

Social media use and youth mental health and well-being: a systematic review of longitudinal and experimental evidence

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Abstract

This review synthesises longitudinal and experimental evidence on social media use and well-being or mental health among adolescents and emerging adults, identifying 55 studies from 4,188 records through a PRISMA-based process (41 longitudinal and 14 experimental studies).

Overall, the evidence does not support a single uniform association between social media use and poorer mental health across all young people: findings based on time- or frequency-based measures are mixed, often small, and sensitive to modelling choices, while reverse or bidirectional pathways remain plausible in some contexts.

More consistent associations are found for problematic or dysregulated use, negative consequences, and harmful online experiences, although these measures also require cautious interpretation where they overlap conceptually with distress or impairment.

Experimental evidence is informative for short-run, mechanism-linked outcomes, particularly appearance-related self-evaluative outcomes; evidence for FoMO is more conditional, and broader symptom changes are less consistent across studies and intervention designs.

For policy, approaches focused only on reducing time online are likely to be imprecise unless they also consider dysregulated engagement, harmful online experiences, and specific risk pathways such as social comparison, appearance pressures and sleep disruption.

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Executive summary

Policy context

This report was prepared by the JRC's Survey Methods and Analysis Centre (SMAC) for DG EAC within the MISMAW¹ administrative agreement on social media and adolescent well-being. It supports ongoing EU work on youth mental health, school well-being and digital environments by clarifying what longitudinal and experimental evidence can indicate about links between social media use and well-being. Its added value is to focus on designs more informative for temporal ordering and plausible effects, rather than summarising cross-sectional associations. The report informs next steps in MISMAW, including survey development, pilot work and potential interventions, with relevance also for broader youth, health and online-safety policy discussions.

Key conclusions

The review indicates that policy approaches based solely on reducing time spent on social media are likely to be too imprecise for the current evidence base. Across the included studies, more consistent associations are observed for problematic or dysregulated use, harmful online experiences, and mechanism-linked pathways such as social comparison and appearance-related pressures. However, these findings should be interpreted with caution, particularly where exposure measures overlap conceptually with distress or impairment.

The evidence does not support a single uniform relationship between social media use and mental health. Associations based on time or frequency alone are mixed, often small, and sensitive to modelling choices. In some studies, reverse or reciprocal relationships remain plausible, with mental health also predicting subsequent patterns of use. Differences across developmental stages and baseline vulnerability further limit generalisation.

For policy, the findings support more targeted approaches. These include improving monitoring of risk-relevant patterns of engagement and online harms, informing survey and pilot design, and testing focused behavioural interventions rather than relying on broad assumptions about all use. At the same time, important uncertainties remain. Much of the evidence relies on self-reported exposure, experimental studies are concentrated in older adolescents and short follow-up periods, and some outcomes of policy relevance remain less studied.

Overall, the review clarifies where the evidence is relatively more consistent, where it remains weaker, and which areas require further data collection and analysis.

Main findings

What was reviewed?

Using a PRISMA-based process, the review identified 55 empirical studies (41 longitudinal and 14 experimental), with priority given to these designs as they are better suited than cross-sectional approaches to assessing temporal ordering and short-run effects.

¹ MISMAW stands for *Measuring the Impact of Social Media on Adolescent Well-being*.

What do the studies suggest?

Findings based on time or frequency of use are mixed. Some studies report prospective associations with poorer well-being or internalising symptoms, but these are often small, heterogeneous, or sensitive to modelling choices. More consistent associations are observed for problematic or dysregulated use, negative consequences and harmful online experiences, although interpretation requires care where measures overlap with distress or impairment.

Experimental evidence is most informative for short-run, mechanism-linked outcomes such as social comparison, self-evaluation and appearance-related well-being. Broader changes in distress or well-being are reported in some interventions, but results are less uniform and may depend on compliance, substitution effects and intervention design.

What are the main limits?

The evidence base is heterogeneous and often relies on self-reported exposure. Experimental studies are concentrated in older adolescents and short follow-up periods, and some outcomes, including sleep and more severe mental health indicators, are less densely covered.

Related and future Joint Research Centre work

This review supports JRC work on adolescent well-being and digital environments, including survey design, pilot validation and potential interventions under MISMAW. It also contributes to broader Commission work on youth mental health, school well-being and safer online environments. A related review, “Digital engagement and academic performance outcomes of children, adolescents and young adults: a PRISMA-guided systematic review emphasizing longitudinal and experimental evidence” (Vlachos et al., 2026), provides complementary insights into how digital behaviours affect academic performance. These reports inform evidence-based EU policymaking.

Quick guide

The relationship between social media and young people’s well-being is not straightforward, partly because “social media use” can refer to time online, specific behaviours, problematic use or harmful online experiences. This review focuses on adolescents and prioritises longitudinal and experimental studies, as these are more informative than cross-sectional research for assessing direction and possible effects. It follows a PRISMA-based search and narrative synthesis. Important uncertainties remain around measurement, reliance on self-reported use, short follow-up periods, and uneven evidence across ages and outcomes.

1. Introduction

This review first outlines the policy relevance of social media and youth mental health and well-being, then summarises what existing evidence shows, and finally explains the methodological scope of this review, which prioritises longitudinal and experimental studies to strengthen interpretation for policy and research use.

1.1. Why social media and youth mental health is a policy priority

Mental health in adolescence is increasingly recognised as a major public health and development concern, with consequences for educational trajectories, social participation, and later-life health. In its flagship report on child and adolescent mental health, UNICEF estimates that more than 13% of adolescents aged 10–19 live with a diagnosed mental disorder (as defined by the World Health Organization) and highlights the scale of unmet need worldwide (UNICEF, 2021). Because mental disorders are underdiagnosed and under-treated in many settings, estimates based on diagnosed disorders likely understate true prevalence, especially in low-resource contexts. This global estimate can mask substantial variation across regions and income contexts, and this matters when interpreting evidence. The same report underlines the severity of the burden for a minority of young people: it estimates that 45,800 adolescents die from suicide each year, and notes that suicide is the fifth leading cause of death among 10-19 year-olds (and the fourth among 15-19 year-olds) (UNICEF, 2021). These indicators motivate sustained policy attention to adolescent well-being and to those environments and behaviours that may contribute to risk or resilience.

At the same time, adolescents' everyday social lives have been reshaped by the widespread diffusion of smartphones and social media platforms. The U.S. Surgeon General's Advisory characterises social media use among young people as nearly universal, reporting that up to 95% of youth aged 13-17 in the United States use a social media platform, and that more than a third report using social media "almost constantly" (Office of the Surgeon General, 2023). The advisory also notes that social media use begins earlier for many children, reporting that nearly 40% of children aged 8-12 use social media. In Europe, central Asia and Canada, the international Health Behaviour in School-aged Children (HBSC) study provides complementary cross-national monitoring. The HBSC 2021/2022 international report on social media use and gaming describes a school-based survey conducted across 44 countries and regions, tracking self-reported behaviours and outcomes among adolescents aged 11, 13 and 15 (Boniel-Nissim et al., 2024). The most recent report highlights growth in indicators intended to capture dysregulated engagement, noting that problematic social media use² increased from 7% in 2018 to 11% in 2022 (Boniel-Nissim et al., 2024).

Using the Centers for Disease Control and Prevention (CDC) nationally representative 2023 Youth Risk Behavior Survey, Young and coauthors estimate how common frequent social media use is

² Throughout this review, "problematic social media use" refers to a pattern of dysregulated, compulsive, or impairing engagement that captures loss of control, salience, conflict, withdrawal-like discomfort, and functional interference with sleep, school, or relationships. It is typically operationalised through validated scales such as the Social Media Disorder Scale (Van den Eijnden et al., 2016) or the Bergen Social Media Addiction Scale (Andreassen et al., 2016) and is conceptually distinct from time- or frequency-based exposure measures. Because some scales include items close to distress or functional impairment, prospective associations with mental health outcomes should be interpreted with care.

among U.S. high school students and how it relates to bullying, low mood, and suicide risk (Young et al., 2024). About 77% report using social media several times a day or more, and frequent use is associated with higher prevalence of in-person and online bullying, persistent sadness/hopelessness, and some suicide-risk indicators, with differences across demographic groups. The CDC's YRBS Data Summary & Trends Report: 2013–2023 emphasises marked disparities in adolescent health indicators and notes that female students are faring more poorly than male students across almost all measures of substance use, experiences of violence, mental health, and suicidal thoughts and behaviours (CDC, 2024). Together, these monitoring and advisory documents situate adolescent mental health and social media use as intersecting policy concerns. Overall, exposure to social media is common and often intense, mental health burdens are substantial, and vulnerable subgroups may face increased risk.

In light of these facts, the scientific question is not simply whether social media is “good” or “bad,” but under what conditions it may support connection and well-being or instead increase stressors, sleep disruption, social comparison pressures, or exposure to harmful interactions. As some authorities point out, much of the available research has not been designed to establish temporal ordering or causal effects in a changing digital ecosystem (U.S. Surgeon General, 2023; UNICEF, 2021). This motivates careful synthesis of research designs that are best positioned to address directionality and reduce bias, alongside a transparent discussion of what can and cannot be concluded from the broader literature.

Against this backdrop, research on adolescent social media use and mental health has expanded quickly, alongside a large public and policy debate about potential harms and benefits. However, much of the empirical base remains correlational and cross-sectional, limiting interpretation because observed associations may reflect reverse causality or unmeasured confounding. The present review therefore focuses on longitudinal and experimental evidence, which is better suited to assess temporal ordering and plausible effects. Even these stronger designs do not fully resolve residual confounding, measurement error, short follow-up windows, or limits to external validity, especially where exposures remain broad or interventions are brief.

1.2. What we know from existing literature

A substantial body of systematic reviews, meta-analyses, and umbrella reviews has already summarised associations between social media use (and related constructs such as screen time or problematic use) and adolescent mental health. A consistent message across these syntheses is that average associations tend to be small and heterogeneous, with conclusions depending on how exposure is defined (e.g., time/frequency, active vs passive use, platform-specific behaviours, or problematic/dysregulated use), how outcomes are operationalised, and on the balance of study designs in the evidence base. For example, in an umbrella review of reviews published between 2019 and mid-2021, Valkenburg and coauthors identified a series of relevant meta-analyses, systematic reviews, and narrative reviews, and reported that most reviews interpreted associations between social media use and mental health as “weak” or “inconsistent,” while a smaller subset described the evidence as more substantial or harmful (Valkenburg et al., 2022). This pattern, widespread public and policy debate alongside mixed and often modest empirical associations, has shaped both the research agenda and the demand for clearer causal evidence. However, because these reviews necessarily synthesise evidence across heterogeneous study designs, they are less suited to isolate what the literature can support in terms of temporal ordering and causal interpretation.

Meta-analytic work further indicates that findings differ meaningfully depending on the exposure construct (i.e., whether social media engagement is operationalised as time/frequency, specific behaviours, or problematic/dysregulated use). In a large systematic review with meta-analyses on social media use, mental health, and sleep among “young individuals,” Ahmed and coauthors reported high heterogeneity in primary-study findings and found small but statistically significant positive associations between social media use and both depression and anxiety in pooled analyses (Ahmed et al., 2024). Importantly, they also reported that problematic social media use showed clearer and stronger patterns, as it was positively associated with depression, anxiety and sleep problems, and negatively with well-being. This distinction aligns with a broader conceptual shift in the literature from treating social media exposure as simple time spent to operationalising it in terms of use patterns, experiences, motivations, and dysregulated engagement (Verduyn et al., 2017; Shannon et al., 2022; Valkenburg et al., 2022).

