (Busch & McCarthy, 2021). These ambiguities certainly require the development of more robust longitudinal research studies.

This age group is frequently neglected by the health services, especially in relation to mental health. Currently it is urgent that health professionals care for and address these themes even more. Health interventions aimed at promoting mental health and adaptive behavior regarding smartphones should be formulated and implemented with the adolescents and their families in each individual appointment, in the schools and in the community (Roberts et al., 2022).

Therefore, the findings of this study shed light on far-reaching concerns about the possibility of a global mental health crisis in the wake of the COVID-19 pandemic. Furthermore, enhancing satisfaction of the adolescents' psychological needs in real life can be effective for preventing smartphone addiction. Thus, specifically those adolescents classified with SRSA need an interprofessional therapeutic plan, with a view to restoring socio-emotional health and an adaptive response to smartphone use. Interventions based on Cognitive Behavioral Therapy (CBT) techniques, meditation, music therapy, limitation of smartphone use time, socio-emotional learning and stimulation of regular physical and outdoor activities have shown to be

promising for the recovery of smartphone-dependent adolescents and of those with emotional distress (Bong et al., 2021; S. Liu et al., 2019; Sociedade Brasileira de Pediatria, 2019). Therefore, they can be implemented by health professionals who deal with this population segment.

## **Limitations and Future Directions**

It must be considered that our findings reflect a group from a single Brazilian municipality, which may have had specific perspectives at the time of this study than other adolescents who experience different realities—for example, those from developed countries. There was difficulty in the adolescents' adherence to the focus groups in this research. In later studies, other recruitment possibilities and data collection techniques can be proposed to improve the participants' adherence and allow greater balance between the groups. An important area for future research is examining the extent to which teen parents report comparable and different perspectives of adolescents.

## **Conclusion**

The qualitative findings allowed understanding that the adolescents classified with SRSA use their devices indiscriminately to escape from the reality imposed by the COVID-19 pandemic and that they perceive the changes caused by the relationship of dependence established with the device. They also adhere to this behavior in the search to alleviate the negative symptoms experienced in the pandemic period. However, they acknowledge that this relief is temporary and ineffective, as this smartphone addiction relationship corroborates with maintenance of the EBPs evidenced.

Thus, in view of the findings, the need stands out for health professionals to develop campaigns and strategies for mental health promotion in different socio-educational scenarios and in the digital media to sensitize adolescents, parents, educators and society in general about the risks of indiscriminate smartphone use to mental health. It is important to enhance satisfaction of the adolescents' psychological needs in real life to achieve an effective prevention of smartphone addiction. Moreover, professionals need to work in an effective way in the prevention, screening and timely treatment of EBPs and SRSA, especially in times of a pandemic crisis such as COVID-19.

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### Author Contributions

Bruna Hinnah Borges Martins de Freitas: Conceptualization, Methodology, Investigation, Data Curation, Formal analysis, Visualization, Project administration and Writing- Original draft preparation. Maria Aparecida Munhoz Gaiva: Supervision, Writing- Reviewing and Editing. Paula Manuela Jorge Diogo: Supervision, Writing- Reviewing and Editing. Juliano Bortolini: Formal analysis, Writing- Reviewing and Editing. All authors read and approved the final manuscript.

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The research was approved by the Research Ethics Committee, under opinion No. 4,661,013.

### Informed Consent

Informed consent was obtained from all individual participants included in the study and from your legal guardians.

