

Uncovering the Impact of Smartphone Addiction on Adolescent Emotion Regulation: A Systematic Literature Review for Intervention Strategies

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Doi: 10.31316/g-couns.v10i02.7873

Abstrack

This study aims to synthesize the impact of smartphone addiction on adolescent emotional regulation and identify effective intervention strategies. This article presents a Systematic Literature Review (SLR) following PRISMA guidelines, with searches conducted in Scopus, ScienceDirect, and Taylor & Francis for literature published between 2019 and 2024. After undergoing stages of identification, screening, feasibility, and inclusion, 11 articles that met the inclusion criteria were selected through a rigorous selection process. The research findings indicate that smartphone addiction correlates with increased psychological symptoms that negatively affect emotional regulation and social interaction among adolescents. This study highlights the need for multidimensional interventions, including Cognitive Behavioral Therapy (CBT), mindfulness, psychoeducation, and social support from parents and teachers. Although these approaches show promising results, evidence of long-term effectiveness remains limited, necessitating further research with a longitudinal design to assess sustainability. These findings also support the development of digital literacy interventions and school-based emotional regulation training to prevent smartphone addiction among adolescents, thereby supporting mental health and reducing the negative impacts of excessive technology use in the digital age.

Keywords: smartphone addiction, emotion regulation, systematic literature review

Abstrak

Penelitian ini bertujuan mensintesis dampak kecanduan smartphone terhadap regulasi emosi remaja dan mengidentifikasi strategi intervensi yang efektif. Artikel ini berupa Systematic Literature Review (SLR) berbasis PRISMA, dengan pencarian artikel melalui Scopus, ScienceDirect, dan Taylor & Francis untuk literatur yang diterbitkan antara 2019 hingga 2024. Setelah melalui tahapan identifikasi, skrining, kelayakan, dan inklusi, terpilih 11 artikel yang memenuhi kriteria inklusi melalui seleksi yang ketat. Temuan penelitian menunjukkan bahwa kecanduan smartphone berkorelasi dengan peningkatan gejala psikologis yang berdampak negatif pada regulasi emosi dan interaksi sosial remaja. Studi ini menyoroti perlunya intervensi multidimensi, termasuk Cognitive Behavioral Therapy (CBT), mindfulness, psikoedukasi, dan dukungan sosial dari orang tua dan guru. Meskipun pendekatan ini menunjukkan hasil yang menjanjikan, bukti efektivitas jangka panjang masih terbatas, sehingga penelitian lanjutan dengan desain longitudinal diperlukan untuk menilai keberlanjutannya. Temuan ini juga mendukung pengembangan intervensi literasi digital dan pelatihan regulasi emosi berbasis sekolah untuk mencegah kecanduan smartphone pada remaja, guna mendukung kesehatan mental dan mengurangi dampak negatif penggunaan teknologi berlebihan di era digital.

Kata kunci: kecanduan smartphone, regulasi emosi, remaja, systematic literature review

Article info

Received May 2025, Revised July 2025, Accepted August 2025, Published February 2026



INTRODUCTION

Adolescence is a crucial transition from childhood to adulthood (Saputro, 2017) and is universally described as a period of crisis, marked by identity formation (Alimuddin & Rahmi, 2021). During this period, adolescents experience rapid and complex physical, social, and emotional development (Saimun, 2022). In Indonesia, adolescents are generally defined as unmarried individuals aged 12 to 24 (Sarwono, 2012), but globally, the definition of adolescents varies by a country's social and cultural norms. Nevertheless, the challenges faced by adolescents in various parts of the world show similar patterns: the search for identity, increasing social pressure, and emotional confusion, such as anxiety, self-doubt, and confusion about the future (Maharani, 2024). One contemporary challenge that significantly shapes the dynamics of adolescent development is widespread exposure to digital technology.

The development of digital technology is one of the most significant external factors influencing the dynamics of adolescent life around the world. Today's adolescents grow up in a digital era characterized by instant connectivity and unlimited access to information. Smartphones, as the primary technological device, are used not only for communication but also for entertainment, education, and self-expression through social media (Padillah, 2020; Syafwan & Daulay, 2023). In Indonesia, for example, 75.50% of adolescents are active social media users (Syafwan & Daulay, 2023), a trend that is also reflected globally, where more than 90% of adolescents in the United States and most other developed countries are connected to social media via mobile devices.

Easy access to digital technology brings many benefits to adolescents, including easier communication, entertainment, and learning. However, behind these benefits are serious risks that are now a global concern, especially those related to excessive smartphone use. Smartphone addiction is defined as a condition in which individuals use smartphones compulsively to the point of disrupting social, academic, and emotional functioning (Kwon et al., 2013). This phenomenon is now widely recognized as a worrying form of modern addictive behavior. In various countries, excessive smartphone use among adolescents has been consistently associated with emotion regulation dysfunction (Shahidin et al., 2022; Xiao et al., 2024). The inability to respond adaptively to stress and social pressure is one of the main factors that exacerbate dependence on digital devices, while also indicating that this addiction has complex psychological roots.