Other review work focused on longitudinal studies reinforces a central limitation of the broader evidence base: much of the literature remains cross-sectional, which constrains interpretation of directionality and causal inference. Course-Choi and Hammond’s (2021) narrative review of longitudinal studies highlighted that distinguishing the type of social media engagement (rather than frequency alone) may be more informative for understanding associations with well-being. They also noted important limitations in the longitudinal literature itself, including the frequent use of self-reported and non-validated exposure measures and limited attention to conditional effects and moderators. Relatedly, Tang and colleagues reviewed longitudinal evidence on screen time and internalising symptoms and argued that the hypothesis that screens underlie rising mental health problems has been “primarily based” on cross-sectional findings. They concluded that associations with subsequent depressive symptoms were small to very small, with limited evidence for reverse associations and weaker or inconsistent longitudinal links for other internalising outcomes (Tang et al., 2021).

Other reviews focused on longitudinal designs highlight that evidence is also uneven across outcomes, with stronger attention for some domains than others. For severe outcomes, the systematic review and meta-analysis of longitudinal studies on screen-based activities and self-harm/suicidal behaviours by Chen et al. (2024) found that total screen use and cyberbullying victimisation were associated with subsequent self-harm and suicidal outcomes. Subgroup analyses also suggested positive associations for social media use and problematic/addictive screen use, but these estimates were based on a small number of studies and should be interpreted cautiously. While this strengthens the case that certain digital exposures may matter for very relevant outcomes, it also illustrates that the most policy-relevant questions often require designs that can address temporality and confounding. Unfortunately, such designs remain less prevalent than simpler cross-sectional studies.

Finally, Agyapong-Opoku and colleagues’ scoping review of reviews explicitly notes the inconsistency in findings and aims to clarify patterns, discrepancies, and gaps in the accumulated review literature, pointing to the need for more informative study designs and better measurement to resolve contested conclusions (Agyapong-Opoku et al., 2025).

Existing reviews document the breadth of the literature, highlight heterogeneity, and point to constructs (notably problematic or dysregulated use) and subgroups that may be especially consequential. These studies flag a methodological bottleneck: cross-sectional dominance and measurement inconsistencies limit causal interpretation and complicate translation into actionable policy guidance. The present review aims to respond to this demand by systematically synthesising evidence from longitudinal and experimental studies, which are better positioned to address

temporal ordering and strengthen causal inference. In addition, existing reviews have rarely integrated experimental and longitudinal evidence within the same framework, which makes this design-focused synthesis particularly useful for identifying where findings converge, where they diverge, and what remains uncertain.

2. Methods and scope

2.1. Overview

This literature review synthesises empirical evidence on the relationship between social media use (and closely related digital exposures) and well-being or mental health outcomes among adolescents and emerging adults. We followed the PRISMA 2020 framework (Page et al., 2021) to document the search strategy, screening process, eligibility assessment, and final inclusion decisions. Given the heterogeneity in exposure definitions, outcome domains, and analytical approaches, we conducted a narrative synthesis with a pre-specified emphasis on evidence with greater inferential power in terms of temporal ordering and confounding control.

Figure 1 presents the PRISMA flow diagram. Searches were conducted in two databases and identified a total of 4,188 records from Scopus (N=2,312) and PubMed/MEDLINE (N=1,876). After eliminating duplicates (N=971) and removing records for other reasons (N=130), 3,087 records remained for title/abstract screening. At this stage, 2,752 records were excluded applying pre-defined criteria in terms of design, exposure and outcome measures. Full texts were sought for 335 reports; one report could not be retrieved (N=1). 334 reports were assessed at full text and 279 were excluded for not meeting the pre-specified criteria, leaving 55 studies included in the evidence base.

This reduction is intentional and reflects the review's design-focused scope rather than a lack of relevant literature. The objective of the included evidence base is not to summarise all published associations, but to prioritise studies that are suited to address temporal ordering, confounding, and, for experiments, short-run causal effects, as these issues are central for policy interpretation. Cross-sectional studies and review papers remain informative for field mapping and hypothesis generation, but they were not the focus of the included evidence because they provide more limited information on directionality.

2.2. Eligibility criteria

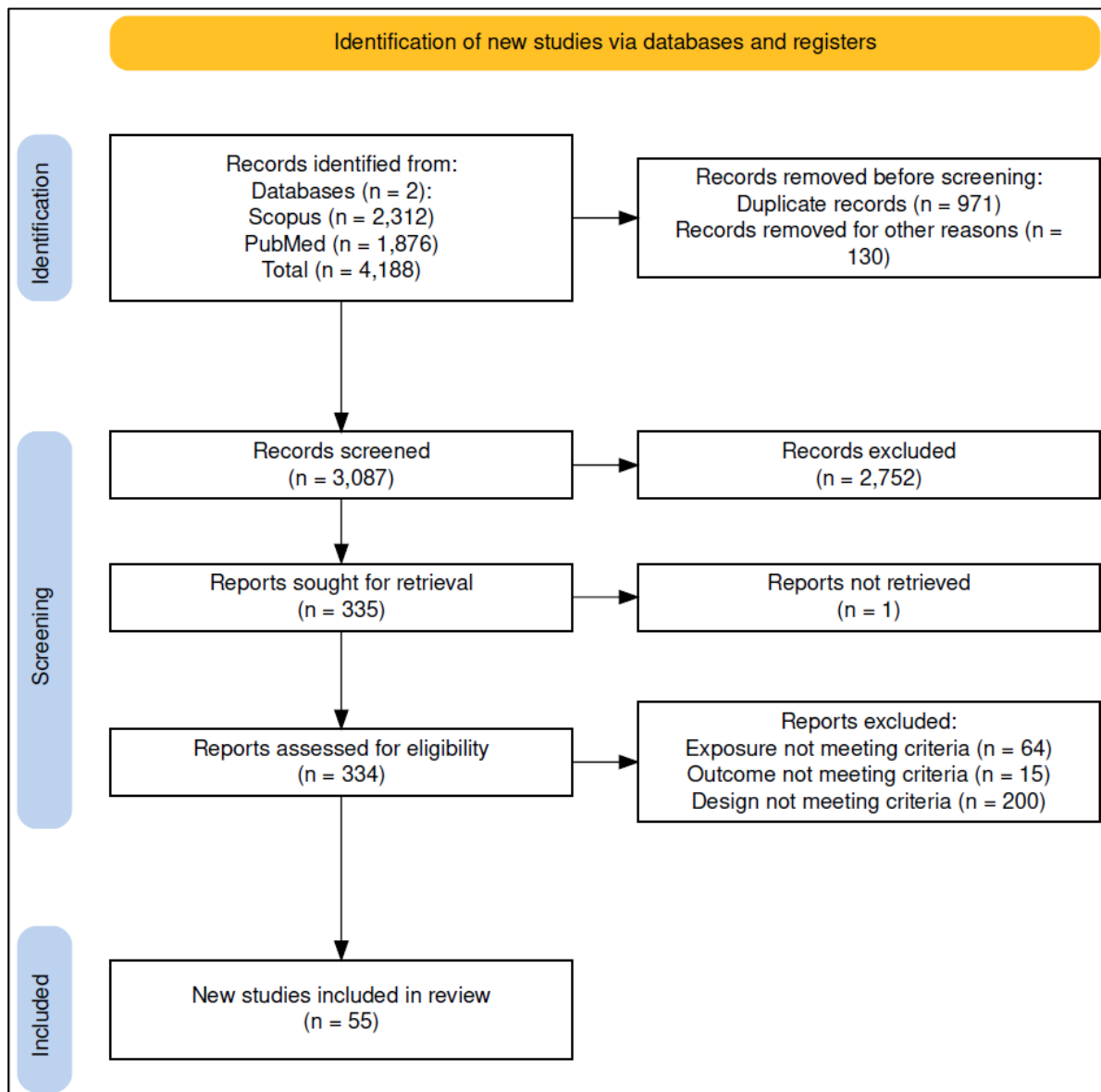
Eligibility criteria were applied at title/abstract screening and full-text assessment. The population of interest comprised adolescents and emerging adults. While the review prioritised adolescence (approximately ages 10–19), late-adolescent and emerging-adult samples (including university student samples) were eligible when the design was strong and exposure and outcome measurement were sufficiently specific and interpretable, particularly to retain experimental evidence that is disproportionately concentrated in late-adolescent and university samples.

Eligible exposure measures included self-reported or objectively tracked social media use (e.g., time, frequency, platform-specific engagement, and behaviourally specific indicators such as active/passive use or appearance-based activities). Broader measures of screen time or digital technology use were eligible only when social media was explicitly included in the measure or when the exposure clearly captured social-media relevant engagement (e.g., social networking use rather than general device use). Studies operationalising problematic or compulsive forms of use (e.g., problematic social media use, compulsive smartphone use) were eligible when the construct was clearly defined and interpretable.

Eligible outcomes captured well-being and mental health, preferably assessed with validated instruments. Outcomes included depressive and anxiety symptoms, psychological distress, internalising/externalising problems, self-esteem, loneliness and social connection, life

satisfaction/well-being, and self-harm/suicidality. The evidence base included only empirical quantitative studies; literature reviews and meta-analyses identified in the searches were used for field mapping but were not eligible for inclusion.

Figure 1. PRISMA flow diagram.



Source: authors' own elaboration following the PRISMA methodology by Haddaway et al. (2022).

2.3. Information sources and search strategy

We searched Scopus and PubMed/MEDLINE³ for peer-reviewed studies published in English between 2010 and 2025. To balance coverage with feasibility and to support a structured synthesis, we ran three complementary query families in each database: (i) literature reviews/meta-analyses, (ii) longitudinal/panel/cohort studies, and (iii) experimental studies (including randomised and closely related designs). The literature reviews/meta-analyses query stream was used primarily for field mapping and framing the state of the evidence, whereas the longitudinal and experimental query streams were used to identify studies eligible for inclusion. Search strings combined terms capturing social media and closely related digital exposures (including screen time and problematic-use constructs where relevant), adolescent/emerging-adult populations, and well-being/mental health outcomes. The full database-specific search strings are reported verbatim in Annex 1. The final search was run on 1 December 2025.⁴ Screening and extraction followed the pre-specified criteria described below.

Table 1. Eligibility criteria.

Population	Adolescents (10–19) and emerging adults when design/measurement are strong (including university samples).
Exposure	Social media specific measures; broader digital/screen measures only when clearly social media relevant.
Outcomes	Well-being and mental health outcomes, preferably via validated instruments.
Design	Longitudinal (≥ 2 waves) and experimental/randomised designs (plus clearly justified quasi/natural experimental designs).
Timeframe	2010–2025.
Language	English.
Publication type	Peer-reviewed quantitative empirical studies.

Source: authors' own elaboration.

2.4. Study selection and record management

Records retrieved from each database were exported and consolidated prior to screening. Before title/abstract screening, records missing a DOI were removed and de-duplication was applied across sources. In total, duplicates removed before screening accounted for N=971 records and records removed for other reasons, such as missing a DOI, accounted for N=130. The remaining 3,087 records were screened on title/abstract against the eligibility criteria. To support consistency and reduce single-reviewer error, a random sample of approximately 20% of title/abstract records was double-screened independently by two reviewers. Inter-rater agreement was quantified using

³ We did not add APA PsycINFO at this stage because it was expected to substantially increase screening volume with high overlap and a larger share of designs outside the review's focus.

⁴ One study (Smout et al.) was identified as an accepted manuscript in late 2025 and subsequently received a 2026 publication date.

Cohen's κ and was substantial ($\kappa = 0.78$). Any disagreements at title/abstract or full-text stage were resolved through discussion against the pre-specified eligibility criteria, with a third reviewer consulted in cases that could not be resolved by consensus.