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### Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

### References

- Alhassan, A. A., Alqadhib, E. M., Taha, N. W., Alahmari, R. A., Salam, M., & Almutairi, A. F. (2018). The relationship between addiction to smartphone usage and depression among adults: A cross sectional study. *BMC Psychiatry, 18*(1), 148–211. <https://doi.org/10.1186/s12888-018-1745-4>

- Ali Yıldız, M. (2017). Emotion regulation strategies as predictors of internet addiction and smartphone addiction in adolescents. *Journal of Educational Sciences and Psychology*, 7(1), 66–78. <https://www.researchgate.net/publication/316879025>
- Andrade, A. L. M., Scatena, A., de Oliveira Pinheiro, B., de Oliveira, W. A., Lopes, F. M., & De Micheli, D. (2022). Psychometric properties of the Smartphone Addiction Inventory (SPAI-BR) in Brazilian adolescents. *International Journal of Mental Health and Addiction*, 20, 2690–2705. <https://doi.org/10.1007/s11469-021-00542-x>
- Ball, C., Huang, K. T., & Francis, J. (2021). Virtual reality adoption during the COVID-19 pandemic: A uses and gratifications perspective. *Telematics and Informatics*, 65, 101728. <https://doi.org/10.1016/j.tele.2021.101728>
- Bardin, L. (2016). *Análise de conteúdo*. Edições 70.
- Bong, S. H., Won, G. H., & Choi, T. Y. (2021). Effects of cognitive-behavioral therapy based music therapy in Korean adolescents with smartphone and internet addiction. *Psychiatry Investigation*, 18(2), 110–117. <https://doi.org/10.30773/pi.2020.0155>
- Buctot, D. B., Kim, N., & Kim, J. J. (2020). Factors associated with smartphone addiction prevalence and its predictive capacity for health-related quality of life among Filipino adolescents. *Children and Youth Services Review*, 110, 104758. <https://doi.org/10.1016/j.childyouth.2020.104758>
- Busch, P. A., & McCarthy, S. (2021). Antecedents and consequences of problematic smartphone use: A systematic literature review of an emerging research area. *Computers in Human Behavior*, 114, 106414. <https://doi.org/10.1016/j.chb.2020.106414>
- Bøe, T., Hysing, M., Skogen, J. C., & Breivik, K. (2016). The Strengths and Difficulties Questionnaire (SDQ): Factor structure and gender equivalence in Norwegian adolescents. *PLoS One*, 11(5), e0152202. <https://doi.org/10.1371/journal.pone.0152202>
- Cerutti, R., Presaghi, F., Spensieri, V., Fontana, A., & Amendola, S. (2021). Adaptation and psychometric analysis of the test of mobile phone dependence—brief version in Italian adolescents. *International Journal of Environmental Research and Public Health*, 18(5), 2612. <https://doi.org/10.3390/ijerph18052612>
- Cha, S. S., & Seo, B. K. (2018). Smartphone use and smartphone addiction in middle school students in Korea: Prevalence, social networking service, and game use. *Health Psychology Open*, 5(1), 1–15. <https://doi.org/10.1177/2055102918755046>
- de Freitas, B. H. B. M., Gaíva, M. A. M., Bernardino, F. B. S., & Diogo, P. M. J. (2021). Smartphone addiction in adolescents, part 2: Scoping review—Prevalence and associated factors. *Trends in Psychology*, 29, 12–30. <https://doi.org/10.1007/s43076-020-00040-4>
- de Freitas, B. H. B. M., Gaíva, M. A. M., Diogo, P. M. J., & Bortolini, J. (2022). Self-reported smartphone addiction among Brazilian adolescents in the COVID-19 pandemic context: A mixed-method study. *Trends in Psychology*. Advance online publication. <https://doi.org/10.1007/s43076-022-00208-0>

