

CONNECTED BUT AT WHAT COST? A RAPID SCOPING REVIEW OF ADOLESCENTS' SMARTPHONE USE AND THEIR WELLBEING

Saidat Adeniji *

University of Southern Queensland,
Australia

Jared Kerwin

University of Southern Queensland,
Australia

Brett Moffett

University of Southern Queensland,
Australia

Abstract

With the current prevalence of smartphones, adolescents are increasingly exposed to both benefits and risks of their use. While much of the existing research has focused on the academic effects of smartphone use, less attention is given to its' broader impacts on adolescents' overall wellbeing. This scoping review synthesises current evidence exploring the link between smartphone use and adolescents' wellbeing. Guided by Arksey and O'Malley's five-step framework, the Joanna Briggs Institute's manual for evidence synthesis, and the PRISMA-ScR checklist, this study identified and screened 230 articles from three electronic databases. Eighteen eligible studies originating from nine countries and employing diverse methodological approaches were thematically categorised according to the domains of wellbeing. Seven studies focused on mental health, while five studies each examined physical, emotional, and social aspects of adolescent wellbeing, illustrating the multifaceted impact of smartphone use. The findings indicate that excessive or unregulated use of smartphones is associated with a range of negative outcomes, including depression, anxiety, suicidal ideation, obesity, sleep disturbances, substance use, low self-esteem and self-worth, social anxiety, peer relationship challenges and feelings of loneliness. This study highlights the need for evidence-informed interventions to promote adolescents' awareness of healthy use of smartphones and to support their holistic wellbeing.

Keywords: adolescents; wellbeing; smartphones; scoping review; mental health

Introduction

Smartphone ownership is rapidly growing, with 86% of the Australian population expected to own a smartphone in 2026 (Hughes, 2023). The

Correspondence concerning this paper should be addressed to:

* Ph.D., University of Southern Queensland, Department of Education, Toowoomba, Australia. Address: No. 487-535 West Street, Toowoomba, Australia. E-mail: Saidat.Adeniji@unisq.edu.au

prevalence of smartphone usage necessitates investigating the impact of these devices, particularly with demographics more prone to high usage such as adolescents (Blahošová et al., 2024; Fischer-Grote et al., 2019). Since the COVID-19 pandemic, the levels of young people requiring different sorts of wellbeing support including mental health support has escalated to the point of being labelled a crisis (Alegría & Cheng, 2025). Poor wellbeing during adolescence can lead to school dropout, academic failure and lifelong effects (Geldard et al., 2019; Stelmach et al., 2022). Research suggests the relationship between adolescents and smartphones is complex and at times contradictory, with some research finding that smartphones allow for greater connectivity and support opportunities (Pardede et al., 2025; Rauschenberg et al., 2021), while others have found links to adverse effects on mental, physical and socio-emotional health (Hidayati, 2019; Lapierre et al., 2019; Marcos-Sánchez & Curto-Rodríguez, 2025; Murphy et al., 2022; Olenik-Shemesh, et al., 2023; Pereira et al., 2020; Zheng, 2022).

Despite existing literature on the impact of adolescents' smartphone use on specific aspects of wellbeing, no study has focused on synthesising evidence from the literature to address the impact of smartphones on multiple domains of adolescents' wellbeing. While there are meta-analysis review studies on the impact of smartphone use on adolescents' mental health (Girela-Serrano, 2024; Sohn et al., 2019), academic learning (Campbell et al., 2024), and physical health (Domoff et al., 2019), these studies do not consolidate findings pertaining to the complex and multidimensional nature of wellbeing. Additionally, there are meta-analyses that either examine the impact of specific technologies such as social media on adolescents' wellbeing (Bottaro & Faraci, 2022; Bozzola et al., 2022) or investigate broader topics such as the impact of multiple digital technologies on wider age ranges (Messena & Everri, 2023); however, these studies do not focus specifically on smartphones nor adolescents exclusively. Therefore, this study aims to synthesise evidence on the impact of adolescents' smartphone use on their wellbeing. The multifaceted nature of wellbeing demands a collation of information to understand how smartphones influence adolescents' wellbeing. Researching this demographic is important given the prevalence of use among adolescents and the various risks associated with their wellbeing. Additionally, wellbeing has been selected as the focal point of this research because there has been a significant push relating to wellbeing in education, evidenced by wellbeing-related initiatives, funding and new wellbeing-centred roles in schools (Clare & Grace, 2023; Department of Education, 2024).

This study aimed to identify key issues and gaps and present a comprehensive overview of how smartphones impact adolescents' wellbeing. This study validates Department of Education policies around the use of smartphones in schools, increasing teachers' and school leaders' confidence in these rulings moving forward. Schools and educators may draw from this collated evidence to endorse and promote processes designed to support adolescents with their smartphone usage, including implementing restricted

smartphone use for adolescents in schools. This research may also inform professionals working with adolescents on the need to consider ways to promote healthy smartphone use.

Background on adolescents and smartphone use

Adolescents' wellbeing

Wellbeing is a multifaceted construct that can be difficult to define (Gennings et al., 2021). Noble et al. (2023) suggest that when people consider wellbeing they may only reflect on singular elements, such as mental health or social connection, and not consider collectively the multiple facets of life that influence one's wellbeing. Gennings et al. (2021) state that "capturing the complexity of wellbeing requires a holistic approach" (p. 2). Researchers, frameworks and institutions have offered understandings of wellbeing that comprise mental, physical, emotional and social health factors (Australian Research Alliance for Children and Youth, 2024; Avedissian & Alayan, 2021; BeYou, 2024; Black Dog Institute, 2024; Cunsolo, 2017; Gennings et al., 2021; Noble et al., 2023; Ross et al., 2020). This multifaceted understanding of general wellbeing also applies to wellbeing for adolescents (Australian Research Alliance for Children and Youth, 2024; Gennings et al., 2021; Noble et al., 2023).

For this scoping review factors impacting adolescents' wellbeing were categorised within the physical, mental, emotional and social health domains. While wellbeing research or frameworks may identify other undoubtedly important domains of wellbeing, such as access to learning, safety and spiritual connection, the depth and aims of this scoping review necessitated a more condensed and focused examination of the impacts of smartphone use on adolescents' wellbeing (Australian Research Alliance for Children and Youth, 2024; Gennings et al., 2021; Matthews et al., 2014). The decision to focus on the mental, physical, emotional and social health components of wellbeing is also consistent with recognised understandings of wellbeing in Australia (BeYou, 2024; Black Dog Institute, 2024).

Adolescent development

For young people, adolescence is a time of critical development across multiple domains of the self (Schwarz, 2009). The arrival of physical change, new emotions and the desire for independence, coupled with a predisposition for risk-taking behaviours, may leave adolescents prone to maladaptive development, leading to mental, social, emotional and physical health problems, and thus affecting their overall wellbeing (Casey et al., 2008; Rapee et al., 2019).