Full texts were sought for 335 reports and one report could not be retrieved. The remaining 334 reports were assessed at full text. At full-text stage, 279 reports were excluded for three pre-specified reasons: exposure measures not meeting criteria (N=64), outcome measures not meeting criteria (N=15), and design not meeting criteria (N=200). The final evidence base comprised 55 studies.

2.5. Inclusion criteria and appraisal approach

To prioritise evidence with stronger inferential value, studies were identified using three dimensions: design quality, exposure measurement quality, and outcome measurement quality. This emphasis is particularly important in the literature connecting social media and well-being because simple cross-sectional associations cannot distinguish whether social media use precedes changes in well-being, whether poorer well-being predicts later changes in use, or whether both reflect shared underlying factors. Prioritising longitudinal designs with stronger confounder control and experimental designs therefore improves the review's ability to inform policy-relevant questions about directionality and plausible effects.⁵ In terms of design, priority was given to longitudinal studies with temporal ordering (≥ 2 waves) and appropriate control for confounding (e.g., robust covariate adjustment and, where available, within-person approaches), as well as experimental studies including randomised trials and closely related designs. In terms of exposure measurement, priority was given to more specific and/or validated measures of social media engagement, including platform or behaviour-specific indicators and objective/device-logged measures where available. Broader problematic use constructs were retained when clearly defined and conceptually distinguishable from outcome measures. In terms of outcomes, priority was given to validated well-being and mental health instruments and clinically oriented assessments where available. The review includes a core set of adolescent-focused studies and a set of late-adolescent/emerging-adult studies retained to strengthen the experimental evidence base and to support interpretation across the transition into young adulthood.

2.6. Quality assessment

We assessed methodological quality and risk of bias using design-specific, standard tools. A summary table can be found in Annex 3. Quality appraisal was conducted independently by two reviewers using the design-appropriate tool, with disagreements resolved through discussion against the tool's domain definitions and a third reviewer consulted in cases that could not be resolved by consensus. For randomised studies, we used the Cochrane Risk of Bias 2 (RoB 2; Sterne et al., 2019) framework, assessing bias across the domains of randomisation, deviations from intended interventions, missing outcome data, outcome measurement, and selection of the reported result, and deriving an overall outcome-level judgement. For longitudinal observational studies, we used the Joanna Briggs Institute (JBI; Barker et al., 2025) Critical Appraisal Checklist for Cohort

⁵ One included study (Hoare et al., 2020) was retained because it informs reverse-direction/selection pathways by examining whether childhood/adolescent mental-health status is associated with adolescent social media use and other health behaviours.

Studies, focusing on comparability of groups, exposure and outcome measurement, confounding, baseline outcome handling, follow-up adequacy, attrition, and statistical analysis. To avoid over-penalising this literature, self-reported mental health/well-being outcomes were not treated as high risk by default when validated instruments were used; instead, ratings reflected the broader risk context (e.g., blinding, attrition, confounding control, and analytic handling). For non-randomised intervention studies and natural experiments we used ROBINS-I (Risk Of Bias In Non-randomised Studies — of Interventions; Sterne et al., 2016), assessing bias across confounding, selection of participants, classification of interventions, deviations from intended interventions, missing data, outcome measurement, and selection of the reported result.

Quality appraisal showed a broadly consistent pattern across designs. Among the randomised controlled trials (RCTs) formally appraised using the Cochrane Risk of Bias 2 (RoB 2) tool, most had some concerns and one was high risk, mainly because of attrition and missing-data handling. Among the longitudinal studies formally appraised using the JBI cohort checklist, most were rated as 'some concerns', with recurring limitations concentrated in self-reported exposure measurement (social media or screen-time), confounding control, and attrition or follow-up completeness. Among the two quasi-experimental designs appraised using ROBINS-I, one was rated low risk overall, while the other was rated moderate risk overall.

Quality appraisal informed the interpretation and weighting of evidence in the synthesis, but no study was excluded solely on the basis of quality appraisal after eligibility had been established through the PRISMA-based screening process.

2.7. Data extraction

For each included study, we extracted information on study design and analytical approach, country, sample size, age group and follow-up, exposure operationalisation, outcome operationalisation, key findings, and relevant information for the quality appraisal. Extracted information is summarised in the table of evidence (Annex 2).

2.8. Synthesis approach

Given the heterogeneity in exposure definitions, outcome domains, and modelling approaches, we synthesised evidence narratively rather than pooling effects in a single meta-analytic estimate. We structured the synthesis so that results are organised by study design family (experimental versus longitudinal), by exposure operationalisation (time-based measures versus behaviour/experience-based measures versus problematic/compulsive constructs), and by outcome domain (for example, depression/anxiety, well-being/life satisfaction, loneliness, and self-harm-related outcomes). Where relevant, we highlight patterns of heterogeneity (e.g., by sex/gender or baseline risk) and distinguish evidence that primarily informs reverse-direction pathways or broader digital-use constructs from evidence that directly addresses the main question of social media use in relation to well-being and mental health. Where studies differed substantially in inferential capacity or measurement quality, these differences were made explicit in the synthesis and taken into consideration when drawing conclusions.

In practice, the Results section starts by presenting the main definitions and exposure/outcomes operationalisations (subsection 3.1) and is then organised primarily by study-design family (experimental and intervention evidence in subsection 3.2; longitudinal and intensive-longitudinal evidence in subsection 3.3). Subsection 3.4 presents syntheses by mechanism, and 3.5, by consistency across designs and measures. Finally, subsection 3.6 summarises the results by

outcome domain, integrating findings across the two design strands. The Discussion (section 4) then interprets these patterns in relation to mechanisms, heterogeneity, and policy translation.

3. Results

3.1. Evidence base and operationalisation of core constructs

3.1.1. Definitions

With respect to the exposure measures that will be discussed, we distinguish between:

1. time/intensity measures of social media use (e.g., hours/minutes per day, or frequency of checking/use).
2. behavioural/experiential measures (e.g., active vs passive engagement, appearance-focused use, social comparison, online social interaction).
3. problematic or dysregulated use measures (i.e., scales capturing loss of control and/or impairment, such as interference with sleep, school/work functioning, relationships, or emotional regulation).⁶
4. adverse online experiences (e.g., cyberbullying, harassment, exposure to harmful content).

Outcome measures are grouped into:

1. internalising symptoms (e.g., depressive and anxiety symptoms, distress)
2. subjective well-being (e.g., life satisfaction, affect, well-being)
3. social connectedness (e.g., loneliness, perceived social support)
4. sleep-related outcomes
5. self-harm/suicidality

3.1.2. Included studies

The evidence base comprises 55 empirical studies included after PRISMA-guided screening (Figure 1; table of evidence in Annex 2). This evidence base is small relative to the wider screened literature because relatively few studies use designs that can address temporal ordering and confounding in ways that support stronger interpretation. The evidence base is anchored in longitudinal designs and complemented by randomised trials, laboratory and field experiments, and a small number of quasi-experiments. Across the included evidence, samples primarily cover adolescence, with an retained subset of late adolescents and emerging adults, including university samples, where design and measurement quality are strong and directly relevant to the review's objectives.

The longitudinal studies permit assessment of temporal ordering and reciprocal pathways, while the experimental strand offers short-run causal leverage through direct manipulation or exogenous exposure shifts. Much of this evidence is still concentrated in brief intervention windows and, for randomised studies, more frequently in older youth or student samples.

⁶ Note that some problematic-use scales include items that are close to distress or functioning, so interpretation requires care to avoid conflating exposure with outcome-like features.

Table 2. Composition of the evidence by design, outcome, geography and publication.

Design	Number of studies
Longitudinal cohort/panel	39
RCT/cluster-RCT	10
Lab experiment	2
Quasi-experiment	2
Experience Sampling Method (ESM)	1
Combined longitudinal + ESM	1
Primary outcome domain⁷	
Depression/anxiety/internalising	42
Well-being/life satisfaction	7
Self-evaluation/body image	3
Sleep/self-harm/eating	2
Loneliness/FoMO ⁸	1
Geography	
Europe	27
USA/Canada	17
Australia/New Zealand	5
East Asia	3
Other/multi-country	3
Publication period	
2022–2025	33
2019–2021	16
≤2018	6

Source: authors' own elaboration.

3.1.3. Exposure operationalisation

The included studies operationalise social media exposure using several recurring families of measures, which are not equivalent in what they capture.

⁷ Provided that many studies include multiple outcomes, this table only reports the dominant one.

⁸ FoMO stands for *Fear of Missing Out*.

Global social media use and time/intensity exposure measures are common, typically measured by means of self-reporting in terms of duration (hours/day) or frequency (e.g., very frequent use). In the experimental literature, time becomes a manipulable target (e.g., caps on minutes/day or short breaks), and several trials document adherence using phone-based tracking or screenshots. A smaller set of longitudinal observational studies incorporates more structured approaches (e.g., time-use diary methods or time-allocation modelling), which strengthens interpretability by making time trade-offs explicit.

Behavioural and experience-oriented measures capture how young people engage (e.g., activity styles, engagement patterns) rather than how much. These measures are more directly aligned with proposed mechanisms such as social comparison, feedback-seeking, and passive consumption, but they are operationalised heterogeneously across studies.

Problematic or dysregulated use constructs treat exposure as an impairment pattern rather than a volume metric (e.g., problematic social media use scales, dependence-like symptoms, or measures emphasising negative consequences). These constructs are analytically distinct from time spent and, in the included studies, they tend to show closer associations with distress and well-being outcomes (and, in some scales, may partly incorporate outcome-related content).

A practical implication for this synthesis is that “social media use” should be treated as a family of exposures (e.g., volume or time, engagement style, dysregulated or problematic use, harmful online experiences) rather than a single indicator. Several included studies illustrate that different exposure constructs can yield different conclusions even when applied to similar outcomes.

3.1.4. Outcome operationalisation

The included studies span a broad outcome space, with three dominant clusters.

First, outcomes related to internalising symptoms and psychological distress (including depression, anxiety and general distress) are most frequent, typically assessed using validated self-report scales or brief screeners. Second, outcomes capturing positive functioning and global well-being (e.g., mental well-being, life satisfaction) appear in a substantial subset, sometimes via multi-item instruments and sometimes via pragmatic survey items in large cohorts. Third, a set of outcomes targets psychosocial functioning, including self-esteem, loneliness and social connectedness, and appearance-related well-being (body image and appearance or weight esteem).

A smaller but high-salience subset addresses self-harm and suicidality, and a small number of studies include sleep outcomes explicitly. Finally, an important strand addresses appearance-related and eating-risk outcomes, where measurement tends to be more specific and experimental evidence is comparatively informative.

3.2. Experimental and intervention evidence

3.2.1. Overview of intervention designs and exposure verification

The experimental evidence base comprises 14 studies spanning randomised trials, short laboratory or field experiments, and quasi-experiments, predominantly conducted in late adolescents and emerging adults, including university samples and targeted samples with elevated distress. Most randomised studies use convenience samples rather than population-representative cohorts; external validity to younger adolescents and to more diverse contexts is therefore constrained. Interventions vary in the degree to which they directly manipulate “use” of social media:

- Time-limitation or restriction interventions, where participants are asked to cap or reduce social media or smartphone use for a defined period (Thai et al., 2024; Davis and Goldfield, 2025; Collis and Eggers, 2022; Faulhaber et al., 2023; Brailovskaia et al., 2020; Pieh et al., 2025; Hunt et al., 2023).
- Short breaks or abstinence designs, where participants stop or strongly reduce use over a short window (Smith et al., 2024).
- Hybrid or engagement-condition interventions, including designs that combine time limits with changes to the social media environment or experimentally manipulate brief exposure conditions (Hunt et al., 2023; de Valle and Wade, 2022; Kohler et al., 2021; Barry et al., 2024).
- Content-curation and literacy interventions, aimed at the quality of social media exposure rather than total time (de Valle and Wade, 2022; Gordon et al., 2021; Hunt et al., 2023).
- Quasi-experimental designs, which exploit exogenous shifts in platform availability rather than randomised assignment (Braghieri et al., 2022), alongside one pre-post observational study conducted around the first COVID-19 lockdown (Marciano et al., 2022).