- Demirci, K., Akgönül, M., & Akpınar, A. (2015). Relationship of smartphone use severity with sleep quality, depression, and anxiety in university students. *Journal of Behavioral Addictions, 4*(2), 85–92. <https://doi.org/10.1556/2006.4.2015.010>
- Duan, L., Shao, X., Wang, Y., Huang, Y., Miao, J., Yang, X., & Zhu, G. (2020). An investigation of mental health status of children and adolescents in China during the outbreak of COVID-19. *Journal of Affective Disorders, 275*, 112–118. <https://doi.org/10.1016/j.jad.2020.06.029>
- Eden, S., Heiman, T., Olenik-Shemesh, D., & Yablon, Y. B. (2023). Cyberbullying and PIU among adolescents before and during COVID-19 pandemic: The association with adolescents relationships. *Youth & Society*. Advance online publication. <https://doi.org/10.1177/0044118x231169493>
- Elhai, J. D., Yang, H., McKay, D., & Asmundson, G. J. G. (2020). COVID-19 anxiety symptoms associated with problematic smartphone use severity in Chinese adults. *Journal of Affective Disorders, 274*, 576–582. <https://doi.org/10.1016/j.jad.2020.05.080>
- Ellis, W. E., Dumas, T. M., & Forbes, L. M. (2020). Physically isolated but socially connected: Psychological adjustment and stress among adolescents during the initial COVID-19 crisis. *Canadian Journal of Behavioural Science, 52*(3), 177–187. <https://doi.org/10.1037/cbs0000215>
- Emirtekin, E., Balta, S., Sural, İ., Kircaburun, K., Griffiths, M. D., & Billieux, J. (2019). The role of childhood emotional maltreatment and body image dissatisfaction in problematic smartphone use among adolescents. *Psychiatry Research, 271*, 634–639. <https://doi.org/10.1016/j.psychres.2018.12.059>
- Fortes, A. B., Broilo, P. L., & Lisboa, C. S. D. M. (2021). Smartphone use and psychological well-being: The moderating role of emotion regulation. *Trends in Psychology, 29*(2), 189–203. <https://doi.org/10.1007/s43076-020-00051-1>
- Hou, J., Zhu, Y., & Fang, X. (2021). Mobile phone addiction and depression: Multiple mediating effects of social anxiety and attentional bias to negative emotional information. *Acta Psychologica Sinica, 53*(4), 362–373. <https://doi.org/10.3724/sp.j.1041.2021.00362>
- Ihm, J. (2018). Social implications of children's smartphone addiction: The role of support networks and social engagement. *Journal of Behavioral Addictions, 7*(2), 473–481. <https://doi.org/10.1556/2006.7.2018.48>
- Jahng, K. E. (2019). Maternal abusive parenting and young South Korean adolescents' problematic smartphone use: The moderating effects of time spent hanging out with peers and trusting peer relationships. *Children and Youth Services Review, 98*, 96–104. <https://doi.org/10.1016/j.childyouth.2018.12.028>
- Jeong, B., Lee, J. Y., Kim, B. M., Park, E., Kwon, J. G., Kim, D. J., Lee, Y., Choi, J. S., & Lee, D. (2020). Associations of personality and clinical characteristics with excessive internet and smartphone use in adolescents: A structural equation modeling approach. *Addictive Behaviors, 110*, 106485. <https://doi.org/10.1016/j.addbeh.2020.106485>
- Jeong, S. H., Kim, H., Yum, J. Y., & Hwang, Y. (2016). What type of content are smartphone users addicted to?: SNS vs. games. *Computers in Human Behavior, 54*, 10–17. <https://doi.org/10.1016/j.chb.2015.07.035>