Excessive smartphone use has been linked to a variety of mental health issues, including depression, anxiety, and sleep disturbances. International studies have shown a strong link between smartphone addiction and these psychological disorders. For example, in South Korea, adolescents who used smartphones for more than four hours per day experienced increased stress, depression, and suicidal thoughts (Kim & Han, 2020). Other studies have highlighted decreased self-esteem, increased anxiety, and cognitive difficulties due to excessive smartphone use (Rathod et al., 2022). These findings are not limited to a specific region but have been reported globally, highlighting the pervasiveness of the problem. In addition, excessive smartphone use also negatively impacts adolescents' social and academic lives. In Indonesia, adolescents face challenges in detaching themselves from devices, which often leads to addiction (Wati & Haq, 2024; Setiawan et al., 2022). The addictive nature of smartphones reduces face-to-face social interactions and hinders academic engagement. Adolescents may struggle to balance academic responsibilities with excessive screen time, leading to decreased academic performance and poorer social interaction skills.



The interaction between smartphone addiction and emotion regulation is reciprocal. Smartphone addiction can weaken the ability to regulate emotions, while poor emotion regulation increases the risk of addiction. Adolescents who rely on maladaptive emotion regulation strategies, such as avoidance or rumination, are more susceptible to smartphone addiction, which in turn exacerbates anxiety and depression (Mascia et al., 2020). Conversely, research suggests that emotional intelligence and self-regulation skills act as protective factors, which can mitigate the negative effects of smartphone addiction (Li et al., 2017; Gülden & Polat, 2024). Cross-cultural research further supports these findings. Studies in Europe and Asia have shown that adolescents addicted to smartphones often use maladaptive emotion regulation strategies, such as rumination, self-blame, and catastrophizing. These strategies have been shown to exacerbate the risk of psychological disorders, including depression and anxiety (Extremera et al., 2019). In addition, failure in emotion regulation has also been associated with other mental health problems, such as chronic stress and impulsive behavior, in both developed and developing countries (Ma et al., 2018). Therefore, smartphone addiction is not just a negative habit, but also a reflection of deep psychological dysfunction, which crosses cultural boundaries.

Good emotion regulation skills are essential for adolescents who face a variety of challenges, both in school and in their social lives. Adolescents with adequate emotion regulation skills tend to be better able to manage stress (Elhai et al., 2018), resolve conflicts, and build healthy interpersonal relationships (Gross, 2015). In contrast, smartphone addiction can disrupt these processes, creating a pattern of emotional dependence in which adolescents feel anxious or frustrated when not using their phones and experience barriers in social interactions that affect self-esteem (Wacks & Weinstein, 2021). In James Gross's emotion regulation theory, emotion regulation is defined as the conscious or unconscious process of perceiving, managing, and responding appropriately to emotions to achieve specific goals (Gross, 2015). Emotion regulation involves monitoring, evaluating, and modifying an individual's emotional responses, especially in a social context (Gross, 2015). Gross identified two main strategies in emotion regulation: antecedent-based regulation, such as reappraisal, and response-based regulation, such as suppression. In the context of smartphone addiction, adolescents who are not accustomed to using antecedent strategies are more likely to use their mobile phones as an escape from negative emotions, which ultimately worsens emotional distress. Therefore, understanding and implementing adaptive emotion regulation strategies is essential for preventing and reducing the risk of digital addiction.

Previous studies, especially those based on Systematic Literature Review (SLR), mostly describe the correlational relationship between smartphone addiction and dysfunctional emotion regulation. However, most studies have not identified effective interventions to improve emotion regulation in adolescents addicted to smartphones. So far, no SLR study has systematically analyzed effective interventions to improve emotion regulation in the context of smartphone addiction among adolescents, particularly those published between 2019 and 2024. This study aims to synthesize the impact of smartphone addiction on adolescent emotion regulation and identify intervention strategies used in studies published between 2019 and 2024.

Given the increasing prevalence of smartphone addiction and its detrimental impact on adolescent mental health, the findings of this study are of great importance to various stakeholders, including counseling practitioners, educational institutions, and



policymakers. Effective interventions may help mitigate the negative impacts of smartphone addiction, promote healthier emotion regulation, and improve adolescent psychological well-being. The results of this study also provide important insights for counseling practitioners, educational institutions, and policymakers on how to design school-based interventions and digital literacy programs to help adolescents manage their smartphone use in a healthy manner.

METHOD

This research uses a Systematic Literature Review (SLR) to identify the impact of smartphone addiction on adolescent emotion regulation. Systematic Literature Review is a research method that aims to identify, evaluate, interpret, and present the results of studies related to topics, research questions, or phenomena of concern (Nugroho et al., 2021; Murdiningrum & Handayani, 2021; Putrie & Saadah, 2024). The use of Systematic Literature Review provides benefits for synthesising various relevant research articles, so that the facts presented become more comprehensive and balanced (Meitasari et al., 2021).