A notable strength of this strand is the comparatively frequent use of exposure verification. Several trials document behaviour change via device-logged screen-time records or screenshot-based verification of phone settings, reducing reliance on retrospective self-report for exposure change. Across the randomised and laboratory studies, intervention windows range from 10-20 minute sessions and one-week breaks to multi-week interventions, with some studies including follow-up beyond the immediate post-test. Sample sizes range from 38 to approximately 1,100 participants; trials are conducted across diverse national contexts including Canada, the United States, Germany, Austria, Denmark, China, the Netherlands, and Australia. The two quasi-experiments extend coverage by exploiting exogenous shifts in platform access or broader social conditions. Follow-up windows are often short relative to adolescent development, positioning trial evidence as most informative about short-run responsiveness and proximal outcomes rather than longer-run developmental effects.

3.2.2. Effects on internalising symptoms and global well-being

Across trials and quasi-experiments, effects on broad symptom outcomes (depressive symptoms, anxiety, distress) and global well-being are reported in some studies but are not uniform. Several interventions that reduce use or target problematic engagement report improvements in mental-health indicators over the intervention period. Pieh et al. (2025) reports short-run improvements in depressive symptoms, stress, sleep quality, and well-being after reducing total smartphone screen time, but no significant effects on anxiety, disordered eating, or body appreciation. Hunt et al. (2023) found that limiting use reduced depression primarily among participants with higher baseline depression, while adding Instagram muting and TikTok abstinence produced the clearest FoMO reductions among highly depressed participants and reduced social comparison more generally. Faulhaber et al. (2023) reports broader improvements across several domains. Davis and Goldfield (2025) extend this evidence to a population of distressed youth specifically recruited on the basis of elevated anxiety or depression symptoms. In a randomised controlled trial, participants were assigned either to reduce smartphone-based social media use to a maximum of one hour per day for three weeks or to continue as usual. Social media use was measured objectively via daily smartphone screen-time screenshots. Compared to the control group, the intervention group showed significantly greater reductions in depressive symptoms and anxiety symptoms, alongside a greater

reduction in fear of missing out. Sleep increased by about 30 minutes per night in the intervention group, while declining non-significantly in the control group.

However, the experimental evidence also provides clear cautions for extrapolation: restriction does not always translate into measurable changes in broad well-being, and implementation dynamics can dilute effects. Collis and Eggers (2022), for example, highlight the role of substitution, showing that reductions in social media time may be offset by increased time in other digital activities, including messaging, with null effects on well-being and performance outcomes in that context. Brailovskaia et al. (2020) reports improvements in life satisfaction and depressive symptoms following a two-week Facebook reduction intervention, but the evidence is Facebook-specific, based on self-reported use, and drawn from a young-adult sample. These results underscore that “reducing time” in social media is not a single behavioural change; what replaces that time, how exposure is changed, and which outcome is measured may determine whether downstream outcomes change.

The quasi-experimental evidence extends this picture beyond the short-run trial window, although the strength of causal inference differs across studies. Braghieri et al. (2022), exploiting the staggered rollout of Facebook across U.S. college campuses between spring 2004 and spring 2005, estimates that Facebook access (measuring platform availability rather than individual social media use) worsened student mental health by approximately 0.085 standard deviations. Marciano et al. (2022), examining Swiss adolescents before and after the first COVID-19 lockdown, found that increases in self-reported social media use were associated with worse overall mental-health problems at follow-up after adjustment for baseline mental health, other screen-media activities, and covariates. These two studies point in the same direction, but they provide different kinds of evidence: Braghieri identifies an effect of exogenous platform access, whereas Marciano documents associations during a period in which school routines, peer contact, physical activity, and family life changed simultaneously.

3.2.3. Effects on self-evaluation and appearance-related outcomes

In the included studies, the most consistent experimental findings concern outcomes that seem closely linked to self-evaluation and affective responses to evaluative content. A one-week break study reports improvements in self-esteem and body-image outcomes among young women (Smith et al., 2024). Trials that restricted smartphone-based social media time among distressed late adolescents and emerging adults also report improvements in appearance-related outcomes, with effects on both appearance esteem and weight esteem in Thai et al. (2024); in the same RCT sample, Davis and Goldfield reported reductions in depression, anxiety and FoMO and improved sleep. Gordon et al. (2021) provides preliminary evidence that a classroom-based social media literacy programme may reduce dietary restraint and depressive symptoms among girls at six months, although effects were modest, sex-specific, and not consistently sustained across outcomes or at 12 months.

De Valle and Wade (2022) conducted a pilot randomised trial among university students comparing brief self-criticism CBT-based modules and a social-media feed-curation condition against a control, targeting mechanisms thought to link social media engagement with eating-risk and body-image concerns. At one week, the self-criticism arm showed moderate improvements in appearance motivations, comparison, disordered eating, and body-image flexibility relative to the control, while the feed-curation arm reduced appearance comparison. The authors note high attrition and insufficient power as key limitations, concluding that a fully powered RCT is needed before firm conclusions can be drawn. The results nonetheless suggest that changing particular cognitive and

affective mechanisms linked to social media use may be possible, and that improving targeted risk-related outcomes need not depend only on reducing time.

3.2.4. Findings relevant for implementation

Across the experimental evidence, two implementation issues are especially relevant. First, trials with objective or semi-objective verification strengthen confidence that participants actually changed use in the intended direction. Second, restriction interventions can operate within broader digital ecosystems. In other words, participants may reallocate engagement across applications, platforms, or activities. Where substitution is documented (Collis and Eggers, 2022), it provides a plausible explanation for null effects on broader outcomes even when targeted exposure changes. Together, this evidence supports careful interpretation: experimental studies most clearly identify the effects of short-run changes in exposure conditions under specific compliance and substitution patterns, rather than to long-run population-level effects.

3.3. Longitudinal and intensive longitudinal evidence

3.3.1. Overview of designs and analytic strategies

The included longitudinal studies span standard cohort and panel designs (two-wave and multi-wave studies), with a smaller subset incorporating diary-based or experience-sampling elements. Across these 41 studies, the evidence is concentrated in high-income settings (United Kingdom, United States, Australia, and several Western and Northern European countries) but also includes a smaller number of cohorts from India, China, and Hong Kong. Follow-up intervals vary markedly, from short two-wave panels with 4- or 6-month lags, to one-year panels, to multi-wave cohorts spanning roughly 2–3 years, with a smaller number of studies extending over approximately 6–9 years. Analytic strategies range from regression adjustment and cross-lagged models to time-use substitution modelling, which establishes inference by making explicit what activities social media use replaces. In several studies, modelling choices determine whether inference is driven primarily by between-person differences (stable characteristics associated with both higher use and poorer well-being) or by within-person change (whether increases in an individual's use precede subsequent changes in their outcomes).

3.3.2. Time/intensity measures and later well-being/mental health

Evidence using time and frequency measures is mixed. Several longitudinal studies report prospective associations between higher social media use and poorer mental health indicators, particularly at high use levels or in subgroup analyses. Thorisdottir et al. (2020) finds associations between greater social media use and higher depressed mood, especially among girls, though the authors note that directionality was not formally tested in this study. Viner et al. (2019) suggests that associations between very frequent social media use and later distress/well-being may operate substantially through cyberbullying, sleep and physical activity, especially among girls. McNamee et al. (2021) reports that prolonged use is associated with poorer emotional health and behavioural difficulties, while moderate use shows a more nuanced pattern including peer-related associations.

Several included studies using modelling frameworks that more explicitly separate stable between-person differences from within-person change report small or unstable effects for time-based exposure. Coyne et al. (2020) and Schemer et al. (2021) report small or inconsistent within-person prospective effects under more stringent modelling. Orben et al. (2019), using an Random Intercept

Cross-Lagged Panel Model⁹ (RI-CLPM) in a large UK panel of 12,672 adolescents aged 10–15 across eight waves, similarly find that social media use has very small within-person effects on life satisfaction, reinforcing the conclusion that stable between-person differences account for much of the observed association once within-person change is modelled separately. Beeres et al. (2021), applying RI-CLPM to a Swedish school cohort of 3,501 adolescents across grades 8–10, find that cross-lagged paths from social media use to outcomes from the Strengths and Difficulties Questionnaire (SDQ) (total, internalising, externalising) are small and non-significant, despite between-person associations being clearly present. Steinsbekk et al. (2023), in a Norwegian four-wave cohort (ages 10–16), likewise find no significant within-person paths from either self-oriented or other-oriented social media behaviours to depression, social anxiety, or generalised anxiety, and no reverse paths. Maurya et al. (2024), in a large Indian longitudinal sample, find cross-sectional associations between social media use and depression but no significant cross-lagged paths in either direction, suggesting that the cross-sectional association may not translate into a prospective cross-lagged relationship. Plackett et al. (2023), examining UK adolescents from ages 12 to 15 in the Understanding Society panel, similarly find that the unadjusted prospective association between active social media use and SDQ difficulties becomes non-significant after adjustment for socio-demographic and household covariates, with self-esteem partially mediating only in unadjusted models. Houghton et al. (2018), in an Australian six-wave cohort, add specificity: in RI-CLPM analyses disaggregating screen activities, only web browsing (not social media, gaming, or TV) showed a cross-lagged association with later depressive symptoms, suggesting that effects may not generalise uniformly across screen types even when total screen time shows an association. Sex-stratified analyses suggested some small cross-lagged associations among boys, including for social media time, but the overall pattern remained inconsistent and should be interpreted cautiously given the small effects and multiple activity-specific models. This attenuation is not universal: Nagata et al. (2025), using a RI-CLPM, reports evidence consistent with within-person increases in use predicting later depressive symptoms, emerging from year 1 to year 2 and year 2 to year 3 of follow-up but not at the earliest interval. Notably, depressive symptoms did not predict subsequent social media use at any wave in this sample. Mader et al. (2025) provide further evidence of contextual heterogeneity: in Swiss panel models with fixed effects, more than two hours per day of social media use was associated with lower life satisfaction only among females with low or middle parental education, with no significant effects among males or high-education females, and with effect sizes largest at ages 15–17 and diminishing to near zero by early adulthood. Orben et al. (2022) provide complementary evidence of age- and sex-specific developmental sensitivity windows, identifying narrow age ranges (girls 11–13 and 19; boys 14–15 and 19) in which higher social media use predicts lower life satisfaction, with weaker or null effects outside those windows. Lee et al. (2022), in the U.S. PATH cohort, similarly report sex-stratified mental-health trajectories, with deteriorating internalising trajectories among girls and improving trajectories among boys, partially accounted for by frequent social media use in early waves. Shoshani et al. (2024), in a five-wave Israeli cohort spanning the COVID-19 period, report that increased social media use across platforms was associated with elevated psychological symptoms and negative emotions, but also with higher positive emotions and life satisfaction, with social support buffering harmful effects, illustrating that aggregate associations can mask co-occurring positive and negative outcomes within the same sample. Beyens et al. (2020), using ESM data, find