- Jiang, Y. (2021). Problematic social media usage and anxiety among university students during the COVID-19 pandemic: The mediating role of psychological capital and the moderating role of academic burnout. *Frontiers in Psychology, 12*, 612007. <https://doi.org/10.3389/fpsyg.2021.612007>
- Khoury, J. M., de Freitas, A. A. C., Roque, M. A. V., Albuquerque, M. R., Das Neves, M. C. L., & Garcia, F. D. (2017). Assessment of the accuracy of a new tool for the screening of smartphone addiction. *PLoS One, 12*(5), e0176924. <https://doi.org/10.1371/journal.pone.0176924>
- Kim, D., Lee, Y., Lee, J., Nam, J. K., & Chung, Y. (2014). Development of Korean smartphone addiction proneness scale for youth. *PLoS One, 9*(5), e97920. <https://doi.org/10.1371/journal.pone.0097920>
- Kim, H. H., & Chun, J. (2018). Is the relationship between parental abuse and mobile phone dependency (MPD) contingent across neighborhood characteristics? A multilevel analysis of Korean children and youth panel survey. *PLoS One, 13*(5), e0196824. <https://doi.org/10.1371/journal.pone.0196824>
- Kim, S. G., Park, J., Kim, H. T., Pan, Z., Lee, Y., & McIntyre, R. S. (2019). The relationship between smartphone addiction and symptoms of depression, anxiety, and attention-deficit/hyperactivity in South Korean adolescents. *Annals of General Psychiatry, 18*(1), 1–8. <https://doi.org/10.1186/s12991-019-0224-8>
- Kinalski, D. D. F., Paula, C. C. D., Padoin, S. M. D. M., Neves, E. T., Kleinubing, R. E., & Cortes, L. F. (2017). Focus group on qualitative research: Experience report. *Revista Brasileira de Enfermagem, 70*(2), 443424–448429. <https://doi.org/10.1590/0034-7167-2016-0091>
- Király, O., Potenza, M. N., Stein, D. J., King, D. L., Hodgins, D. C., Saunders, J. B., Griffiths, M. D., Gjoneska, B., Billieux, J., Brand, M., Abbott, M. W., Chamberlain, S. R., Corazza, O., Burkauskas, J., Sales, C. M. D., Montag, C., Lochner, C., Grünblatt, E., Wegmann, E., & Demetrovics, Z. (2020). Preventing problematic internet use during the COVID-19 pandemic: Consensus guidance. *Comprehensive Psychiatry, 100*, 1–4. <https://doi.org/10.1016/j.comppsy.2020.152180>
- Kwak, J. Y., Kim, J. Y., & Yoon, Y. W. (2018). Effect of parental neglect on smartphone addiction in adolescents in South Korea. *Child Abuse & Neglect, 77*, 75–84. <https://doi.org/10.1016/j.chiabu.2017.12.008>
- Laudrum, T. J. (2017). Emotional and behavioral disorders. In J. M. Kauffman & D. P. Hallahan (Eds.), *Handbook of special education* (2nd ed., pp. 28–32). Routledge.
- Lee, H., & Kim, J. (2018). A structural equation model on Korean adolescents' excessive use of smartphones. *Asian Nursing Research, 12*(2), 91–98. <https://doi.org/10.1016/j.anr.2018.03.002>
- Lee, H., Kim, J. W., & Choi, T. Y. (2017). Risk factors for smartphone addiction in Korean adolescents: Smartphone use patterns. *Journal of Korean Medical Science, 32*(10), 1674–1679. <https://doi.org/10.3346/jkms.2017.32.10.1674>
- Lee, S.-Y., Lee, D., Nam, C. R., Kim, D. Y., Park, S., Kwon, J.-G., Kweon, Y.-S., Lee, Y., Kim, D. J., & Choi, J.-S. (2018). Distinct patterns of Internet and smartphone-related problems among adolescents by gender: Latent