In this study, the PRISMA flow chart was used to select articles relevant to the research question, which includes four stages: identification, screening, eligibility, and inclusion. The following explains each stage: (1) The identification stage is searching and identifying relevant articles that can be used for the systematic review. At this stage, literature is searched through various sources, such as research databases. (2) The screening stage is a step to filter out articles irrelevant to the topic or the inclusion criteria set previously. In this stage, the titles and abstracts of the articles found in the identification stage were examined to determine whether they met the basic criteria for further review. (3) The eligibility stage is where articles that pass the screening stage will be further examined to determine if they meet the more stringent eligibility criteria. At this stage, the review team will fully examine the article to ensure that it is methodologically relevant, meets more specific criteria (such as research design, sample size, relevant population, and type of data collected), and has a valid methodology that fits the purpose of the systematic review. (4) The inclusion stage is after the eligibility process, where articles that fulfil the eligibility criteria will be included in the systematic review. Only articles that fulfil all inclusion criteria and have gone through the identification, screening, and eligibility process will be used in further analysis. The articles referred to in the selection and screening using the PRISMA method were original research articles (Ardila et al., 2024).



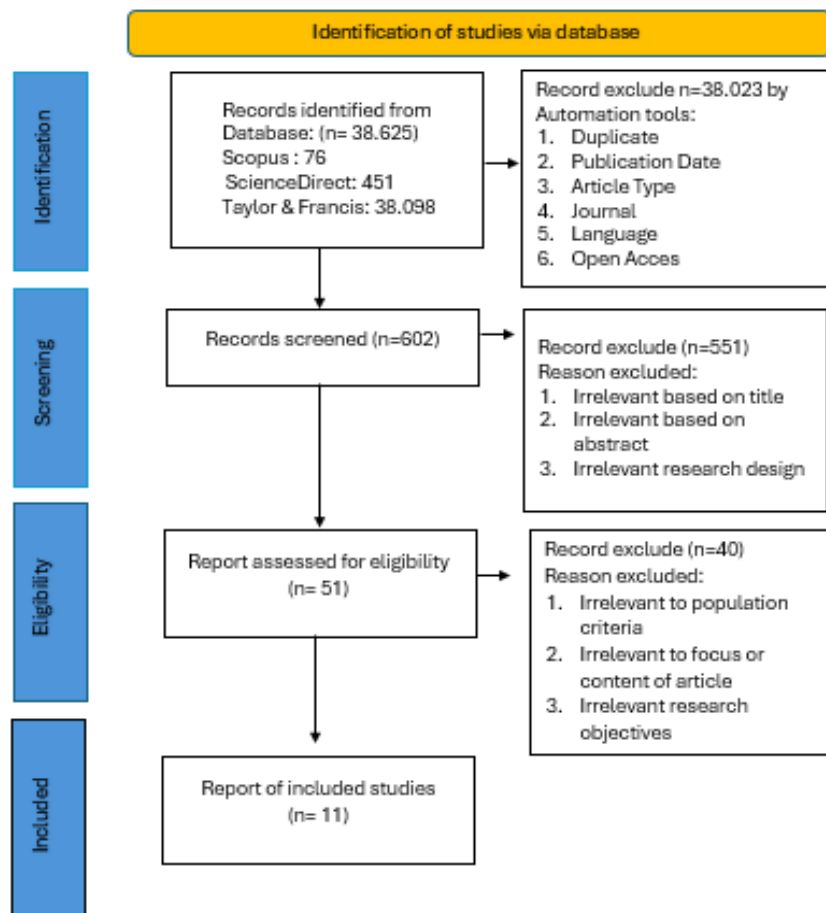


Figure 1. PRISMA Flowchart

Based on Figure 1, the first stage of the article selection process is the identification stage, which is conducted by searching three major electronic databases: Scopus, ScienceDirect, and Taylor & Francis. An initial search using the keywords ‘smartphone addiction’, ‘emotion regulation’, and ‘adolescents’ yielded a total of 38,625 articles, with the following breakdown: Scopus (76 articles), Science Direct (451 articles), and Taylor & Francis (38,098 articles). Next, an initial screening was conducted using automated tools to identify and exclude duplicate articles and filter by publication year, article type, journal field, language, and open access.

The results of this stage left 602 articles. The next stage was screening based on pre-defined inclusion and exclusion criteria, such as age of participants (12-24 years), clinical and non-clinical populations, and focus on smartphone addiction and emotion regulation. A total of 551 articles were excluded at this stage due to irrelevance based on title, abstract or research design, leaving 51 articles for the eligibility assessment stage. The eligibility assessment was conducted manually by reading the full content of the articles. At this stage, 40 articles were excluded because they did not meet the population criteria, did not align with the article's focus, or were not relevant to the research objectives. Thus, 11 articles were eligible for further analysis in this review. As an additional measure to reduce publication bias, a search for grey literature and unpublished studies was also conducted through Google Scholar and ProQuest Dissertations.



The initial stage in SLR research is to develop research questions (RQ). These questions can be used to assist in the search and extraction of literature formulated into five elements, known as PICOC: 1) Population (P): the target group of the study; 2) Intervention (I): detailed aspects of the study or issues of interest to the researcher, 3) Comparison (C): aspects to be compared with the Intervention (I), 4) Outcomes (O): effects and results of the Intervention (I), and 5) Context (C): research setting and environment (Aliyah & Mulawarman, 2020). The research questions developed in this study are:

1. How does smartphone addiction impact adolescents in 2019 to 2024?
2. What is the level of emotional regulation ability in adolescents with smartphone addiction from 2019 to 2024?
3. What intervention strategies are used to improve emotional regulation in adolescents with smartphone addiction from 2019 to 2024?