⁹ RI-CLPM separates stable between-person differences from within-person change, reducing bias from time-invariant confounding.

that the average within-person effect of social media use on momentary affective well-being is non-significant, but masks marked person-specific heterogeneity: 44% of adolescents are unaffected, 46% feel better and 10% feel worse after passive use, reinforcing the importance of distinguishing person-specific from average effects. Two further studies examine whether the type of social media behaviour — rather than overall volume — matters for outcomes. Smout et al. (2026), in an Australian two-wave cohort, find little longitudinal evidence that messaging, posting, or passive viewing frequency predicts psychological distress or well-being at 12-month follow-up, and conclude that findings do not support the active/passive use framework. Winstone et al. (2022), in a two-wave longitudinal survey of 2,456 thirteen-year-olds in south-west England, use a person-centred latent class approach to identify four social media user types based on patterns across 13 platform-agnostic activities: High Communicators (48%), characterised by frequent messaging with moderate content sharing; Moderate Communicators (33%), with moderate messaging and minimal content sharing; Broadcasters (13%), characterised by frequent content sharing in addition to messaging and browsing; and Minimal users (7%). In Winstone et al. (2022), social media user type at age 13 predicted self-harm, anxiety, depression and poor well-being at age 14 in fully adjusted models. Broadcasters showed the poorest overall profile, most clearly for depression, where they had higher odds than all other user types. For self-harm and anxiety, pairwise comparisons were more mixed. Moderate Communicators generally showed the most favourable profile, including lower odds of poor well-being than Broadcasters and Minimal users. These observational findings suggest that content-sharing profiles may be risk-relevant, but they should not be interpreted as evidence that broadcasting causally worsens mental health or that moderate use is intrinsically beneficial. Tibbs et al. (2025), in a Dutch four-wave panel, find no within-person prospective effect of passive viewing on internalising difficulties, but find an isolated within-person path at a single wave transition (2021–2022) in which higher interactive social media use predicted lower internalising difficulties, a directionally protective result that contrasts with the adverse between-person association and underscores why within-person and between-person estimates should not be conflated. The evidence is therefore better interpreted as limited support for a consistent behavioural-effect pattern rather than as evidence of a robust protective effect. This combination of findings suggests that time and intensity metrics may capture relationships that vary by cohort, context, developmental stage, behaviour type, measurement, outcome domain and lag structure, and that effects (where present) may not be large or uniform across individuals or settings.

One further set of time-measure findings concerns eating-disorder symptoms specifically. Chu et al. (2024), using a prospective cohort from the U.S. ABCD study, find that each additional hour of social media use per day at baseline was associated with higher odds of multiple eating-disorder symptoms two years later (symptom types including fear of obesity, compensatory behaviours, and binge eating), with cross-sectional associations for problematic social media use also significant. Effects were relatively small and problematic use was not examined prospectively.¹⁰

3.3.3. Problematic use and negative consequences as predictors

A somewhat clearer pattern emerges in studies that operationalise exposure as dysregulated engagement or negative consequences rather than time alone. Boer et al. (2021), using RI-CLPM in a Dutch adolescent sample, find that SMU intensity — frequency of use — shows no prospective

¹⁰ This study draws on the same ABCD cohort as Nagata et al. (2025) and Xiao et al. (2025); their contributions should be read as a single cohort's evidence across different outcomes rather than independent replications.

association with depressive symptoms or life satisfaction in either direction, whereas increases in social media disorder (problematic use) predict higher depressive symptoms and lower life satisfaction one year later. This within-study contrast directly illustrates the intensity-versus-problems distinction: in this study, it was not use frequency itself but whether use became dysregulated and harmful that predicted later well-being outcomes. Hökby et al. (2016), in a multicountry school-based longitudinal study across seven European countries, distinguish general internet activity from perceived negative consequences of use and find that longitudinally, only sleep loss and withdrawal from internet use show direct prospective effects on mental health over four months, not general time spent online. Gingras et al. (2023) reports that problematic social media use predicts later anxiety; passive use shows no significant longitudinal association; and active use predicted later anxiety among adolescents with lower extraversion but not among those with higher extraversion, suggesting that individual personality characteristics moderate this path. Wong et al. (2022) links smartphone overuse to later depressive symptoms, poorer functioning, reduced productivity, and higher momentary negative affect. Xiao et al. (2025) further shows that high-peaking and increasing trajectories of addictive social media use are associated with later internalising and externalising symptoms as well as suicidal behaviours and ideation. However, in this study, baseline total screen time is not associated with those outcomes in the same way. Vernon et al. (2017), in an Australian three-wave school-based cohort, find that bivariate latent growth curves linking problematic social networking use to depressed mood and externalising behaviour are partially mediated by sleep disruption (53% mediation for depressed mood; 13% for externalising), pointing to disrupted sleep as a downstream pathway. Li et al. (2022), in a large cohort of Chinese adolescents who were depression-free at baseline, report that the social function and entertainment function dimensions of online social networking intensity prospectively predicted higher incidence of major depression nine months later, while the emotional connection dimension did not. This suggests that function-specific measures may add useful granularity beyond simple volume measures, although this study does not directly benchmark them against aggregate time-use indicators.

Narita et al. (2025) extend the evidence on problematic internet use (PIU) to an outcome not previously covered by the included studies, which is psychotic experiences. Using the Tokyo Teen Cohort, a population-based Japanese sample, they find that high PIU at age 12 was associated with an increased risk of psychotic experiences at age 16 and increased risk of depression, after exclusion of participants with pre-existing psychopathology and adjustment for IQ, household income, adverse childhood experiences, and neighbourhood characteristics. PIU at ages 12 and 16 showed larger effect sizes than PIU at age 10, suggesting that exposure closer to or during later adolescence may be more consequential. Social withdrawal mediated part of the association with psychotic experiences, indicating that reduced in-person social participation is one plausible pathway. Two important limitations apply: the exposure measure covers general internet use and does not distinguish social media from other online activities, and the sample is drawn from urban Tokyo, limiting generalisability.

Across these contributions, problematic-use constructs, typically capturing loss of control and negative consequences/functional interference, show more consistent prospective associations with well-being outcomes than simple time/frequency measures of social media or screen exposure. One interpretive caution applies throughout: some problematic-use scales incorporate items about distress or functional impairment that conceptually overlap with mental health outcomes, which requires care when drawing causal conclusions.

3.3.4. Directionality and reciprocal pathways

Several longitudinal studies provide evidence compatible with reverse-direction pathways and reciprocal dynamics. Salmela-Aro et al. (2017), in two Finnish cohorts, find bidirectional cross-lagged associations between excessive internet use and school burnout, with reciprocal associations also observed between school burnout and depressive symptoms. This reciprocal burnout–internet dynamic illustrates how excessive digital engagement and academic/emotional exhaustion can reinforce one another, outside a platform-specific social media framework.¹¹ Puukko et al. (2020) more specifically reports a small within-person reverse-direction effect in which higher-than-usual depressive symptoms predict slightly higher later active social media use, with no corresponding within-person effect from social media use to later depressive symptoms. Hoare et al. (2020) shows that adolescents with depressive symptoms at age 14, including those with persistent problems from childhood, reported greater social media use at age 14; because use and adolescent symptoms were measured at the same wave, this is better treated as evidence that adolescent mental-health status is associated with health behaviours than as a clean earlier-mental-health-to-later-social-media pathway. Nesi et al. (2021) shifts the lens from quantity to quality in their study with a U.S. cohort followed across one year, where higher depressive symptoms at baseline predicted more negative emotional responses to social media experiences a year later, while paradoxically positive emotional responses to social media were also associated with later depression, suggesting that affectively charged engagement (rather than time per se) is part of the prospective dynamic. Ohannessian et al. (2021), in a three-wave U.S. study, provide evidence for a prospective interpersonal pathway, where more frequent social media use predicted later co-rumination, and in turn predicted higher anxiety symptoms. The indirect pathway for depression was weaker and did not reach conventional significance.

Reciprocal pathways also arise in specific harm-related domains. Pang et al. (2025) reports bidirectional cross-lagged associations between cyberbullying perpetration and depression — each predicting the other at the next wave — while SNS usage intensity did not independently predict subsequent depression or vice versa, suggesting a reinforcing system centred on cyberbullying rather than on use volume per se. These findings show that selection and reciprocity are both empirically plausible, which helps explain why simpler models (looking only from use to outcome) can overstate a one-way causal relationship. Not all studies, however, find reciprocal dynamics. Nagata et al. (2025) find no reverse-direction effect, suggesting that bidirectionality patterns are not universal across samples and age groups.

3.3.5. Wider outcome domains: loneliness, sleep, and self-harm/suicidality

Several included studies address outcomes beyond standard symptom scales. Loneliness and social connectedness are examined across both longitudinal and experimental designs. Wang et al. (2018), in a Belgian two-wave panel, find U-shaped relationships between active public Facebook use and both social and emotional loneliness: moving from low to moderate use was associated with lower loneliness, while moving from moderate to high use was associated with higher loneliness. This non-linear pattern cautions against treating social media use as uniformly harmful or uniformly

¹¹ The evidence on reciprocal pathways comes from a mix of national or school-based cohorts and convenience/student samples; where studies rely on non-representative samples, results should be interpreted as mechanistic evidence rather than population prevalence estimates.

beneficial for social connection and suggests that moderate social engagement online may serve different functions than high-volume use. Barry et al. (2024) find that within the TikTok condition, perceived connectedness to others fell significantly over the 20-minute session; no between-group differences in post-session connectedness were detected, pointing to connectedness as an outcome worth tracking separately from symptom measures. Sleep is implicitly relevant as a plausible mediating pathway in several included studies (e.g., Viner et al., 2019; Tsomokos, 2025). Tsomokos (2025) report evidence consistent with indirect pathways from age-11 social media use to age-17 psychological distress through later bedtime, distrust and negative self-perception; the sleep and self-image pathways were significant for both sexes, while the distrust pathway was significant for females only.

Self-harm, suicidality, and psychotic experiences are addressed in a small number of studies, including analyses that use structured items (Xiao et al., 2025) and cohort or trajectory approaches (Tsomokos, 2025). Longitudinal evidence linking problematic internet use to psychotic experiences specifically is provided by Narita et al. (2025) and discussed in Section 3.3.3. Across this limited evidence base, higher trajectories of addictive/problematic digital engagement and related mediating pathways are generally associated with elevated internalising symptoms and suicidality indicators, but confidence remains limited by low coverage and outcome heterogeneity. Despite their limited number, these studies cover outcomes of high policy salience, and their findings are discussed further in Section 4.

3.4. Mechanisms and sources of heterogeneity across the evidence base

3.4.1. Social comparison, FoMO, and self-evaluative pathways

Across designs, the most coherent mechanism-oriented signals involve self-evaluation and comparison-related processes. Experimental restriction and engagement-condition trials report reductions in FoMO and social comparison under particular intervention conditions (Hunt et al., 2023) and improvements in appearance-related outcomes (Thai et al., 2024; Smith et al., 2024). The laboratory experiment by Kohler et al. (2021) adds mechanistic specificity: exposure to image-conscious Instagram content, as distinct from general social media use, increased negative mood and reduced positive mood, while showing only weaker evidence on state anxiety. This is consistent with the view that appearance-salient, comparison-relevant content may be an important trigger for self-evaluative responses, above and beyond overall exposure volume. In the longitudinal literature, Maheux et al. (2024) extend this logic by tracking appearance-related social media consciousness (ASMC) specifically, finding a substantial between-person association with depressive symptoms alongside a significant within-person cross-lagged effect from ASMC to later depressive symptoms. This suggests that prospective associations may be more detectable when exposure is defined in appearance-specific terms rather than as general social media time. Together, these experimental and longitudinal contributions point to social comparison and self-presentation pressure as one of the clearest mechanism-level pathways in the evidence base. Several studies also report that problematic-use constructs, often capturing compulsive checking, loss of control, and negative consequences, are linked to later internalising outcomes, consistent with the view that social media engagement style and its psychosocial correlates may matter more than time alone.