A significant challenge adolescents face is emotional regulation, with Hollenstein and Faulkner (2024) suggesting this is more difficult for adolescents due to the significant changes they are experiencing. Inadequate emotional regulation may lead to more frequent experiences of negative emotions, which are risk factors for mental health disorders such as depression and anxiety (Larson & Sheeber, 2009). Larson and Sheeber (2009) note that adolescents are more likely to experience these negative emotions than both children and adults.

Adolescents place substantial importance on peer relationships, with peer influence and acceptance becoming one of their primary concerns (Hamshari et al., 2024; Rapee et al., 2019). With complex social navigation comes complex social issues such as feelings of loneliness, which has been associated with poor outcomes for both physical and mental health, particularly depression and suicidal ideation (Lapierre et al., 2019; Marcos-Sánchez & Curto-Rodríguez, 2025; Murphy et al., 2022; Olenik-Shemesh et al., 2023).

Evidence suggests that adolescents are also at great risk of physical health problems. Brodersen et al. (2007) found that adolescents are at greater risk of sedentary behaviour than children, which correlates with evidence from Ruiz et al. (2019) showing obesity is more prevalent in adolescents than children. Additionally, poor sleep is often associated with adolescence, which is seen to adversely impact both physical and mental health outcomes (Reiter & Rosen, 2014). This evidence suggests that the developmental stage of adolescence is complex. It also suggests the domains of wellbeing adolescents must navigate may influence one another, resulting in cyclical relationships. Therefore, developing understandings of how emerging factors, such as smartphones, impact wellbeing is of the utmost importance.

Adolescents' smartphone use

The prevalence of smartphone ownership in adolescence is high. The Royal Children's Hospital Melbourne (2017) reports that almost all teenagers own their own smartphone. This finding is in line with global trends, with a reported average of 90% of adolescents owning a smartphone in both the United States of America and Europe (Elavsky et al., 2022) at an average age of 11.7 years (Gómez et al., 2025). Elavsky et al. (2022) found that the majority of adolescents' digital experiences, both positive and negative, occur through a smartphone. Furthermore, adolescents are considered the heaviest users of smartphones of any age group (Marciano et al., 2022). Jiang et al. (2024) found that the majority of adolescents have a medium-to-high dependency on their smartphone. Xiao et al. (2025) also comment that the majority of adolescent smartphone users are either considered high-risk or addicted. Therefore, it appears adolescents are prone to problematic smartphone use.

Despite this high prevalence, how smartphone use influences adolescents is still an emerging field of study. Many researchers agree that more research is required to better understand this prominent technology (Campbell et al., 2024; Elavsky et al., 2022; Gómez et al., 2025). Therefore, attention to research on the effects of smartphone use on adolescents' wellbeing is imperative to support developing minds.

Smartphone use and adolescents' wellbeing

Previous research has found that prolonged use of smartphones throughout adolescence has the potential to harm adolescents' wellbeing (Dielin & Johannes, 2020). Findings show smartphones have adverse effects on adolescents' mental health (Lapierre et al., 2019; Pereira et al., 2020; Zheng, 2022). Zheng (2022) found smartphone addiction leads to an increased risk of

anxiety, depression and fear of missing out, with Lapierre et al. (2019) corroborating these concerns by suggesting smartphone dependency is a strong predictor of these mental health concerns. Thus, research shows smartphones can negatively impact adolescents' mental health outcomes.

Smartphone use is also seen to shape social norms, with Cookingham and Ryan (2015) suggesting social media smartphone apps serve as a "media super-peer", influencing adolescents' behaviours and attitudes. As adolescents increase their independence, access to unfiltered and unregulated information and content via their smartphones may lead to risky behaviours, both online and offline, which may negatively impact their social and emotional health. Cookingham and Ryan (2015) also emphasise the potential negative consequences of smartphone use on self-esteem, cyberbullying and peer relationships. Therefore, the quality of social interactions and risk of loneliness can be influenced by adolescents' smartphone usage (Cookingham & Ryan, 2015; Hidayati, 2019; Lapierre et al., 2019).

Additionally, excessive smartphone use can disrupt healthy eating habits and engagement in physical activity, leading to negative physical health consequences for adolescents (Brown et al., 2021; Murphy et al., 2022; Rosen et al., 2014). As physical health is a strong indicator of wellbeing, these findings further suggest that adolescents may be adversely affected by smartphone usage.

However, research conducted after the peak of the COVID-19 pandemic indicates potential positive effects of smartphone use for adolescents. Rimel et al. (2023) discovered that smartphones played an important role in lessening feelings of loneliness throughout the pandemic. Additionally, smartphone apps have allowed greater access to mental health support by creating safe spaces for adolescents to seek support (Rauschenberg et al., 2021; Rimel et al., 2023).

This evidence highlights the various types of impacts (physical, mental, social and emotional) of using smartphones on adolescents' wellbeing, emphasising both negative and positive effects. It confirms the need for research that collates findings pertaining to adolescents' wellbeing to better understand how this prominent and evolving piece of technology may influence them.

Objective

This study seeks to synthesise existing research evidence on how smartphone use influences adolescents' overall wellbeing across multiple domains including emotional, physical, social and mental aspects. Following a transparent scoping review approach guided by Arksey and O'Malley's framework, the Joanna Briggs Institute's guidelines and the PRISMA-ScR checklist, this study identifies key patterns, gaps and implications of promoting healthy smartphone use with a focus of supporting adolescents' holistic wellbeing. Specifically, this study aimed to answer the following research question: How does adolescents' smartphone usage influence their wellbeing?

Method

Scoping reviews, as defined by the Joanna Briggs Institute (JBI), are a systematic approach of identifying and mapping existing literature on a specific topic, concept or issue (Peters et al., 2020). This review employed Arksey and O'Malley's (2005) five-step framework, as it is considered an influential and valid methodology for scoping reviews (Peters et al., 2020). The steps are: 1) formulating the research question; 2) identifying relevant studies; 3) selecting studies; 4) charting the data; and 5) summarising and presenting the results. To ensure transparency and rigour, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and its extension for scoping reviews (PRISMA-ScR) was employed (Tricco et al., 2018). PRISMA-ScR was chosen as evidence-based, transparent and well-regarded for evidence synthesis (Paige et al., 2021; Peter et al., 2020).

Eligibility criteria

The inclusion criteria were developed by following the JBI guidelines, including participants, concept and context (Peters et al., 2020). The participants for this study were defined as adolescents. For this study, adolescents are young people aged 10-19, as defined by the World Health Organization (2024). This study focused on young people aged 10-19; though it did not exclude articles with participants aged 20-24, provided the median age of participants was between 10 and 19. Where an age range is not provided, studies needed to refer to school students, not college or university students; this was to capture the expected age range of Australian high school students, being 12-18 years (Australia Education, 2024).

The concepts important to this study are smartphones and wellbeing. The scope of this review was limited to research that examines the impact of smartphone use on adolescents' wellbeing. Throughout this review, the term "smartphone" refers to a handheld, portable device capable of calls, messaging and internet connection. This review analysed evidence that pertains to the wellbeing of adolescents. As stated above, this includes factors that align with mental, physical, emotional and social health (Australian Research Alliance for Children and Youth, 2024; Avedissian & Alayan, 2021; BeYou, 2024; Black Dog Institute, 2024; Cunsolo, 2017; Gennings et al., 2021; Noble et al., 2023; Ross et al., 2020).