- class analysis. *Journal of Behavioral Addictions*, 7(2), 454–465. <https://doi.org/10.1556/2006.7.2018.28>
- Lian, L. (2018). Alienation as mediator and moderator of the relationship between virtues and smartphone addiction among Chinese University students. *International Journal of Mental Health and Addiction*, 16(5), 1208–1218. <https://doi.org/10.1007/s11469-017-9842-z>
- Lin, Y., & Liu, Q. (2020). Perceived subjective social status and smartphone addiction tendency among Chinese adolescents: A sequential mediation model. *Children and Youth Services Review*, 116, 105222. <https://doi.org/10.1016/j.childyouth.2020.105222>
- Liu, Q. X., Fang, X. Y., Wan, J. J., & Zhou, Z. K. (2016). Need satisfaction and adolescent pathological internet use: Comparison of satisfaction perceived online and offline. *Computers in Human Behavior*, 55, 695–700. <https://doi.org/10.1016/j.chb.2015.09.048>
- Liu, S., Xiao, T., Yang, L., & Loprinzi, P. D. (2019). Exercise as an alternative approach for treating smartphone addiction: A systematic review and meta-analysis of random controlled trials. *International Journal of Environmental Research and Public Health*, 16(20), 3912. <https://doi.org/10.3390/ijerph16203912>
- Li, X., & Hao, C. (2019). The relationship between parental attachment and mobile phone dependence among Chinese rural adolescents: The role of alexithymia and mindfulness. *10*, 717059. <https://doi.org/10.3389/fpsyg.2021.717059>
- Long, J., Liu, T. Q., Liao, Y. H., Qi, C., He, H. Y., Chen, S. B., & Billieux, J. (2016). Prevalence and correlates of problematic smartphone use in a large random sample of Chinese undergraduates. *BMC Psychiatry*, 16(1), 1–12. <https://doi.org/10.1186/s12888-016-1083-3>
- Malterud, K., Siersma, V. D., & Guassora, A. D. (2016). Sample size in qualitative interview studies: Guided by information power. *Qualitative Health Research*, 26(13), 1753–1760. <https://doi.org/10.1177/1049732315617444>
- Nunes, P. P. D. B., Abdon, A. P. V., Brito, C. B. D., Silva, F. V. M., Santos, I. C. A., Martins, D. D. Q., Meira, P. M. F., & Frota, M. A. (2021). Fatores relacionados à dependência do smartphone em adolescentes de uma região do Nordeste brasileiro [Factors related to smartphone addiction in adolescents from a region in Northeastern Brazil]. *Ciência and Saúde Coletiva*, 26(7), 2749–2758. <https://doi.org/10.1590/1413-81232021267.08872021>
- Organization for Economic Cooperation and Development. (2021). *Education at a glance 2021: OECD indicators*. OECD Publishing. <https://doi.org/10.1787/b35a14e5-en>
- Panova, T., & Carbonell, X. (2018). Is smartphone addiction really an addiction? *Journal of Behavioral Addictions*, 7(2), 252–259. <https://doi.org/10.1556/2006.7.2018.49>
- Pitt, C., Hock, A., Zelnick, L., & Davis, K. (2021). *The kids are/not/sort of all right* [Conference session]. Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (pp. 1–14). Association for Computing Machinery. <https://doi.org/10.1145/3411764.3445541>