3.4.2. Displacement, substitution and time use trade-offs

The included studies suggest that time-use and displacement mechanisms depend on what social media use replaces and on which downstream consequences are measured. Experimental evidence

shows that restriction can lead to substitution into other digital activities, helping explain null effects even when targeted exposure is reduced (Collis and Eggers, 2022). Longitudinal time-reallocation evidence similarly suggests that the counterfactual matters: in Kandola et al. (2022), theoretically replacing social media or television time with team sports, but not individual exercise, was associated with lower later emotional symptoms. Mediation studies point to sleep and related behavioural pathways: Viner et al. (2019) found that cyberbullying, sleep and physical activity explained a substantial share of associations among girls, while Tsomokos (2025) reported indirect pathways through later bedtime, negative self-perception and, among girls, distrust. Hökby et al. (2016), although focused on internet use rather than social media specifically, similarly found that negative consequences such as sleep loss and withdrawal-like discomfort predicted later mental health more clearly than time online or specific activities. Together, these findings suggest that policy narratives focused only on reducing minutes risk overlooking the counterfactual: effects depend on what replaces that time and whether broader routines, sleep and psychosocial experiences change.

3.4.3. Moderators and context

Heterogeneity is a recurring feature of the studies identified. Several studies report sex/gender differences or subgroup-specific associations (Viner et al., 2019; Booker et al., 2018; Mader et al., 2025). Mader et al. (2025) additionally find that effects of higher daily social media use (>2 hours/day) on life satisfaction are moderated by socioeconomic background: in panel fixed-effects models, significant negative effects emerged only for females with low or middle parental education, with effect sizes largest at ages 15–17 and diminishing toward zero by early adulthood, and no significant effects for males at any SES level or for high-education females. This intersection of gender, SES, and developmental stage represents one of the more nuanced moderation patterns in the evidence base. The role of socioeconomic deprivation as a moderator is examined more directly by Kurten et al. (2025), using ten annual waves of UK panel data (Understanding Society). Applying Latent Class Analysis to derive deprivation groups and RI-CLPM, they find that deprived adolescents had lower access to social media at younger ages, though access differences had disappeared by age 18. Among adolescents with social media access, those from deprived households spent slightly more time on it.¹² Time spent on social media was associated with lower life satisfaction both cross-sectionally and longitudinally within persons. However, deprivation did not moderate the longitudinal link between time spent on social media and life satisfaction. The negative association between SM use and life satisfaction was small and consistent across deprivation levels, even though deprived adolescents reported lower life satisfaction overall. The authors suggest that material deprivation alone may be insufficient to capture how social media affects disadvantaged adolescents, and that factors such as parental mediation and digital literacy warrant further investigation.

Experimental evidence further suggests that baseline depressive symptoms shape responsiveness to intervention (Hunt et al., 2023). Personality also appears as a moderator in parts of the evidence base. Gingras et al. (2023), for example, find that active social media use predicts later anxiety only among adolescents with low extraversion. Developmental stage is central: the experimental evidence is concentrated in late adolescence and emerging adulthood, while longitudinal cohorts provide broader coverage of earlier adolescence. The synthesis therefore distinguishes findings

¹² This association held for the household-deprivation classification but not for childhood material deprivation.

anchored in adolescent cohorts from those primarily supported in older youth and university samples.

3.5. Consistency across designs and measures

Across the included studies, consistency depends strongly on exposure definition, outcome domain and study design. Time- and frequency-based measures show mixed and often small associations, particularly when within-person change is separated from stable between-person differences. Problematic or dysregulated use, negative consequences and harmful online experiences show more consistently adverse associations, although interpretation requires caution where measures include distress or impairment. Experimental studies provide their clearest leverage for short-run, mechanism-proximal outcomes, while longitudinal studies add developmental coverage and evidence on reciprocal pathways. Section 3.6 therefore integrates the evidence by outcome domain, and Section 4 discusses implications for mechanisms, heterogeneity and policy translation.

3.6. Synthesis by outcome domain

The previous subsections present the experimental and longitudinal evidence separately, reflecting the inferential differences between designs. This section integrates findings around outcomes instead, summarising each domain by drawing the longitudinal and experimental results together, while preserving key modelling distinctions.

3.6.1. Depression, anxiety, and broader internalising symptoms

Longitudinal observational evidence. Across the longitudinal studies covering internalising outcomes, results vary substantially with how exposure is defined and which population is examined. For time- or frequency-based exposure measures, some studies report small adverse associations (e.g., Thorisdottir et al., 2020; Nagata et al., 2025), while more specific constructs such as appearance-related social media consciousness also show prospective associations in some studies (Maheux et al., 2024). Other studies report null or weak within-person prospective associations even when between-person correlations are present (Beeres et al., 2021; Coyne et al., 2020; Steinsbekk et al., 2023; Schemer et al., 2021; Houghton et al., 2018; Maurya et al., 2024; Smout et al., 2026). A further set of studies provides evidence consistent with reverse-direction or bidirectional pathways (Hoare et al., 2020; Puukko et al., 2020; Nesi et al., 2021; Salmela-Aro et al., 2017; Ohannessian et al., 2021).

Problematic and dysregulated use. Studies operationalising exposure as problematic, addictive or consequence-based engagement tend to report more consistently adverse longitudinal associations with internalising outcomes. Examples include studies where social media use problems, problematic social networking use, perceived negative consequences of internet use, problematic use, or problematic internet use predicted later depressive symptoms, anxiety, mental-health problems or related outcomes more consistently than simple time or intensity measures (Boer et al., 2021; Vernon et al., 2017; Gingras et al., 2023; Hökby et al., 2016; Narita et al., 2025). Li et al. (2022) adds that function-specific measures may also matter, with social-function and entertainment-function use intensity predicting incident depression among previously depression-free adolescents. These findings support the importance of dysregulated or consequence-based engagement, while requiring caution because some measures cover broader internet use or include impairment-related content.

Experimental evidence. Trials and quasi-experiments in this domain are typically short and concentrated in late adolescents and emerging adults. Several report reductions in depression, anxiety, stress, distress-related outcomes or FoMO when social media or smartphone use is restricted, but findings vary by intervention target, baseline vulnerability, adherence and substitution (Brailovskaia et al., 2020; Davis and Goldfield, 2025; Faulhaber et al., 2023; Hunt et al., 2023; Pieh et al., 2025; Collis and Eggers, 2022). More proximal laboratory evidence shows effects on mood rather than robust anxiety effects (Kohler et al., 2021). Quasi-experimental evidence adds context, but should be read carefully because exposure shifts and causal assumptions differ across studies (Braghieri et al., 2022; Marciano et al., 2022). Overall, this evidence supports the possibility of short-run changes in selected symptom outcomes under specific intervention conditions, but not a general conclusion that reducing use reliably improves internalising symptoms across populations.

In conclusion, the integrated picture is heterogeneous for internalising outcomes. Within-person analyses of time/frequency exposure most often produce weak or null prospective associations. Problematic and dysregulated-use measures, and analyses focused on particular subgroups, report more consistently adverse associations. Short-run trials often report improvements in selected outcomes when social media or smartphone use is restricted, but findings vary by intervention target and are concentrated in older adolescents, university students or selected samples. The body of studies examined does not support a conclusion of uniform causal harm; rather, it is compatible with adverse associations or short-run effects in some subgroups, exposure types and intervention settings.

3.6.2. Global well-being and life satisfaction

Longitudinal observational evidence. Findings on global well-being and life satisfaction are generally small in magnitude and conditional. Studies using within-person or fixed-effects approaches often find weak, null or developmentally specific associations, with some evidence of heterogeneity by sex, age, socioeconomic background and individual response patterns (Orben et al., 2019; Orben et al., 2022; Mader et al., 2025; Booker et al., 2018; Schemer et al., 2021; Smout et al., 2026; Beyens et al., 2020). Overall, this strand suggests that average associations between social media use and global well-being are modest and may mask subgroup-specific or person-specific patterns.

Experimental evidence. Trials report some short-run improvements in well-being when social media use is restricted, but the effects are limited in size and not consistently maintained. Brailovskaia et al. (2020) reported increased life satisfaction; Faulhaber et al. (2023) reported increased positive affect; Pieh et al. (2025) reported a small post-intervention well-being effect of reducing smartphone time that was not maintained at follow-up. Collis and Eggers (2022) reported a null effect on well-being.

In conclusion, effects on global well-being and life satisfaction are small, often conditional on sex, age, socioeconomic background or individual response patterns, and not consistently distinguishable from null in either observational or trial evidence. The included evidence does not support strong general claims about social media use uniformly lowering well-being, but is compatible with small adverse associations or short-run effects in specific developmental windows, subgroups or intervention contexts.

3.6.3. Self-evaluation, body image, FoMO and social comparison

Experimental evidence. This is the outcome domain in which experimental and observational results are most coherent. Several controlled or preregistered studies report improvements in appearance-related, body-image, FoMO or comparison-related outcomes when social media exposure is reduced, curated or otherwise modified (Smith et al., 2024; Thai et al., 2024; Hunt et al., 2023; Faulhaber et al., 2023; Davis and Goldfield, 2025). Other intervention studies provide more preliminary or mechanism-specific evidence, including social media literacy, feed-curation and self-criticism modules targeting appearance comparison or eating-risk pathways (Gordon et al., 2021; de Valle and Wade, 2022). Laboratory evidence further supports the relevance of image-conscious content for short-run affective responses, although these effects are proximal and should not be interpreted as durable mental-health changes (Kohler et al., 2021).

Longitudinal observational evidence. Maheux et al. (2024) report a within-person link from appearance-related social media consciousness to depression that holds independently of total social media time and is not reciprocated, providing evidence that comparison and self-evaluation engagement may be more proximal than time-based exposure for some outcomes.

In conclusion, self-evaluative outcomes (including FoMO, social comparison, appearance esteem and body-image evaluations) are one of the domains where the evidence is most coherent. The strongest support comes from short-run experimental studies in older adolescents and emerging adults, with complementary longitudinal evidence for appearance-related social media consciousness. This supports the interpretation of self-evaluation and comparison as plausible risk-relevant pathways, but does not establish durable population-level effects or equivalent effects in younger adolescents.

3.6.4. Loneliness and social connectedness

Coverage of loneliness as a primary outcome is limited. Wang et al. (2018) suggest a curvilinear pattern for active public Facebook use, where moderate use may be linked to lower later loneliness, whereas high use may be linked to higher later loneliness. Faulhaber et al. (2023) reported reduced loneliness in a social media restriction trial. Marciano et al. (2022) examined loneliness alongside other indicators in a pandemic-period quasi-experiment. The integrated reading across these few studies does not support strong general claims; the limited number of studies and the heterogeneity of measures make this an under-covered policy-relevant outcome.

3.6.5. Sleep

Sleep appears as a recurring candidate pathway in several studies. Longitudinal evidence points to sleep disruption or later bedtime as possible mediating pathways linking problematic or time-based use to later mental-health outcomes (Vernon et al., 2017; Tsomokos, 2025). Experimental evidence also reports improvements in sleep or sleep quality in some restriction interventions, while pandemic-period evidence includes sleep among several indicators that worsened during lockdown (Davis and Goldfield, 2025; Pieh et al., 2025; Marciano et al., 2022). Across designs, sleep emerges as a plausible pathway, but the evidence remains limited and is not sufficient to establish a robust or general sleep-mediated effect.