This scoping review included original articles containing all categories of data collected from participants that pertain to the concepts outlined above. This review did not include articles that are meta-analyses such as systematic or scoping reviews. There was no restriction on the geographical area where the research was conducted.

Search strategy

To ensure a comprehensive search, a multi-step strategy aligned with JBI and PRISMA-ScR guidelines was employed. This included preliminary and pilot searches to refine search terms and select relevant databases for optimal results

(Peters et al., 2020). The initial search was guided by an expert research librarian from the authors' university to determine the suitability of the search. The following databases were used for this scoping review: EBSCOHost Megafire Ultimate, Scopus and PubMed. These databases, with their broad, scientific, medical and psychology focus and advanced search features, enabled a comprehensive search for research on smartphone use and adolescents' wellbeing. The full search strategy is documented in Figure 1.

Key concept #1	Key concept #2	Key concept #3	
	AND	AND	AND NOT
"Smartphone" OR "mobile phone" OR "iphone" OR "android phone"	Teenager* OR adolescen*	"Wellbeing" OR "mental health" OR "emotional health" OR "physical health" OR "social interactions" OR "relationships"	Adult* OR aged OR elderly

Figure 1. Search strategy

The literature searches across all three databases were conducted in January 2025, and various study designs were considered eligible if they contained data collected from adolescents, were peer-reviewed and original, with full text available online, and written in English. Filters were placed to include articles published in 2024. This is to ensure relevancy, recency and to encompass the rapid evolution of both technology and scoping review; as smartphones develop and change, so will the literature. Therefore, including the most recent evidence pertaining to this topic was crucial to remain as well-informed as possible. All included literature was required to be thematically relevant to the research question. While scoping reviews can include grey literature, this review focused solely on peer-reviewed articles to ensure objectivity and credibility (Peters et al., 2020).

Screening procedure

The PRISMA three-stage screening process was employed to evaluate all identified citations. At the initial stage, all citations were imported into EndNote and duplicates were removed. Subsequently, titles and abstracts were examined against the inclusion criteria, followed by a full-text review of selected articles to identify relevant themes. To reduce bias at the screening stage, two authors independently screened the articles and consensus was reached. References from these sources were also assessed and were included if they met the eligibility criteria; however, no additional publications were included. A narrative and visual representation of this process (as a PRISMA-ScR flow diagram) is provided in the results section (Figure 1) (Page et al., 2021; Tricco et

al., 2018). As a scoping review intends to gather existing evidence and provide a map of findings, the need for formal quality appraisal is unnecessary (Arksey & O'Malley, 2005). However, the authors relied on the credibility of peer-reviewed articles to ascertain the quality of the included articles.

Data charting / Extracting and analysis

To analyse the data, thematic analysis was employed due to its wide acceptability and use in qualitative and scoping review methodologies (Braun & Clarke, 2006). This method is recommended when research is investigating factors related to concepts (Elo & Kyngäs, 2008; Pollock et al., 2023). The identified themes were mental, physical, social and emotional health, which formed the framework for data extraction and analysis. Therefore, a deductive approach was used for this scoping review which included preparation and immersion in the data, extraction and organisation of data, and synthesising, presenting and reporting the data (Elo & Kyngäs, 2008; Pollock et al., 2023). To facilitate data extraction, a charting table was created. Following JBI guidelines, the following were extracted from each included article: (1) author/s; (2) country; (3) study aim/s; (4) study design; (5) study participants; (6) outcome measures; and (7) key findings of studies related to identified categories, author-identified limitations and implications (Peters et al., 2020). This data extraction and analysis process ensured a comprehensive understanding of the current literature pertaining to adolescents' use of smartphones and its influence on their wellbeing.

Results

The three database searches resulted in a total of 230 articles. For the first stage of the screening procedure, 67 duplicate records were identified and removed, leaving 163 articles to be assessed. Both title and abstract were screened for each article, which led to 129 studies being excluded. The reasons for the exclusion of 129 articles were having the wrong participants, such as an age range outside of adolescence, or being unrelated to the research question – for example, investigating a unidirectional relationship between an element of wellbeing and an adolescent's smartphone use; how a parent's smartphone use influences an adolescent's behaviour. This screening process results in a total of 35 studies meeting the eligibility criteria for full-text retrieval. One article could not be retrieved due to access issues. Once retrieved, these full texts were independently reviewed and eligibility for inclusion was confirmed for 18 articles for the final review (see Figure 2). The reasons for the exclusion of 16 articles were the same as the reasons for excluding articles at the title and abstract screening stage.

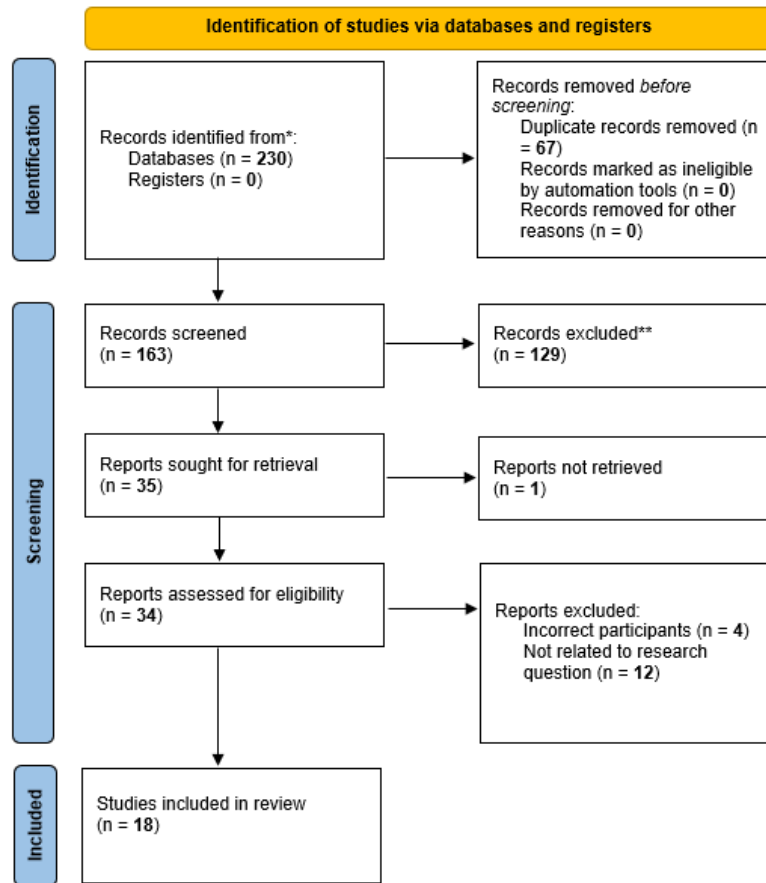


Figure 2. PRISMA flow diagram

Characteristics of included studies

This scoping review included studies conducted in 9 different countries: Canada (n=1), China (n=6), Ghana (n=1), Iran (n=1), Mexico (n=1), Palestine (n=1), South Korea (n=4), Turkey (n=1), and United States of America (n=2). Across the 18 articles, a range of different study designs were used, including cross-sectional (n=8); longitudinal in various forms including a retrospective cohort study, parallel latent growth model, cross-lagged panel model and within person intensive (n=8); machine learning (n=1); weekly diary (n=2); and ecological momentary assessment (n=1). The total number of study designs is 20; this is because two included articles used two different study designs within their research.