- Potas, N., Açıklım, Ş. N., Erçetin, Ş. Ş., Koçtürk, N., Neyişci, N., Çevik, M. S., & Görgülü, D. (2022). Technology addiction of adolescents in the COVID-19 era: Mediating effect of attitude on awareness and behavior. *Current Psychology, 41*, 1687–1703. <https://doi.org/10.1007/s12144-021-01470-8>
- Rich, M., Tsappis, M., & Kavanaugh, J. R. (2019). Uso problemático de mídias interativas entre crianças e adolescentes: Dependência, compulsão ou síndrome? In K. S. Yong & C. N. Abreu (Eds.), *Dependência de internet em crianças e adolescentes* (pp. 7–31). Artmed.
- Roberts, M. Z., Flagg, A. M., & Lin, B. (2022). Context matters: How smartphone (mis)use may disrupt early emotion regulation development. *New Ideas in Psychology, 64*, 100919. <https://doi.org/10.1016/j.newideapsych.2021.100919>
- Roser, K., Schoeni, A., & Rösli, M. (2016). Mobile phone use, behavioural problems and concentration capacity in adolescents: A prospective study. *International Journal of Hygiene and Environmental Health, 219*(8), 759–769. <https://doi.org/10.1016/j.ijheh.2016.08.007>
- Ruggiero, T. E. (2000). Uses and gratifications theory in the 21st century. *Refining Milestone Mass Communications Theories for the 21st Century, 3*(1), 3–37. [https://doi.org/10.1207/s15327825mcs0301\\_02](https://doi.org/10.1207/s15327825mcs0301_02)
- Savci, M., & Aysan, F. (2017). Technological addictions and social connectedness: Predictor effect of internet addiction, social media addiction, digital game addiction and smartphone addiction on social connectedness. *Dusunen Adam The Journal of Psychiatry and Neurological Sciences, 30*(3), 202–216. <https://doi.org/10.5350/dajpn2017300304>
- Shin, Y. M. (2019). Dependência de smartphone em crianças e adolescentes. In K. S. Young & C. N. de Abreu (Eds.), *Dependência de internet em crianças e adolescentes* (pp. 31–48). Artmed.
- Sociedade Brasileira de Pediatria. (2019). *Manual de Orientação: Menos telas Mais Saúde*. Sociedade Brasileira de Pediatria (Vol. 829, Issue 2008). [https://www.sbp.com.br/fileadmin/user\\_upload/\\_22246c-ManOrient\\_-\\_MenosTelas\\_MaisSaude.pdf](https://www.sbp.com.br/fileadmin/user_upload/_22246c-ManOrient_-_MenosTelas_MaisSaude.pdf)
- Sun, J., Liu, Q., & Yu, S. (2019). Child neglect, psychological abuse and smartphone addiction among Chinese adolescents: The roles of emotional intelligence and coping style. *Computers in Human Behavior, 90*, 74–83. <https://doi.org/10.1016/j.chb.2018.08.032>
- Theunissen, M. H. C., de Wolff, M. S., & Reijneveld, S. A. (2019). The strengths and difficulties questionnaire self-report: A valid instrument for the identification of emotional and behavioral problems. *Academic Pediatrics, 19*(4), 471–476. <https://doi.org/10.1016/j.acap.2018.12.008>
- Ting, C. H., & Chen, Y. Y. (2020). Smartphone addiction. In C. A. Essau & P. H. Delfabbro (Eds.), *Adolescent addiction* (2nd ed., pp. 215–240). Elsevier Inc. <https://doi.org/10.1016/b978-0-12-818626-8.00008-6>
- Turgeman, L., Hefner, I., Bazon, M., Yehoshua, O., & Weinstein, A. (2020). Studies on the relationship between social anxiety and excessive smartphone use and on the effects of abstinence and sensation seeking on excessive smartphone use.

- International Journal of Environmental Research and Public Health*, 17(4), 1262. <https://doi.org/10.3390/ijerph17041262>
- Wang, J., Li, Z., Zhou, Y., & Xiao, J. (2020). Mental health response for children and adolescents during the COVID-19 outbreak in China. *Psychiatry Research*, 294, 113530. <https://doi.org/10.1016/j.psychres.2020.113530>
- Yang, J., Fu, X., Liao, X., & Li, Y. (2020). Association of problematic smartphone use with poor sleep quality, depression, and anxiety: A systematic review and meta-analysis. *Psychiatry Research*, 284, 112686. <https://doi.org/10.1016/j.psychres.2019.112686>
- Yang, X. J., Liu, Q. Q., Lian, S. L., & Zhou, Z. K. (2020). Are bored minds more likely to be addicted? The relationship between boredom proneness and problematic mobile phone use. *Addictive Behaviors*, 108, 106426. <https://doi.org/10.1016/j.addbeh.2020.106426>
- Yang, Y. S., Yen, J. Y., Ko, C. H., Cheng, C. P., & Yen, C. F. (2010). The association between problematic cellular phone use and risky behaviors and low self-esteem among Taiwanese adolescents. *BMC Public Health*, 10, 217. <https://doi.org/10.1186/1471-2458-10-217>
- Yayan, E. H., Suna Dağ, Y., & Düken, M. E. (2019). The effects of technology use on working young loneliness and social relationships. *Perspectives in Psychiatric Care*, 55(2), 194–200. <https://doi.org/10.1111/ppc.12318>
- Yu, S., & Sussman, S. (2020). Does smartphone addiction fall on a continuum of addictive behaviors? *International Journal of Environmental Research and Public Health*, 17(2), 1–21. <https://doi.org/10.3390/ijerph17020422>

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