3.6.6. Self-harm, suicidality, and eating-disorder symptoms

These high-stakes outcomes are among the least densely covered domains in the included evidence. There is no direct experimental coverage for self-harm or suicidality, and evidence on eating-disorder symptoms is limited. Longitudinal studies report adverse associations particularly for problematic use: Xiao et al. (2025) found that increasing and high-peaking addictive social media use predicted suicidal behaviours and ideation compared with the low-use trajectory. Winstone et al. (2022) identified a “Broadcasters” user type, characterised by frequent content sharing alongside messaging and browsing, that showed the poorest overall follow-up profile, especially for depression; pairwise contrasts for self-harm and anxiety were more mixed. Chu et al. (2024) reported that each additional hour of social media use per day predicted eating-disorder symptoms two years later, with stronger cross-sectional associations for problematic social-media use. De Valle and Wade (2022) provide only preliminary pilot evidence for intervention approaches targeting disordered eating and related mechanisms. Across the limited evidence, the integrated reading is that adverse associations are reported in this domain, particularly for problematic-use indicators, but the small number of studies, absence of direct trial evidence for the most severe outcomes, and methodological diversity prevent firm conclusions.

4. Discussion

4.1. Integrating the evidence

The evidence base comprises a methodologically diverse set of longitudinal studies complemented by a smaller experimental and quasi-experimental literature. When viewed together, the evidence does not support a single uniform relationship on average between ‘social media use’ and youth well-being/mental health across settings and populations. Instead, the strongest and most interpretable patterns depend on (i) how exposure is defined, (ii) which outcome domains are examined, and (iii) the inferential power of the design.

A central theme is that time and frequency-based indicators of use often show different patterns of association from measures that capture dysregulated engagement or negative consequences. Variation across cohorts may reflect differences in country context, developmental stage, platform ecosystem and time period, exposure measurement, lag spacing, and modelling choices (between-person versus within-person designs). Longitudinal studies using time-based measures sometimes report prospective associations with internalising symptoms or distress. However, results vary across cohorts and are sensitive to modelling approaches that separate stable between-person differences from within-person change over time. In parallel, several studies provide evidence compatible with reverse-direction pathways in which earlier distress predicts later social media engagement. This indicates that simple prospective correlations between time spent and later symptoms may reflect a mixture of processes, including selection into higher use among vulnerable adolescents, exposure-related effects in some contexts, and stable characteristics correlated with both engagement patterns and mental health.

By contrast, exposure operationalisations emphasising problematic or compulsive patterns and negative consequences show more consistent associations with poorer outcomes. This is an important distinction for both research and policy: the forms of use most consistently associated with adverse outcomes in this evidence base involve dysregulated engagement, functional interference, or negative consequences, rather than simple volume alone. Note that these constructs require careful framing, as they can include elements that overlap conceptually with distress and functional impairment, and therefore may not be interpreted as pure exogenous exposures.

The experimental evidence provides complementary insights, but most studies assess short-run effects under relatively specific intervention or exposure conditions. Trials and quasi-experiments that manipulate exposure over short periods, or that exploit environmental shifts, more consistently show changes in mechanism-proximal outcomes than broad improvements in mental health symptoms. This pattern supports cautious interpretation; experimental evidence can shed light upon plausible pathways, but it does not justify broad claims about long-term effects across all populations and platforms.

To support interpretation of the synthesis, and to avoid overgeneralising from mixed findings, the evidence base suggests different degrees of consistency across exposure/outcome domains:

- Time and frequency measures in relation to broad well-being and internalising outcomes: evidence indicates small and heterogeneous associations that vary across cohorts, modelling strategies, and contexts; time alone has limited interpretive value as an indicator of risk.

- Problematic/dysregulated engagement in relation to poorer outcomes: associations appear more consistent than for time measures, but interpretation should remain cautious because several instruments embed elements of distress and functional impairment, increasing the risk of conceptual overlap with mental-health outcomes.
- Adverse peer experiences and online harms (e.g., cyberbullying): in the smaller subset of studies examining them, evidence is relatively consistent in linking harmful experiences to poorer mental-health and well-being outcomes, aligning with harm-relevant pathways.
- Mechanism-linked behavioural exposures (e.g., social comparison, appearance pressures, FoMO): evidence is promising but sensitive to operationalisation and follow-up window; experimental studies most consistently detect changes in mechanism-proximal outcomes rather than broad symptom reduction.
- Severe or rarer outcomes (e.g., self-harm/suicidality): lower confidence given fewer included studies, outcome rarity, and measurement constraints, even where estimates point in a concerning direction.

These differences in evidence strength suggest that policy approaches may be better anchored in risk-relevant mechanisms and harms than in uniform messaging based on time spent alone.

4.2. Implications for conceptualising “exposure” in social media and well-being research

The evidence base indicates that “social media use” is not a single, uniform exposure. Time spent captures overall volume, but it does not distinguish between active and passive engagement, supportive versus harmful interactions, content types, or context (for example, bedtime use, public posting, or messaging-based communication). The presence of substitution effects in at least part of the trial evidence further complicates interpretation, as reducing time on specific platforms may not reduce total digital engagement, and effects may depend on what replaces restricted use.

In contrast, measures of problematic or dysregulated use and negative consequences are closer to risk-relevant engagement patterns, and they are often more consistently associated with mental health outcomes. However, because these measures can incorporate impairment and distress, they sit conceptually closer to outcomes. This suggests that the most informative future research and policy monitoring would combine (i) more precise behavioural metrics (including device-logged measures where feasible), (ii) context and content descriptors (for example, what is being viewed or produced, on which platforms, in what interaction context, and at what times of day), and (iii) measures capturing problematic patterns without embedding outcome criteria (e.g., separating loss of control items from distress/impairment items).

From a measurement perspective, the evidence base would likely benefit from stronger harmonisation: consistent reporting of platforms/apps included, definitions of “social media” relative to messaging, and clearer separation of “screen time” constructs from social media-specific exposures. In monitoring, this also implies that indicators based solely on ‘hours/day’ are unlikely to be sufficiently precise as standalone markers of risk, unless complemented by indicators of dysregulated engagement, negative consequences, and context.

4.3. Mechanisms: interpreting the most coherent pathways

The mechanism-level evidence points to three pathways, each with different degrees of empirical support. The first, and most consistently supported, concerns self-evaluation and social comparison, particularly for appearance-related outcomes among older adolescents and emerging adults. Across experimental and longitudinal evidence, appearance-salient and comparison-relevant forms of engagement appear more informative than overall use volume for understanding self-evaluative risk. However, this evidence is concentrated in samples aged 17 and above, and it does not establish whether these pathways operate with equal strength in younger adolescents.

A second mechanism is displacement and substitution. The evidence indicates that restricting use can sometimes shift engagement to other digital activities, and that the consequences of use may depend partly on what activities are displaced. This means that the relevant mechanism is not simply time online, but broader patterns of behavioural allocation, including whether engagement displaces sleep, physical activity or other activities relevant for well-being.

A third mechanism involves adverse online experiences and peer dynamics. The included evidence suggests that cyberbullying and related online peer harms should be understood not only as correlates of social media use, but also as possible risk pathways in their own right. Interpersonal dynamics such as co-rumination, negative emotional responses to social media experiences, and exposure to harmful interactions may help explain why similar levels of use have different implications across young people. This highlights the importance of distinguishing between social media as a communication tool and social media as a setting in which social harms can occur.

These mechanisms should be interpreted as plausible pathways rather than as settled causal explanations. The evidence is most informative when exposures are defined in terms of specific behaviours, experiences or consequences, and less informative when social media use is measured only as total time or frequency.

4.4. Heterogeneity and vulnerable groups

The evidence base reinforces that associations are not uniform across individuals or contexts. Several studies report variation by sex/gender, and intervention evidence suggests differential responsiveness by baseline depressive symptoms. Longitudinal studies also provide evidence consistent with reverse-direction and selection-type pathways, in which adolescents experiencing poorer mental health may subsequently increase certain forms of engagement.

This heterogeneity has two implications. First, population-wide claims framed solely in terms of average effects may obscure meaningful differences across subgroups. Second, policies and interventions may need to be sensitive to baseline vulnerability and contextual differences, rather than assuming that effects are uniform across young people. Evidence also suggests that effects may differ across developmental stages: experimental evidence is concentrated in older youth, while mid-adolescent cohorts dominate parts of the longitudinal evidence. Interpretations should therefore account for the developmental stage of the sample.

4.5. Methodological considerations and limitations of the evidence base

Several methodological limitations recur across the included studies and shape interpretation. Beyond these, an additional limitation concerns the geographic concentration of the evidence base: the included studies are heavily concentrated in high-income settings (United Kingdom, United

States, Canada, Australia, and Western and Northern Europe), with comparatively few studies from low- and middle-income countries and limited cross-country evidence within the European Union. This restricts the external validity of the synthesis and signals a clear gap for future EU-relevant research.

Measurement limitations. Many studies rely on self-reported time or frequency measures, which can be noisy and may not map well onto platform and engagement conditions. Even when time measures are accurate, they conflate heterogeneous activities. Problematic-use measures often have stronger associations with outcomes but can embed distress and impairment criteria, complicating causal interpretation. Outcome measures are typically self-reported; structured assessments and multi-informant outcomes are scarce.

Confounding and modelling choices. In longitudinal observational evidence, confounding remains a key concern, and results vary depending on whether models account for stable individual differences and whether reciprocal pathways are explicitly tested. Lag structure and wave spacing differ across studies, which can alter detected effects. Some studies include rich covariate controls or within-person approaches, but these are not universal.

External validity and feasibility of trials. Randomised studies in the included evidence are concentrated in university or older-youth samples and range from 10-20 minute exposures to interventions lasting several weeks with short follow-up. This limits generalisability to younger adolescents and to longer-run outcomes. The mechanism-level evidence on social comparison and appearance-related pathways is similarly concentrated in older adolescents and emerging adults; caution is therefore warranted before assuming these pathways operate with equal strength in younger age groups. Compliance and substitution patterns vary across interventions and can determine whether changes in the targeted exposure translate into broader outcomes. Experimental studies also tend to focus on outcomes that can be measured over short periods and may not capture longer-term clinical trajectories. Finally, because the included studies span 2010–2025, findings from earlier cohorts and interventions should be transferred cautiously to current platform environments, given substantial changes in platform features, algorithms, and norms of use.¹³

Outcome coverage imbalance. Depression and anxiety outcomes dominate, while other relevant outcomes such as self-harm, suicidality or sleep are less densely covered. This limits the ability to make strong comparative statements about policy-relevant but less frequently studied factors.

These limitations do not undermine the value of the present evidence base, but they point to clear priorities for future work: longer follow-up interventions, adolescent-focused randomised designs where feasible, more objective exposure measurement, and greater harmonisation of constructs across studies.

4.6. Implications for policy and practice

The evidence base indicates that policy interpretation is stronger when social media use is treated as multidimensional, distinguishing overall volume from potentially risky engagement patterns.

¹³ One longitudinal study (Schemer et al., 2021) collected its earliest waves in 2008–2010, before the widespread adoption of smartphone-based social media; the null findings from that study should be interpreted with this context in mind.

Policies aimed only at reducing hours may therefore have limited precision unless they also address dysregulated patterns, negative consequences, and exposure to online harms.