Articles from 3 databases, namely Scopus, Science Direct, and Taylor & Francis, from 2019 to 2024 were collected using a search strategy according to predetermined criteria. Data search was carried out using keywords and Boolean AND and OR operators. Keywords for emotional regulation use: "emotion regulation", "emotional self-regulation", "self-regulation", "emotion". While for smartphone addiction, the keywords used are: "problematic smartphone use", "smartphone addiction". Moreover, for teenagers, the keywords used are: "adolescent", "teenager", "young adult".

The keywords were chosen to ensure the data were and relevant the complete, focusing on emotional regulation, smartphone addiction, and adolescents. Using Boolean operators AND and OR enables a structured search, combining relevant concepts, refining search results, and keeping the focus on the study's topic.

The screening stage is when researchers review the collected articles to ensure they meet the requirements. Inclusion and exclusion criteria are used to screen articles for relevance to the research question. One method to conduct screening to obtain in-depth research results is to provide a publication deadline, because less mature research takes longer to complete (Kraus et al., 2020).

In addition to limiting publication time, the Rayyan application is used during the screening stage to filter articles relevant to the research. Rayyan allows researchers to upload and assess articles from various databases using predetermined criteria and facilitates team collaboration in selecting articles efficiently and systematically. This tool ensures that only relevant, high-quality articles are selected for research.



Table 1.
 Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Population	The study focused on adolescent smartphone users aged 12 to 24 years of all genders, covering both clinical and non-clinical populations to capture the broad spectrum of severity of smartphone addiction	Studies that focus on smartphone users who are children (under 12 years) or adults (over 24 years) of any gender, from both clinical and non-clinical populations.
Document Type	Research articles	Non-research articles (e.g., books, book chapters, proceedings, etc.)
Publication Year	Articles published between 2019 to 2024	Articles published before 2019 and after 2024
Language	Written in English	Written in languages other than English
Article Type	Open access and full-text articles	Closed access and/or not available in full text
Database	Sourced from Scopus, ScienceDirect, and Taylor & Francis	Sources outside of Scopus, ScienceDirect, and Taylor & Francis

RESULTS AND DISCUSSION

Results

Based on the review results of the eleven (11) articles that fall into the inclusion category, they can be described in two stages. The first stage is based on 3 categories: research location, year of publication, and research method. The second stage presents the answers to the research questions set.

The first part of this article is categorized based on research location, year of publication, and research method. Research on smartphone addiction and emotion regulation in adolescents has been conducted in several countries, including Astana (Kazakhstan), England, China, Spain, Italy, Brazil, Taiwan, Hungary, and China. It has been confirmed that research on smartphone addiction and emotion regulation has been conducted in at least three continents Asia, Europe, and South America, reflecting the diverse situations and conditions in these countries. Although the number of studies in each country is relatively balanced, this distribution shows that the topic has become a global concern, with an expanding focus across different regions.

One of the criteria in searching for articles is the year of publication. In this study, the publication year is limited to 2019-2024, to ensure the articles are relevant to current conditions. Based on the study of 11 articles, the distribution of publication years is 2020 (n=1), 2021 (n=1), 2022 (n=1), 2023 (n=5), and 2024 (n=3). The majority of studies discussed were published in 2023 and 2024, with 5 articles in 2023 and 3 articles in 2024. This indicates that the topic has seen a significant increase in interest and relevance in recent years. Few articles were published from 2020 to 2022, with only 1 each, indicating that this topic has started to grow in recent years.



In this study, the articles reviewed are quantitative, qualitative, and mixed-method studies using various types of research designs. The following research methods were identified in 11 articles reviewed: quantitative correlation (n=2), quantitative survey (n=1), quantitative experiment (n=1), quantitative cross-sectional (n=5), and qualitative (n=2). Respondents from the 11 articles studied were adolescents aged 11 to 24 years.

Most studies used cross-sectional quantitative methods (5 articles), indicating a tendency toward more frequent use of observational designs at a single point in time. Quantitative correlation methods (2 articles) were also used frequently, indicating research on relationships between variables. In addition, there were studies with experimental quantitative (1 article) and survey quantitative (1 article) designs, which provided further insight into the effects and characteristics of smartphone addiction and emotion regulation. Qualitative methods (2 articles) were used to explore the phenomenon in greater depth, providing a deeper understanding of adolescents' context and perceptions.

Based on the data mapping from the eleven articles that meet the inclusion criteria based on research location, publication year, and research method, the summary can be presented in the diagram below:

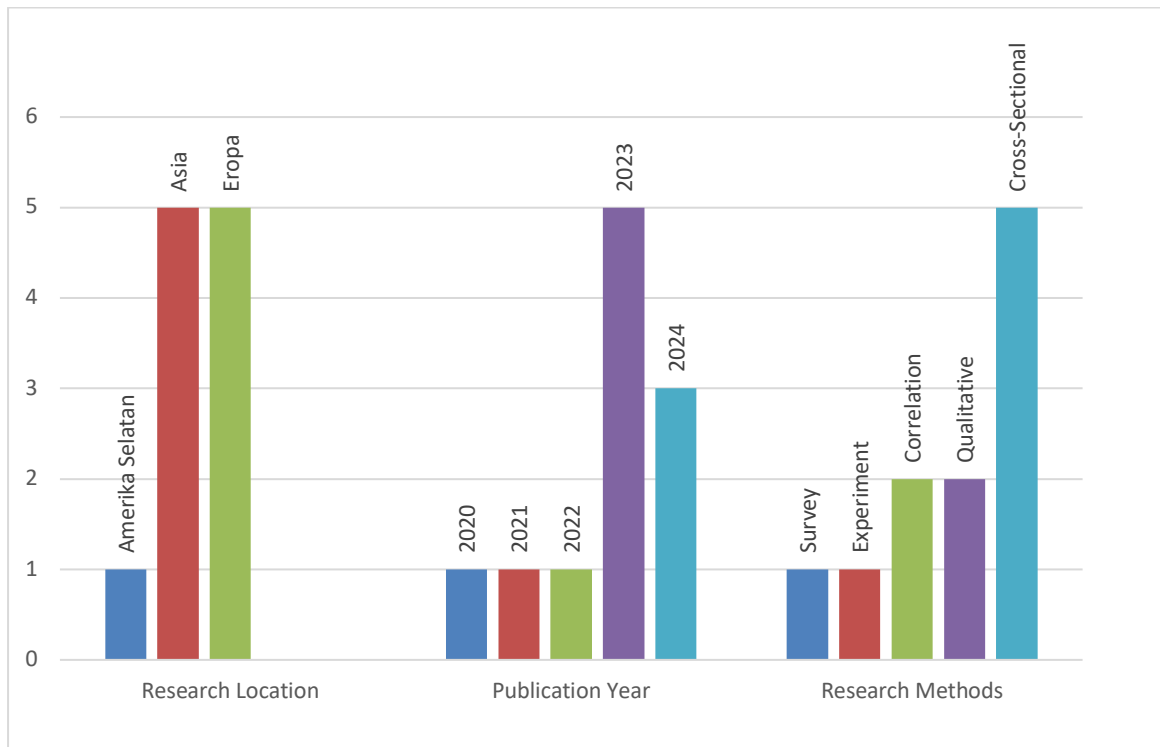


Figure 2. Research Location, Publication Year, and Research Method



Table 2. Article Review Results

No.	Article Title/Author/Year	Country	Research Purposes	Method or Strategy	Research Description	Population and Sample Size	Results
1.	Personality traits and social intelligence roles in self-regulation ability of university students. Author: Kurmanova, Anar, Shaikhymuratova, Indira, Aubakirova, Zhanat, Lawrence, Kehinde C., Baizhumanova, Bibana, Yermentayeva, Ardakh Year: 2024	Astana, Kazakhstan.	Investigating the role of personality traits and social intelligence in students' self-regulation abilities.	No intervention methods or strategies were found to be used.	Research Type: Quantitative Data Collection Method: Survey Instruments: SSRQ, SIS, PS, Data analysis using Structural Equation Modeling.	466 students from various universities in Astana, Kazakhstan	The findings suggest that developing social intelligence is critical to enhancing self-regulation skills.
2.	Digitally Un/Free: the everyday impact of social media on the lives of young people. Author: Bibizadeh, Roxanne Ellen, Procter, Rob, Girvan, Carina, Webb, Helena, Jirotko, Marina. Year: 2023	Inggris	Examining the impact of social media on young people's everyday lives, including perceptions of digital freedom.	Tidak ditemukan metode atau strategi intervensi yang digunakan	Type of research: Qualitative with multimethod approach Data collection method: Focus group and interview with teachers. Data analysis: Thematic analysis with coding scheme	109 participants: 11 university students, 91 pupils (11-21 years), 7 teachers in schools in the UK	Social media provides freedom but also limits; young people experience digital freedom and unfreedom.
3.	Trait Mindfulness and Problematic Smartphone Use in Chinese Early Adolescents: The Multiple Mediating Roles	China	Investigating whether mindfulness protects against	Using a mindfulness model to improve self-regulation and	Research Type: cross-sectional. Instruments: Mindful Attention	517 junior high school students in	Mindfulness reduces problematic smartphone



No.	Article Title/Author/Year	Country	Research Purposes	Method or Strategy	Research Description	Population and Sample Size	Results
	of Negative Affectivity and Fear of Missing Out Author: Jin, Y., Xiong, W., Liu, X., An, J. Year: 2023		problematic smartphone use (PSPU).	stress coping skills in adolescents.	Awareness Scale (MAAS), Mobile Phone Addiction Index (MPAI), Self-Rating Anxiety Scale (SAS), Self-Rating Depression Scale (SDS), UCLA Loneliness Scale, Fear of Missing Out (FoMO). Data analysis: structural equation model	China, aged 12-15 years.	use, mediated by FoMO and negative affectivity.
4.	Depressive Symptomatology Is Associated With Problematic Smartphone Use Severity in Adolescents: The Mediating Role of Cognitive Emotion Regulation Strategies Author: Arrivillaga, C., Elhai, J.D., Rey, L., Extremera, N. Year: 2023	Spanyol	Examining the relationship between depressive symptoms and problematic smartphone use in adolescents	No intervention methods or strategies were found to be used.	Type of Research: Cross-sectional Instruments: Depression Anxiety Stress Scale-21, CERSQ, Smartphone Addiction Scale-Short Version Data analysis: parallel mediation analysis.	The sample consisted of 2,197 adolescents aged 12 to 19 years in Southern Spain.	Depressive symptoms increase problematic smartphone use through maladaptive emotion regulation strategies.