To address this scoping review's research question, findings relating to adolescents' smartphone use and its potential impact on mental (n=7), physical (n=5), emotional (n=5) and social health (n=5), as they pertain to their wellbeing, will be presented. The total number of findings (n=22) is larger than the number of included articles because some articles contained themes relating to two

domains of adolescents' wellbeing. A visual presentation of the key findings is provided in Figure 3.

The influence of adolescents' smartphone usage on their mental health

Seven studies presented findings on how adolescents' smartphone use impacts their mental health. These studies investigated how adolescents' smartphone usage influenced depression, anxiety and suicidal behaviours. While all studies found a negative relationship between adolescents' smartphone use and mental health, there were mixed results regarding the nature of this connection, with some studies finding direct relationships (Cha & Lee, 2024; Deng et al., 2024; Faryabi et al., 2024; Hamshari et al., 2024; Oh & Heo, 2024), while others found indirect relationships (Sarman & Çiftci, 2024; Wei, Chu et al., 2024).

Several studies investigated the link between adolescents' smartphone usage and depression (Cha & Lee, 2024; Deng et al., 2024; Hamshari et al., 2024; Oh & Heo, 2024; Sarman & Çiftci, 2024). Hamshari et al. (2024) examined how electronic devices may influence depression and anxiety in adolescents, reporting that 92.9% of participants used a smartphone and that less time on smartphones was associated with lower likelihood of depression. Cha and Lee's (2024) retrospective cohort study, through a secondary analysis of data taken from the Korean Children and Youth Panel Survey, found that higher smartphone dependence is linked to a higher risk of an adolescent experiencing depression. Among a similar demographic, also using secondary data (Korean Youth Risk Behaviour Web-Based Survey), Oh and Heo (2024) also discovered that smartphone overdependence positively predicts depression. Additionally, they found that an overdependence on smartphones predicts suicidal ideation and planning (Oh & Heo, 2024). This evidence confirms findings from Deng et al. (2024) that smartphone addiction can predict depression in adolescents, and, through the mediation of depression, internalised aggression is linked to smartphone addiction. Internalised aggression in this study was defined as non-suicidal self-harm. Sarman and Çiftci (2024) highlighted an indirect link between adolescents' smartphone addiction and depression, suggesting that, while there is no significant relationship between smartphone addiction and depression, the longer an adolescent spends on a smartphone correlates with greater risk of developing depression.

Faryabi et al. (2024) reported no statistically significant relationship between smartphone use and adolescent depression, noting this differed from other studies. However, Faryabi et al. (2024) did find a bidirectional relationship between adolescents' smartphone usage and anxiety. Two other studies investigated how smartphone use may influence anxiety in adolescents (Hamshari et al., 2024; Wei, Chu et al., 2024). In addition to their findings on depression, Hamshari et al. (2024) also found that higher electronic device use correlates with a higher risk of anxiety. Wei, Chu et al. (2024) found that problematic smartphone use has a negative relationship with state core self-

evaluation (self-worth or self-esteem) which, in turn, predicts anxiety symptoms in adolescents.

The influence of adolescents' smartphone usage on physical health

The included articles identified four areas of physical health that are impacted by adolescents' smartphone use: sleep, obesity, substance use and self-harm. Firstly, Lee and Chun (2024) employed machine learning using nine models to identify factors that contribute to obesity in Korean adolescents. They found that 44% of the models identified smartphone overdependence as a risk factor for overweight and obese adolescents, and one model found that duration of time on a smartphone is a strong predictor of obesity. Secondly, Olivares-Guido et al. (2024) determined that sleep issues are related to problematic smartphone use and, while other factors may contribute to this, smartphone usage is the strongest factor. Thirdly, Mohammed et al. (2024) discovered substance use, meaning harmful use of substances including alcohol and illicit drugs, and owning and using a smartphone are significantly related. Oh and Heo (2024) echoed the findings of these studies by suggesting that high use of smartphones predicts unhealthy lifestyle choices for adolescents, including poor diet, low physical activity, problematic sleep habits and substance use. Finally, as mentioned in the previous subsection, Deng et al. (2024) found that smartphone addiction, through the mediating factor of depression, has a relationship with internalised aggression, or non-suicidal self-harm. Overall, these studies found that adolescents' smartphone use negatively impacts their physical health.

The influence of adolescents' smartphone usage on emotional health

Regarding emotional health, three key themes were common among the research findings: self-evaluation, self-regulation and mood. As stated above, Wei, Chu et al. (2024) discovered that problematic smartphone use has a negative association with state core self-evaluation, which is related to self-worth and self-esteem, and therefore to emotional health. Zhang et al. (2024) also found that problematic smartphone use impacts adolescents' self-worth and self-esteem through competency frustration, one of three psychological need frustration domains. This study also discovered that problematic smartphone use has a bidirectional relationship with autonomy frustration, which can negatively influence an adolescent's ability to self-regulate. Xiao et al. (2025) found that high smartphone use is associated with lower emotional self-regulation.

Conversely, two studies conducted in the United States of America using real-time data found that smartphone use has no negative impact on adolescents' mood; it in fact improves their mood during and after use (Minich & Moreno, 2024; Rodman et al., 2024). Minich and Moreno (2024), through their in-situ ecological momentary assessment study, suggest that adolescents may use their smartphone to modify their mood.

The influence of adolescents' smartphone usage on social health

Like emotional health, three key themes were common among research findings pertaining to social health: relationships, loneliness and social anxiety.

Wei, Dang et al. (2024) discovered that smartphone addiction is associated with, and is a strong predictor for, both social anxiety and interpersonal problems. Lee et al. (2024) echoed findings related to interpersonal problems by investigating the link between smartphone dependence and negative peer relationships and social withdrawal. While this study found no relationship between smartphone dependence and social withdrawal, it did discover that smartphone dependence increases negative peer relationships (Lee et al., 2024).