No.	Article Title/Author/Year	Country	Research Purposes	Method or Strategy	Research Description	Population and Sample Size	Results
5.	Emotional intelligence and adult attachment: Effects on problematic smartphone usage Author: Aranda, M., García-Domingo, M., Fuentes, V., Linares, R. Year: 2022	Spain	Analyzing the effects of dimensions of emotional intelligence and attachment style on problematic smartphone use and the influence of gender and age.	Providing psychoeducational programs and building positive and secure attachments in childhood	Type of Research: Cross-sectional Instruments: Smartphone Dependency and Addiction Scale, the Wong & Law Emotional Intelligence Scale, and the Adult Attachment Questionnaire Data analysis: Regression analysis	552 teenagers (74.1% female) from Generation Z and Millennials	Low emotional intelligence is associated with problematic smartphone use. Women tend to have more problematic smartphone use than men.
6.	Smartphone and social network addiction in early adolescents: The role of self-regulatory self-efficacy in a pilot school-based intervention Author: Favini, A., Culcasi, F., Cirimele, F., Remondi, C., Plata, M.G., Caldaroni, S., Virzi, A.T., Luengo Kanacri, B.P. Year: 2024	Italia	Evaluating the effectiveness of a school-based intervention to reduce smartphone and social media addiction and strengthen self-regulatory efficacy in adolescents.	No intervention methods or strategies were found to be used.	Research Type: Quantitative experiment. Instruments: Bergen Social Media Addiction Scale, Smartphone Addiction Scale, SRSE scale Data Analysis: Mean difference test	462 junior high school students in Italy, aged 15 years	School-based interventions are effective in reducing smartphone and social media addiction in the short term, especially in students with higher self-



No.	Article Title/Author/Year	Country	Research Purposes	Method or Strategy	Research Description	Population and Sample Size	Results
7.	Adolescents' Perception About the Relationship Between Self-Reported Smartphone Addiction and Emotional and Behavioral Problems During COVID-19 Author: Hinnah Borges Martins de Freitas, B., Munhoz Gaíva, M.A., Bortolini, J., Manuela Jorge Diogo, P. Year: 2023	Brazil	Understanding adolescents' perceptions of smartphone addiction and its relationship to emotional and behavioral problems during the COVID-19 pandemic	Using Cognitive Behavior Therapy (CBT) for recovery for teenagers addicted to smartphones	Type of research: Qualitative. Instrument: Smartphone Addiction Inventory scale. Data collected by the focus group Data analysis: Content analysis (Bardin)	16 teenagers (ages 15-18 years)	regulatory self-efficacy. Smartphone addiction is used as an escape from reality during the pandemic, but it worsens emotional stress.
8.	Common and specific risk factors for comorbidity types of problematic smartphone use in adolescents Author: Chang, Wei-Che, Ko, Huei-Chen. Year: 2023	Taiwan	Identifying types of PSU comorbidities and general/specific risk factors in adolescents	No intervention methods or strategies were found to be used.	Type of research: Quantitative survey Instruments: Perceived Stress Scale, Social Anxiety Scale, and Smartphone Addiction Test Data analysis: Regression analysis.	1292 teenagers (aged 11-18 years)	Perceived stress and social anxiety are common risks for all types of PSU, while gender and positive expectations regarding online activities are specific factors.



No.	Article Title/Author/Year	Country	Research Purposes	Method or Strategy	Research Description	Population and Sample Size	Results
9.	The role of maladaptive cognitive emotion regulation strategies and social anxiety in problematic smartphone and social media use Author: Zsido, Andras N., Arato, Nikolett, Lang, Andras, Labadi, Beatrix, Stecina, Diana, Bandi, Szabolcs A Year: 2021	Hungaria	Examining whether maladaptive emotion regulation strategies mediate the relationship between social anxiety and problematic smartphone use.	No intervention methods or strategies were found to be used.	Research type: Cross-sectional Instruments: Social Phobia Scale (SPS) and Social Interaction Anxiety Scale (SIAS), Cognitive emotion regulation questionnaire (CERQ), Bergen social media addiction scale (BSMAS), Smartphone addiction scale (SAS) Data analysis: Structural Equation Model	499 participants from 18 years old	Maladaptive emotion regulation strategies play an important role in the relationship between social anxiety and problematic smartphone or social media use.
10.	The longitudinal relationships between problematic mobile phone use symptoms and negative emotions: a cross-lagged panel network analysis	Tionggkok	Over time, examine whether negative emotions trigger problematic mobile phone use	No intervention methods or strategies were found to be used.	Type of research: Cross-sectional and longitudinal Instruments: Mobile Phone Addiction Index (MPAI), short	5568 new students under the age of 18	A bidirectional relationship was found, where academic burnout