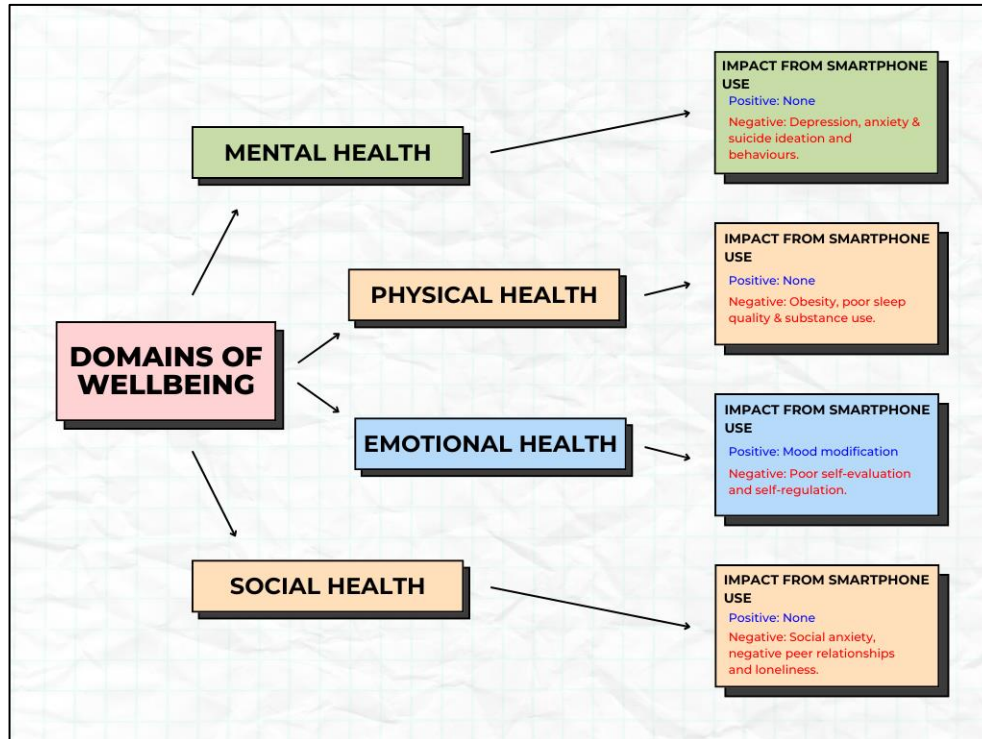


Figure 3. Synthesis of findings on the impact of smartphone use on adolescents' wellbeing

Lastly, four studies presented indirect findings related to loneliness (Hu & Xiang, 2024; Sarman & Çiftci, 2024; Zhang et al., 2024; Zhao et al., 2024). Similarly to their findings regarding adolescents' smartphone use and its relationship to depression, Sarman and Çiftci (2024) found that smartphone addiction does not predict loneliness; however, the amount of time spent on a smartphone correlates with loneliness. The indirect impact of smartphone usage on loneliness is also seen in findings from Zhao et al. (2024) that problematic smartphone use inconsistently predicts loneliness; this finding was more consistent for particular demographics within the study - girls (53.5% of participants) and junior high school students (66.07% of participants). Hu and Xiang (2024) also reported inconsistent findings on loneliness. In their longitudinal study, they found smartphone addiction does not influence trait loneliness (long-term loneliness), but in a weekly diary study, they found that

smartphone addiction predicts state loneliness (short-term loneliness). Finally, Zhang et al. (2024) discovered that there is no direct relationship between problematic smartphone use and relatedness frustration (feeling of connection with others and sense of belonging). As stated in the previous subsection, this study did find a relationship between problematic smartphone use and competency frustration. Zhao et al. (2024) note that there may be an indirect link between problematic smartphone use and relatedness frustration.

Discussion

The findings from this scoping review show that adolescents' smartphone use influences their wellbeing. This is based on results from the reviewed studies revealing the impacts of adolescents' smartphone use on the four identified domains of wellbeing: mental, social, emotional and physical health. Many reviewed articles emphasise the problems of overdependence and addiction to smartphones, although it is imperative to understand that all adolescents are at risk of problematic smartphone use (Jiang et al., 2024; Wei, Dang et al., 2024; Xiao et al., 2025). As this scoping review synthesises the impact of adolescents' smartphone use on their wellbeing, the findings from the included studies help answer the research question.

The domain with the most substantial findings regarding the impact of adolescents' smartphone use was mental health. Specific mental health conditions identified were depression, anxiety and suicidal ideation (Cha & Lee, 2024; Deng et al., 2024; Faryabi et al., 2024; Hamshari et al., 2024; Oh & Heo, 2024). The most concerning of these mental health issues is suicidal ideation. Oh and Heo (2024) found that smartphone overdependence positively predicts suicide-related behaviours, with Deng et al. (2024) also finding that smartphone addiction is associated with self-harm. Research has found that there is a significant relationship between self-harm and suicide attempts (Duarte et al., 2020). As suicide is one of the leading causes of adolescent death, this negative influence on adolescents from smartphone use is of high concern (Bilsen, 2018).

Clearly there is also a negative impact of adolescents' smartphone use on their physical health. There is a direct correlation between physical health and overall wellbeing (Murphy et al., 2022). Therefore, when an adolescent's sleep, diet and physical activity are negatively influenced by their smartphone habits, they are adversely affecting their overall wellbeing (Lee & Chun, 2024; Olivares-Guido et al., 2024; Oh & Heo, 2024). Research has established that poor physical health can exacerbate mental, emotional and social health issues in adolescents (Martin, 2011; Murphy et al., 2022; Palmer et al., 2018). Interestingly, Mohammed et al. (2024) discovered that smartphone ownership and usage among adolescents is a significant predictor of substance use. Mohammed et al. (2024) comment that other studies have reported similar findings pertaining to social media use and substance use, but there is no mention of other studies that discuss smartphone ownership as a factor that contributes to substance use

among adolescents. Another study by Haug et al. (2015), conducted in Sweden, found that smartphone addiction has no association with alcohol and tobacco consumption. Therefore, future research may need to investigate this potential impact further.

Studies on the influence of adolescents' smartphone use on their emotional health reported mixed results. On one hand, problematic smartphone use has strong associations with self-regulation and self-evaluation (Wei, Chu et al., 2024; Xiao et al., 2025; Zhang et al., 2024). Poor self-regulation and negative self-evaluation can result in the experience of negative emotions and have the potential to lead to further wellbeing-related issues such as impulse control, depression and anxiety, and poor life satisfaction (Menefee et al., 2022; Zhang et al., 2022). On the other hand, two studies found that smartphone use is associated with mood improvement among adolescents (Minich & Moreno, 2024; Rodman et al., 2024). These findings present a contrasting perspective regarding how adolescents' smartphone use may influence their wellbeing through the concept of mood modification. This suggests adolescents could strategically use their phones to support their emotional health. Of importance though is the study size for Rodman et al. (2024), with only 26 participants. Future research regarding mood modification through smartphone use among adolescents should aim to increase the range of participants to test replicability. Furthermore, considering that both studies were conducted in the United States of America, it would perhaps be beneficial to discover whether studies in other geographical areas have similar findings.

Despite findings related to social health discovering inconsistencies and indirect links between adolescents' smartphone use and loneliness, there is still a clear negative impact on adolescents' social health upon analysis. Wei, Dang et al. (2024) and Lee et al. (2024) found that smartphone addiction results in negative peer relationships and interactions. As adolescents are significantly concerned with the quality of peer relationships, negative peer interactions are likely to have adverse effects on their friendships, therefore impacting their feelings of connection and belonging (Hamshari et al., 2024; Rapee et al., 2019). Furthermore, negative peer relationships are likely to lead to loneliness (Chiao et al., 2022; Vanhalst et al., 2014). Hu and Xiang (2024) found that loneliness influences smartphone usage and therefore a potential cycle between loneliness and smartphone use might exist. This can be explained when considering Sarman and Çiftci's (2024) suggestion that duration of smartphone use among adolescents can predict loneliness; these findings share similarities with Hu and Xiang's (2024) finding that short-term loneliness is influenced by smartphone addiction. Zhao et al. (2024) reported inconsistent results on the relationship between loneliness and smartphone use, but suggested loneliness was prevalent among the junior high school participants in the study. It is imperative to note that junior high school participants made up two thirds of the total number of participants; therefore, most participants were experiencing loneliness due to smartphone addiction. Therefore, these inconsistent and indirect links still shed

light on how smartphone use among adolescents has the potential to influence their social health.

Finally, of interest were the recommendations regarding interventions targeted towards adolescents to support healthy, regulated use of smartphones. The majority of the included articles (n=14) explicitly comment that the implications of their research include the need for development of education and intervention programs to support the reduction of smartphone use and to raise awareness of the risks associated with problematic smartphone use (Cha & Lee, 2024; Faryabi et al., 2024; Hamshari et al., 2024; Hu & Xiang, 2024; Lee & Chun, 2024; Lee et al., 2024; Mohammed et al., 2024; Oh & Heo, 2024; Olivares-Guido et al., 2024; Sarman & Çiftci, 2024; Wei, Chu et al., 2024; Xiao et al., 2025; Zhang et al., 2024; Zhao et al., 2024). This shared commentary on the implications of the findings is clear evidence of the risk associated with adolescents using smartphone on their wellbeing. Considering the significantly high proportion of Australian adolescents who own a smartphone, the recommendation from this research is to embed programs with these central themes within the Australian Curriculum (Royal Children's Hospital Melbourne, 2017). As the "Away for the Day" policy designed to reduce distractions from mobile devices by the Queensland Government (Department of Education, 2023) - evolves, intervention programs should be created to ensure that educators, parents and students receive support and education regarding smartphone regulation.

Conclusions

This scoping review has presented findings relating to the influence of adolescents' smartphone use on the multifaceted nature of their wellbeing. Based on the literature review, this paper is the first to synthesise findings relating to multiple domains of adolescents' wellbeing. Results substantiate a pattern of influence on adolescents' wellbeing that is clearly negative. Though some findings suggest that adolescents may use smartphones to positively influence their mood, most findings link adolescents' smartphone use to adverse effects on their wellbeing. This is observed through impacts on their mental health, with smartphone usage being a predictor of depression, anxiety and, most concerning, suicidal behaviours; social health, through increases in social anxiety, poor peer interactions and loneliness due to smartphone overdependence; physical health, with smartphone use being a significant factor in adolescent obesity, poor sleep quality and substance use; and emotional health, with both self-evaluation and self-regulation having a negative relationship with problematic smartphone use. Therefore, adolescents are at risk of negatively impacting their wellbeing due to excessive smartphone habits. The adverse impact on adolescents' wellbeing confirms the need for intervention and education programs to support adolescents' understanding of smartphone use-related issues, and to reduce smartphone dependence.

Practical implications

The findings from this review highlight the urgent need for parental, policymakers and coordinated educational interventions that could develop healthy use of smartphones amidst adolescents. This study provided evidence to support that unregulated smartphone use by adolescents negatively influences their social, emotional, physical and mental wellbeing which underscores the importance of creating structured digital literacy programs in schools. Mental health professionals, parents of adolescents and educators should collaborate to integrate digital citizenship and wellbeing monitoring into the curricula, so that adolescents could have balanced online engagement, emotional awareness and self-regulation. There should be campaign on screen time boundaries and appropriately modelling positive smartphone behaviors. This study reinforces the ecological and biopsychosocial perspectives (Engel, 1977) of adolescent development and advances theoretical discourse by highlighting how smartphone dependence may explain the unmet wellbeing needs of adolescents. Based on this, context-specific frameworks could be developed to regulate smartphone accessibility, support evidence-based public health initiatives and encourage healthy digital environments. Overall, this review provides a foundation for multiple stakeholders to promote the holistic wellbeing of adolescents in this digital era.

Limitations and future research directions

This scoping review had several limitations. Firstly, the geographical scope could have been more diverse. Though several regions were represented, the majority of the included studies were from China and South Korea; therefore, the findings may represent specific data relating to cultural nuances. There was no representation from Australia, the country of origin for this research project, which may limit the application of the findings in Australia. Secondly, the breadth of wellbeing could be extended for future research, as this scoping review did not include other components, such as safety, spirituality and academic success, that are referred to within some wellbeing research and frameworks. This review attempted to research the most agreed upon and relevant domains associated with adolescents' wellbeing, but there might be other areas which adolescents' smartphone use could impact. Thirdly, as this scoping review only included academic articles, the inclusion of grey literature may add another layer of depth to the findings. Lastly, the eligibility criteria for included publications stipulated that research must be published in a journal from 2024 onwards. Though this decision aimed to include the most recent and emerging findings pertaining to the topic, it enforced a strict date range which possibly limited the breadth of the research.

Future research should examine precisely what regulated smartphone use looks like to ensure interventions are evidence based and consistent. Furthermore, studies related to adolescents' smartphone usage and its impact on their wellbeing need to be conducted in Australia. It is important for Australian parents, educators and policy makers to understand the implications of

smartphone usage for Australian adolescents, capturing the nuances of Australian contexts.

Ethics statement

This study uses secondary data available online, hence, no ethical clearance was required.

Conflicts of interest

The authors declare no conflict of interest.

Author contributions

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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References

- Alegría, M., & Cheng, M. (2025). Understanding and Improving Mental Health in Adolescence and Youth. In A.R. Weil *Ed.* Addressing the child and adolescent Mental Health Crisis, 31. Aspen Institute. <https://www.aspeninstitute.org/wp-content/uploads/2025/06/Report-Addressing-the-Child-and-Adolescent-Mental-Health-Crisis.pdf#page=40>
- Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*, 8(1), 19-32. <https://doi.org/10.1080/1364557032000119616>
- Australia Education. (2024). *Australian school academic year, curriculum and costing*. <https://www.australiaeducation.info/k12/academic-year.html>
- Australian Research Alliance for Children and Youth. (2024). *What's in the nest?* <https://www.aracy.org.au/wp-content/uploads/2024/10/Whats-In-The-Nest-2024-Update.pdf>
- Avedissian, T., & Alayan, N. (2021). Adolescent well-being: A concept analysis. *International Journal of Mental Health Nursing*, 30(2), 357-367.
- Bilsen, J. (2018). Suicide and youth: Risk factors. *Frontiers in Psychiatry*, 9, 540-540. <https://doi.org/10.3389/fpsy.2018.00540>
- Black Dog Institute. (2024). *Wellbeing*. <https://www.blackdoginstitute.org.au/resources-support/wellbeing/>
- Bottaro, R., & Faraci, P. (2022). The use of social networking sites and its impact on adolescents' emotional well-being: A scoping review. *Current Addiction Reports*, 9(4), 518-539. <https://doi.org/10.1007/s40429-022-00445-4>