No.	Article Title/Author/Year	Country	Research Purposes	Method or Strategy	Research Description	Population and Sample Size	Results
	Author: Shen, Guanghui, Huang, Guoyong, Wang, Mengting, Jian, Wenqian, Pan, Hong, Dai, Zheru, Wu, Anise M.S., Chen, Li. Year: 2024		(PMPU) or vice versa.		version of the social networking sites addiction tendency scale, gaming scale, 10-item fear of missing out scale, UCLA loneliness scale, 6-item social anxiety scale, Learning Burnout Scale (LBS) Data analysis: missing completely at random (MCAR), paired sample t-test, centrality index, contemporary network comparison test (NCT)		predicted increased PMPU and negative emotions, as well as a cycle between escapism and social anxiety that could reinforce PMPU tendencies.
11.	Can emotion regulation difficulty lead to adolescent problematic smartphone use? A moderated mediation model of depression and perceived social support Author:	China	Analyzing whether difficulties in emotion regulation lead to problematic	Guidance from teachers and parents to control emotions properly and form emotional	Type of research: Quantitative correlational. Instruments: Difficulties in Emotion Regulation Scale, Smartphone	720 Chinese adolescents (mean age = 13.66 years)	It was found that emotion regulation difficulties were positively correlated with problematic



No.	Article Title/Author/Year	Country	Research Purposes	Method or Strategy	Research Description	Population and Sample Size	Results
	Linqian Fu, Pengcheng Wang, Meng Zhao, Xin Xie, Ye Chen, Jia Nie, Li Lei, Year: 2020		smartphone use in adolescents.	regulation strategies.	Addiction Scale, Epidemicologic Studies Depression Scale, Multidimensional Scale of Perceived Social Support (MSPSS) Data analysis: Data screening, descriptive statistical methods, and Pearson correlation, PROCESS macro		smartphone use. Depression acted as a mediator, while perceived social support strengthened the relationship between depression and problematic smartphone use.



Based on the results of the review, show that research on the topic of the impact of smartphone addiction on adolescent emotional regulation has been conducted in several countries. From the results of these studies, it can be seen that the impact of smartphone addiction on adolescents. Adolescents who are addicted to smartphones have characteristics of higher levels of psychopathological symptoms, such as depression, anxiety, stress, low self-esteem, anger, and OCD symptoms, and have high impulsiveness (Zsido et al., 2021; Freitas et al., 2023). Excessive smartphone use also impacts adolescent productivity (Shen et al., 2024). Female adolescents show higher levels of smartphone use and misuse (Aranda et al., 2022; Favini et al., 2024), due to higher social orientation levels than males. Excessive smartphone use is a means for adolescents as a coping style to reduce stress from life stress and unpleasant moods. Adolescents perceive internet-related activities as a space of freedom, a “haven,” and an “escape from the rules” experienced both at home and school (Chang & Ko, 2023; Bibizadeh et al., 2023; Arrivillaga et al., 2023; Freitas et al., 2023; Fu et al., 2020). Moreover, for students experiencing academic stress, smartphones become a coping mechanism that inadvertently increases anxiety (Shen et al., 2024). In addition, adolescents perceive smartphones as maintaining social relationships, increasing social interaction and integration, and fulfilling socialization needs (Jin et al., 2023; Freitas et al., 2023). However, excessive smartphone use decreases face-to-face social interactions, potentially leading to feelings of disconnection and anxiety (Shen et al., 2024).

The findings of this study reaffirm that there is a relationship between emotional regulation and smartphone addiction. A person's perception and ability to regulate emotions play an important role as a trigger for the emergence of addictive behavior (Aranda et al., 2022). According to Fu et al. (2020), difficulties in emotional regulation can lead to problematic smartphone use, especially among adolescents. Adolescents with higher levels of maladaptive cognitive emotion regulation will use smartphones to escape from irregular negative affective states, which can trigger depression (Zsido et al., 2021; Fu et al., 2020). According to Arrivillaga et al. (2022), there is a significant and positive relationship between depressive symptoms and maladaptive regulation strategies, such as self-blame, blaming others, assuming bad things, and ruminating. Increasing adolescents' self-regulation can encourage intrinsic motivation, adaptive coping, and emotional and behavioral skills. This, in turn, can be a key component in preventing the risk of smartphone addiction among adolescents (Favini et al., 2024).

Based on the results of the analysis of article reviews that meet the inclusion criteria, several models or methods were found that can be used to improve emotional regulation in adolescents with smartphone addiction, including:

1. The mindfulness model can improve self-regulation and stress management skills in early adolescents. Because mindfulness helps reduce subconscious thoughts and unhealthy behavioral patterns, people with lower levels of mindfulness are often unknowingly overinvolved with smartphones (Jin et al., 2023).
2. Interventions based on Cognitive Behavioral Therapy (CBT) techniques, meditation, music therapy, limiting smartphone usage time, social-emotional learning, and regular stimulation of physical and outdoor activities are promising for recovery for adolescents with smartphone addiction (Freitas et al., 2023).
3. Building positive and secure attachments in childhood is important for a positive self-image and relationships with others in adulthood. It can also influence how people view the virtual world and use smartphones (Aranda et al., 2022).



4. Psycho-educational programs that include activities to improve emotional intelligence and build safe and positive affective relationships will positively influence emotional intelligence (Aranda et al., 2022).
5. Teachers and parents should guide students in managing their emotions effectively and in developing adaptive emotion regulation strategies to cope with stressful life events (Fu et al., 2020).