- Bozzola, E., Spina, G., Agostiniani, R., Barni, S., Russo, R., Scarpato, E., ...Corsello, G. (2022). The use of social media in children and adolescents: Scoping review on the potential risks. *International Journal of Environmental Research and Public Health*, 19(16), Article 9960. <https://doi.org/10.3390/ijerph19169960>
- Brodersen, N. H., Steptoe, A., Boniface, D. R., & Wardle, J. (2007). Trends in physical activity and sedentary behaviour in adolescence: Ethnic and socioeconomic differences. *British Journal of Sports Medicine*, 41(3), 140-144. <https://doi.org/10.1136/bjsm.2006.031138>
- Blahošová, J., Tancoš, M., Cho, Y. W., Šmahel, D., Elavsky, S., Chow, S. M., & Lebedíková, M. (2024). Examining the Reciprocal Relationship Between Social Media Use and Perceived Social Support Among Adolescents: A Smartphone Ecological Momentary Assessment Study. *Media Psychology*, 28(1), 70-101. <https://doi.org/10.1080/15213269.2024.2310834>
- Campbell, M., Edwards, E. J., Pennell, D., Poed, S., Lister, V., Gillett-Swan, J., ... Nguyen, T.-A. (2024). Evidence for and against banning mobile phones in schools: A scoping review. *Journal of Psychologists and Counsellors in Schools*, 34(3), 242-265. <https://doi.org/10.1177/20556365241270394>
- Casey, B. J., Getz, S., & Galvan, A. (2008). The adolescent brain. *Developmental Review*, 28(1), 62-77. <https://doi.org/10.1016/j.dr.2007.08.003>
- Chiao, C., Lin, K.-C., & Chyu, L. (2022). Perceived peer relationships in adolescence and loneliness in emerging adulthood and workplace contexts. *Frontiers in Psychology*, 13, 1-9.
- Clare, J., & Grace, G. (2023). *Boost for student wellbeing in Queensland schools*. Ministers' Media Centre. <https://ministers.education.gov.au/clare/boost-student-wellbeing-queensland-schools>
- Cunsolo, S. (2017). Subjective wellbeing during adolescence: A literature review on key factors relating to adolescent's subjective wellbeing and education outcomes. *Studi Sulla Formazione*, 20(1), 81-94.
- Department of Education. (2024). *Wellbeing workforce*. <https://alt-qed.qed.qld.gov.au/working-with-us/wellbeing-workforce>
- Domoff, S. E., Borgen, A. L., Foley, R. P., & Maffett, A. (2019). Excessive use of mobile devices and children's physical health. *Human Behavior and Emerging Technologies*, 1(2), 169-175. <https://doi.org/10.1002/hbe2.145>
- Duarte, T. A., Paulino, S., Almeida, C., Gomes, H. S., Santos, N., & Gouveia-Pereira, M. (2020). Self-harm as a predisposition for suicide attempts: A study of adolescents deliberate self-harm, suicidal ideation, and suicide attempts. *Psychiatry Research*, 287, Article 112553. <https://doi.org/https://doi.org/10.1016/j.psychres.2019.112553>
- Edwards, B. (2014). *Growing up in Australia: The Longitudinal Study of Australian Children*. Australian Institute of Family Studies. https://aifs.gov.au/sites/default/files/fm95a_0.pdf

- Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, 62(1), 107-115. <https://doi.org/10.1111/j.1365-2648.2007.04569.x>
- Fischer-Grote, L., Kothgassner, O. D., & Felnhofer, A. (2019). Risk factors for problematic smartphone use in children and adolescents: a review of existing literature. *Neuropsychiatrie*, 33(4), 179-190.
- Geldard, K., Geldard, D., & Foo, R. Y. (2019). *Counselling adolescents: The proactive approach for young people* (5th ed.). Sage.
- Gennings, E., Brown, H., & Hewlett, D. (2021). Constructing a definition: Adolescent wellbeing from the perspective of the child and expert. *International Journal of Wellbeing*, 11, 69-88.
- Girela-Serrano, B. M., Spiers, A. D., Ruotong, L., Gangadia, S., Toledano, M. B., & Di Simplicio, M. (2024). Impact of mobile phones and wireless devices use on children and adolescents' mental health: A systematic review. *European Child & Adolescent Psychiatry*, 33(6), 1621-1651. <https://doi.org/10.1007/s00787-022-02012-8>
- Gómez, P., Nogueira-López, A., Liñares, D., Salmerón-Ruiz, M. & Rial-Boubeta, A. (2025). Age of smartphone access: implications for problematic internet use and online risk behaviors, *Anales de Pediatría*, 103(2).
- Haug, S., Castro, R. P., Kwon, M., Filler, A., Kowatsch, T., & Schaub, M. P. (2015). Smartphone use and smartphone addiction among young people in Switzerland. *Journal of Behavioral Addictions*, 4(4), 299-307. <https://doi.org/10.1556/2006.4.2015.037>
- Hidayati, D. (2019). *Smartphone addiction and loneliness in adolescent*. Proceedings of the 4th ASEAN Conference on Psychology, Counselling, and Humanities, 304, 345-350. <https://doi.org/10.2991/acpch-18.2019.84>
- Hollenstein, T., & Faulkner, K. (2024). Adolescent digital emotion regulation. *Journal of Research on Adolescence*, 34(4), 1341-1351. <https://doi.org/10.1111/jora.13009>
- Hughes, C. (2023). *Smartphone penetration rate as share of the population in Australia in 2017 with an estimate until 2026*. Statista. <https://www.statista.com/statistics/321477/smartphone-user-penetration-in-australia/>
- Jiang, M., Ding, W., Wang, X., & Xie, R. (2024). Longitudinal patterns of adolescent mobile phone dependence: Results from the person-centered approach. *Journal of Applied Developmental Psychology*, 92, 101650. <https://doi.org/10.1016/j.appdev.2024.101650>
- Lapierre, M. A., Zhao, P., & Custer, B. E. (2019). Short-term longitudinal relationships between smartphone use/dependency and psychological well-being among late adolescents. *Journal of Adolescent Health*, 65(5), 607-612. <https://doi.org/10.1016/j.jadohealth.2019.06.001>
- Larson, R. W., & Sheeber, L. B. (2009). The daily emotional experience of adolescents: Are adolescents more emotional, why, and how is that related