Discussion

Emotion regulation and smartphone addiction are global issues that require further understanding of how the two are related (Shahidin et al., 2022). Emotion regulation is particularly important during adolescence, given the high prevalence of psychological problems and changes in developmental and maturational processes that affect emotion regulation (Deplus et al., 2016). Moreover, adolescents are vulnerable to smartphone addiction due to their low ability to regulate emotions. According to Deng et al. (2024), smartphone addiction is a global problem, especially among adolescents. Adolescence is considered a difficult period characterized by “storm and stress,” where adolescents are vulnerable to emotional disorders and problem behaviors (Jin et al., 2023). At this stage, adolescents are at a developmental stage vulnerable to deficits in emotion regulation, which is associated with excessive smartphone use (Extremera et al., 2019).

Smartphone addiction can be associated with various problems, such as difficulties in cognitive-emotional regulation, impulsivity, impaired cognitive function, social networking addiction, shame, and low self-esteem (Wacks & Weinstein, 2021). A person's inability to manage emotions is often the main factor that drives compulsive and unhealthy smartphone use patterns (Rozgonjuk & Elhai, 2021). A person with smartphone addiction uses the device as an external tool to regulate emotions (Zsido et al., 2021). Smartphone use can temporarily relieve stress and negative moods, especially in adolescents (Benedetto et al., 2024). However, without realizing it, the convenience obtained from smartphone use creates a dependency that ultimately worsens a person's ability to deal with their emotions directly and healthily, thus creating a cycle that further strengthens the addiction.

One of the causes of someone experiencing smartphone addiction is difficulty or failure in regulating emotions (Fu et al., 2020), especially for adolescent girls who have a higher chance (Van Deursen et al., 2015). Initially, someone may use a smartphone to regulate emotions, especially when dealing with unpleasant feelings such as boredom and stress (Shi et al., 2023). However, this condition is reversed when someone lacks good emotional regulation skills; problematic or excessive smartphone use harms various aspects of life. From a psychological perspective, individuals who cannot manage emotions well are more susceptible to mental health disorders, such as depression and anxiety (Rozgonjuk & Elhai, 2021; Ma et al., 2018). Excessive smartphone use also often interferes with sleep quality (Guo et al., 2024; Akbari et al., 2023), even in young children (Kim et al., 2020). In addition, excessive smartphone use often worsens social relationships and triggers feelings of low self-esteem (Wacks & Weinstein, 2021). In the long term, excessive smartphone use can trigger structural changes in the brain and cause physical health problems, such as body aches and migraines (Wacks & Weinstein, 2021). Therefore, without good emotional regulation skills, smartphones, initially used to cope with stress, can become a source of new emotional problems.

The many impacts of excessive smartphone use require effective interventions to reduce smartphone addiction and improve emotion management skills (Drach et al.,



2021). This is important because emotional regulation is now recognized as a key topic in psychology (Gross, 2015), and strong self-regulation skills are needed early on to prevent problematic smartphone use during adolescence (Xiao et al., 2024).

One effective approach to help adolescents manage impulsivity is mindfulness. Mindfulness is an adaptive approach that helps manage and improve emotion regulation strategies (Ma et al., 2018), particularly for adolescents with emotional and behavioral problems (Lokita et al., 2021). Previous studies have shown that applying mindfulness techniques effectively improves emotion regulation (Ilanloo et al., 2022; Novita, 2022). In addition, through the development of emotion regulation skills and the implementation of appropriate interventions, smartphone addiction can be overcome. When smartphones support daily emotion regulation (Shi et al., 2023), individuals can live more balanced, mentally healthy lives. No less importantly, parents of adolescents at risk of problematic smartphone use need to be educated about the safe use of smartphones and the internet (Gül et al., 2019).

Overall, the systematic literature review is used to assess the level of research relevance as a consideration for further research. Of the 11 articles reviewed, most are set in formal education settings, so the forms of emotion regulation and smartphone addiction identified are also in that context. Furthermore, the results of this SLR indicate that only a small part of the impact of smartphone addiction on adolescent emotion regulation has been identified. This is due to limitations in the year of publication and access, so only openly available articles are reviewed; articles that are not freely available may contain important information not covered in this study. The literature review found that methods thought to improve emotion regulation and reduce smartphone addiction lack empirical evidence of effectiveness. This is an opportunity for future researchers who want to test the effectiveness of the right model or method to improve adolescent emotion regulation abilities to reduce smartphone addiction.

CONCLUSION

The results of this systematic literature review confirm that smartphone addiction has a significant impact on adolescent emotional regulation, which is associated with an increase in psychological symptoms such as depression, anxiety, and high impulsivity. This disorder also impairs adaptive emotion regulation strategies and disrupts the quality and productivity of social relationships. Therefore, interventions such as Cognitive Behavioral Therapy (CBT), mindfulness techniques, and psychoeducational programs that focus on strengthening emotion regulation skills are needed. Active support from teachers and parents, along with school-based emotion regulation training, can be an effective short-term solution for preventing and managing these problems. However, empirical evidence on the long-term effectiveness of these interventions remains limited and warrants further research. Future longitudinal research is urgently needed to evaluate the sustainability of interventions, understand the dynamics of smartphone addiction, and examine the development of adolescent emotion regulation over time.

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