- to depression. In N.B. Allen & L.B. Sheerber (Eds.), *Adolescent emotional development and the emergence of depressive disorders*, 11-32. Cambridge University press.
- Marcos-Sánchez, R., & Curto-Rodríguez, R. (2025). Mental Health and the Use of internet-mobile Phones in Adolescents. *European Public & Social Innovation Review*, 10, 1-18. <https://doi.org/10.31637/epsir-2025-2104>
- Martin, K. (2011). *Electronic overload: The impact of excessive screen use on child and adolescent health and wellbeing*. Department of Sport and Recreation.
- Matthews, N., Kilgour, L., Christian, P., Mori, K., & Hill, D. M. (2014). Understanding, evidencing, and promoting adolescent well-being: An emerging agenda for schools. *Youth & Society*, 47(5), 659-683. <https://doi.org/10.1177/0044118X13513590>
- Menefee, D. S., Ledoux, T., & Johnston, C. A. (2022). The importance of emotional regulation in mental health. *American Journal of Lifestyle Medicine*, 16(1), 28-31. <https://doi.org/10.1177/15598276211049771>
- Messena, M., & Everri, M. (2023). Unpacking the relation between children's use of digital technologies and children's well-being: A scoping review. *Clinical Child Psychology and Psychiatry*, 28(1), 161-198.
- Murphy, J., McGrane, B., White, R. L., & Sweeney, M. R. (2022). Self-esteem, meaningful experiences and the rocky road-contexts of physical activity that impact mental health in adolescents. *International Journal of Environmental Research and Public Health*, 19(23), Article 15846.
- Olenik Shemesh, D., Heiman, T., & Wright, M. F. (2023). Problematic Use of the Internet and Well-Being among Youth from a Global Perspective: A Mediated-Moderated Model of Socio-Emotional Factors. *The Journal of Genetic Psychology*, 185(2), 91-113.
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*, 372. <https://doi.org/10.1136/bmj.n71>
- Palmer, C. A., Oosterhoff, B., Bower, J. L., Kaplow, J. B., & Alfano, C. A. (2018). Associations among adolescent sleep problems, emotion regulation, and affective disorders: Findings from a nationally representative sample. *Journal of Psychiatric Research*, 96, 1-8.
- Pardede, S., Pardede, D. L., & Pardede, L. (2025). Exploring Smartphone Use and Learning Behaviors among Senior High School Students: Insights from a Developing Region in Indonesia. *Open Journal of Educational Research*. <https://doi:10.31586/ojer.2025.6099>
- Pereira, F. S., Bevilacqua, G. G., Coimbra, D. R., & Andrade, A. (2020). Impact of problematic smartphone use on mental health of adolescent students: Association with mood, symptoms of depression, and physical activity. *Cyberpsychology, Behavior, and Social Networking*, 23(9), 619-626. <https://doi.org/10.1089/cyber.2019.0257>

- Peters, M. D. J., Marnie, C., Tricco, A. C., Pollock, D., Munn, Z., Alexander, L., ... Khalil, H. (2020). Updated methodological guidance for the conduct of scoping reviews. *JBIM Evidence Synthesis*, 18(10), 2119-2126. <https://doi.org/10.11124/jbies-20-00167>
- Pollock, D., Peters, M. D. J., Khalil, H., McInerney, P., Alexander, L., Tricco, A. C., ... Munn, Z. (2023). Recommendations for the extraction, analysis, and presentation of results in scoping reviews. *JBIM Evidence Synthesis*, 21(3), 520-532. <https://doi.org/10.11124/JBIES-22-00123>
- Rapee, R. M., Oar, E. L., Johnco, C. J., Forbes, M. K., Fardouly, J., Magson, N. R., & Richardson, C. E. (2019). Adolescent development and risk for the onset of social-emotional disorders: A review and conceptual model. *Behaviour Research and Therapy*, 123, Article 103501. <https://doi.org/10.1016/j.brat.2019.103501>
- Rauschenberg, C., Schick, A., Goetzl, C., Roehr, S., Riedel-Heller, S. G., Koppe, G., Reininghaus, U. (2021). Social isolation, mental health, and use of digital interventions in youth during the COVID-19 pandemic: A nationally representative survey. *European Psychiatry*, 64(1), 1-16.
- Reiter, J., & Rosen, D. (2014). The diagnosis and management of common sleep disorders in adolescents. *Current Opinion in Pediatrics*, 26(4), 407-412. <https://doi.org/10.1097/MOP.0000000000000113>
- Ross, D. A., Hinton, R., Melles-Brewer, M., Engel, D. M. C., Zeck, W., Fagan, L., Mohan, A. (2020). Adolescent well-being: A definition and conceptual framework. *Journal of Adolescent Health*, 67, 472-476.
- Royal Children's Hospital Melbourne. (2017). *Young children owning smartphones is the new normal*. https://www.rchpoll.org.au/wp-content/uploads/2017/05/20170621_Young-Children-Owning-Smartphones-is-the-new-normal-2017_MR.pdf
- Ruiz, L. D., Zuelch, M., Dimitratos, S. M., & Scherr, R. E. (2019). Adolescent obesity: Diet quality, psychosocial health, and cardiometabolic risk factors. *Nutrients*, 12(1), Article 43. <https://doi.org/10.3390/nu12010043>
- Sawyer, S. M., Azzopardi, P. S., Wickremarathne, D., & Patton, G. C. (2018). The age of adolescence. *Lancet Child and Adolescent Health*, 2(3), 223-228. [https://doi.org/10.1016/s2352-4642\(18\)30022-1](https://doi.org/10.1016/s2352-4642(18)30022-1)
- Schwarz, S. W. (2009). *Adolescent mental health in the United States*. National Centre for Children in Poverty. https://www.nccp.org/wp-content/uploads/2009/06/text_878.pdf
- Sohn, S. Y., Rees, P., Wildridge, B., Kalk, N. J., & Carter, B. (2019). Prevalence of problematic smartphone usage and associated mental health outcomes amongst children and young people: A systematic review, meta-analysis and GRADE of the evidence. *BMC Psychiatry*, 19, 1-10.
- Stelmach, R., Kocher, E. L., Kataria, I., Jackson-Morris, A. M., Saxena, S., & Nugent, R. (2022). The global return on investment from preventing and treating adolescent mental disorders and suicide: A modelling study. *BMJ Global Health*, 7(6). <https://doi.org/10.1136/bmjgh-2021-007759>

- Vanhalst, J., Luyckx, K., & Goossens, L. (2014). Experiencing loneliness in adolescence: A matter of individual characteristics, negative peer experiences, or both? *Social Development*, 23, 100-118.
- World Health Organization. (2024). *Adolescent health*. <https://www.who.int/health-topics/adolescent-health>
- Zhang, Q., Miao, L., He, L., & Wang, H. (2022). The relationship between self-concept and negative emotion: A moderated mediation model. *International Journal of Environmental Research and Public Health*, 19(16). <https://doi.org/10.3390/ijerph191610377>
- Zheng, S. (2022). Psychological well-being and smartphone use among college students. *PEOPLE: International Journal of Social Sciences*, 8(1), 199-212. <https://doi.org/10.20319/pijss.2022.81.199212>

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