A practical implication is that policy guidance and prevention strategies may be better aligned with the evidence when they focus on:

- identifying and responding to problematic and dysregulated engagement and its consequences (e.g., sleep disruption, functional interference);
- considering mechanism-linked pathways, especially social comparison and appearance-based pressures, as potential targets for prevention and support;¹⁴
- reducing exposure to online harms such as cyberbullying and treating them as a policy priority;¹⁵
- developing and evaluating school-based digital and social media literacy or parental-awareness initiatives, particularly where they target relevant mechanisms such as social comparison, appearance pressures, online harms and sleep disruption;
- supporting environments that encourage healthier time allocation, particularly sleep and physical activity.¹⁶

At the same time, the evidence does not suggest that all social media engagement is uniformly harmful. Some findings indicate that associations depend on the type, context and intensity of use, but evidence for beneficial patterns is limited and observational. This reinforces the need to avoid blanket interpretations and to distinguish between potentially supportive, neutral and harmful forms of engagement. Overall, the included studies provide stronger support for targeted risk-reduction approaches than for relying solely on broad restrictive messaging.

4.7. Directions for future research

The evidence base points to several priorities for strengthening future inference. First, studies should improve exposure measurement by combining device-logged indicators where feasible with better classification of engagement type, content, and context. Second, observational studies would benefit from wider use of designs that separate within-person change from stable differences and test reciprocal pathways explicitly. Third, experimental research would benefit from more adolescent-focused designs, especially in younger cohorts, with longer follow-up and careful monitoring of substitution effects. Finally, outcome coverage should expand beyond depression and anxiety to include sleep, loneliness, and high-stakes endpoints such as self-harm and suicidality.

¹⁴ The evidence supports small experimental interventions, but does not directly test ‘media literacy’ as a broad policy.

¹⁵ The present evidence base demonstrates associations between cyberbullying and mental health outcomes; it does not directly test school-based prevention models or parental awareness programs.

¹⁶ Offline social connection is a plausible counterfactual but is not directly tested as an outcome in the included studies.

5. Conclusion and key messages

5.1. Conclusion

This review synthesised empirical evidence on the relationship between social media use and well-being or mental health outcomes among adolescents and emerging adults. Across the included studies, the results are best understood by distinguishing: (i) the type of exposure being measured (time or intensity of social media use versus dysregulated or consequence-based engagement); (ii) the outcome domain (broad well-being or mental health symptoms versus mechanism-linked psychosocial outcomes); and (iii) the inferential leverage of the design (observational longitudinal evidence versus short-run experimental manipulation).

Overall, the evidence base does not support a single uniform association between social media use and mental health across all young people. Longitudinal studies using time- or frequency-based measures sometimes report prospective links with internalising symptoms or distress, but findings vary across cohorts and are sensitive to modelling strategies that address stable differences between individuals and reciprocal pathways. A recurring contribution of the longitudinal evidence is that reverse-direction and bidirectional dynamics are plausible in at least some contexts, with poorer mental health predicting later changes in engagement in some studies.

By contrast, studies that operationalise exposure as problematic or dysregulated use, negative consequences, or functional interference tend to report more consistent associations with poorer well-being and mental health than studies relying on time alone. These constructs appear to capture risk-relevant engagement more directly than time alone, although they must be interpreted with care because some measures incorporate features close to distress and functional impairment.

The experimental evidence, which is concentrated in late adolescents and emerging adults and typically operates over short intervention windows, provides complementary leverage. Trials that restrict use or alter engagement conditions most consistently report changes in appearance-related self-evaluative outcomes, with particularly coherent findings in appearance- and body image-related domains. Evidence for FoMO reductions is more conditional, appearing most clearly in participants with elevated baseline depressive symptoms and under specific intervention conditions. Some experiments and quasi-experiments also report broader changes in well-being or distress, but these findings arise under specific intervention conditions and are less uniform across studies. Implementation features such as adherence and substitution are therefore important for interpretation.

These findings support a policy interpretation focused less on social media volume alone and more on dysregulated engagement, harmful experiences, and specific risk pathways.

5.2. Key messages for policy and practice

1. **“Social media use” is not a single exposure.** Measures of time or frequency capture volume, whereas problematic-use and consequence-based measures capture dysregulated engagement. In the included evidence, the latter are more consistently associated with poorer well-being and mental health, although interpretation should remain cautious where exposure measures include distress or impairment.
2. **Time-based associations are not uniform.** Prospective links between higher use and poorer outcomes are reported in some cohorts and subgroups, but findings vary across

modelling strategies and populations. Several studies provide evidence consistent with reverse-direction pathways, in which earlier distress predicts later changes in engagement, and some find bidirectional dynamics.

3. **Experimental studies provide the clearest causal leverage for short-run, mechanism-proximal outcomes.** Interventions that restrict use or modify engagement conditions most consistently affect outcomes related to self-evaluation and comparison processes, including FoMO and appearance-related outcomes. Symptom improvements are observed in some contexts, but they are less consistent across studies and intervention designs.
4. **What replaces social media time matters.** Trial evidence indicates that restricting social media can lead to substitution into other digital activities, which may weaken downstream effects on well-being; time-allocation approaches in observational evidence similarly highlight the importance of counterfactual activities.
5. **Heterogeneity is a central feature of the evidence.** Effects vary by developmental stage, baseline vulnerability, and, in some studies, by sex/gender and socioeconomic background, supporting approaches that prioritise targeted risk reduction and support for vulnerable groups. Explicit moderation tests remain limited in several domains, and few included studies examine socioeconomic or digital-inequality indicators directly. Where sex or gender differences are examined, patterns are mixed and depend on outcome and context.
6. **Policy implications should not be framed solely in terms of reducing hours.** The included studies more strongly support policy attention to dysregulated engagement, harmful experiences, and mechanism-linked pathways such as social comparison, with additional attention to consequences such as sleep disruption where these are directly implicated.

5.3. Key messages for research and monitoring

1. **Improve exposure measurement.** Future work would benefit from combining device-logged indicators where feasible with clearer classification of engagement type, content, and context, and from distinguishing social media-specific exposures from general screen time.
2. **Design and modelling choices shape conclusions.** Longitudinal evidence would benefit from more routine testing of reciprocal pathways and, where the data permit, from separating within-person change from stable between-person differences.
3. **Strengthen the experimental evidence base in adolescents.** Longer follow-up interventions and more adolescent-focused trials, especially in younger cohorts where feasible, would improve inference on sustained effects and developmental sensitivity, alongside careful monitoring of adherence and substitution.
4. **Broaden outcome coverage and harmonise reporting.** Depression and anxiety dominate the literature; greater coverage of sleep, loneliness, and high-stakes endpoints, including self-harm and suicidality, together with more transparent measurement and greater harmonisation of exposure and outcome constructs, would strengthen future synthesis.

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List of abbreviations and definitions

Abbreviations	Definitions
ABCD	Adolescent Brain Cognitive Development study
ALT-SR	Autoregressive Latent Trajectory with Structured Residuals
APSS	Adolescent Psychotic-like Symptom Screener
ASMC	Appearance-Related Social Media Consciousness
BDI-II	Beck Depression Inventory, second edition
BESAA	Body Esteem Scale for Adolescents and Adults
CBCL	Child Behavior Checklist
CBT	Cognitive Behavioural Therapy
CDC	Centers for Disease Control and Prevention
CES-D	Center for Epidemiological Studies Depression Scale
CI	Confidence Interval
CIUS	Compulsive Internet Use Scale
CLPM	Cross-Lagged Panel Model
DASS	Depression Anxiety Stress Scales
DG EAC	Directorate-General for Education, Youth, Sport and Culture
DSM-5	Diagnostic and Statistical Manual of Mental Disorders, 5th edition
EDE-Q	Eating Disorder Examination Questionnaire
ESM	Experience Sampling Method
EU	European Union
FB	Facebook
FE	Fixed Effects
FEIS	Fixed Effects Individual Slopes
FIML	Full Information Maximum Likelihood
FoMO	Fear of Missing Out
GAD-7	Generalised Anxiety Disorder scale, 7-item version
GHQ-12	General Health Questionnaire, 12-item version
HADS	Hospital Anxiety and Depression Scale
HBSC	Health Behaviour in School-aged Children study
ICC	Intraclass Correlation Coefficient
ISI	Insomnia Severity Index
ITT	Intention to Treat
JBİ	Joanna Briggs Institute
JRC	Joint Research Centre
K-SADS	Kiddie Schedule for Affective Disorders and Schizophrenia
LCA	Latent Class Analysis
LTA	Latent Transition Analysis

MHI-5	Mental Health Inventory, 5-item version
MISMAW	Measuring the Impact of Social Media on Adolescents' Well-being
NCHA	National College Health Assessment
OLS	Ordinary Least Squares
PANAS	Positive and Negative Affect Schedule
PHQ	Patient Health Questionnaire
PIU	Problematic Internet Use
POMS	Profile of Mood States
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PSQ-20	Perceived Stress Questionnaire, 20-item version
RCMAS-2	Revised Children's Manifest Anxiety Scale, 2nd edition
RCT	Randomised Controlled Trial
RI-CLPM	Random Intercept Cross-Lagged Panel Model
RoB 2	Cochrane Risk of Bias tool, version 2
RR	Risk Ratio
SAS-SV	Smartphone Addiction Scale – Short Version
SBI	School Burnout Inventory
SD	Standard Deviation
SDQ	Strengths and Difficulties Questionnaire
SEM	Structural Equation Modelling
SES	Socioeconomic Status
SM	Social Media
SMAC	Survey Methods and Analysis Centre
SMAQ	Social Media Addiction Questionnaire
SMFQ	Short Mood and Feelings Questionnaire
SMU	Social Media Use
SNS	Social Networking Sites
SOFAS	Social and Occupational Functioning Assessment Scale
SSES	State Self-Esteem Scale
STAI	State-Trait Anxiety Inventory
SWEMWBS	Short Warwick-Edinburgh Mental Well-Being Scale
SWLS	Satisfaction with Life Scale
UCLA	UCLA Loneliness Scale
UNICEF	United Nations Children's Fund
WEMWBS	Warwick-Edinburgh Mental Well-Being Scale
WHO	World Health Organization
WHO-5	World Health Organization Well-Being Index, 5-item version
YRBS	Youth Risk Behavior Survey

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Annexes

Annex 1. Database search strategies

a. PubMed

Literature reviews

("meta analysis"[Title/Abstract] OR "meta-analysis"[Title/Abstract] OR "literature review"[Title/Abstract] OR "systematic review"[Title/Abstract] OR "systematic literature review"[Title/Abstract])

AND (longitudinal[Title/Abstract] OR panel[Title/Abstract] OR "panel study"[Title/Abstract] OR "cohort study"[Title/Abstract] OR experiment*[Title/Abstract] OR "experimental design"[Title/Abstract] OR intervention[Title/Abstract] OR "behavioural intervention"[Title/Abstract] OR "difference-in-difference"[Title/Abstract] OR "diff-in-diff" [Title/Abstract] OR DiD[Title/Abstract] OR "randomised controlled trial"[Title/Abstract] OR "randomised controlled trial"[Title/Abstract] OR RCT[Title/Abstract])

AND ("Social Media"[Mesh] OR "social media"[Title/Abstract] OR "social network*"[Title/Abstract] OR "screen time"[Title/Abstract] OR "problematic social media use"[Title/Abstract] OR "social media addiction"[Title/Abstract] OR "problematic internet use"[Title/Abstract] OR "internet addiction"[Title/Abstract] OR "problematic smartphone use"[Title/Abstract] OR "smartphone addiction"[Title/Abstract])

AND ("Adolescent"[Mesh] OR adolescen*[Title/Abstract] OR teen*[Title/Abstract] OR youth[Title/Abstract] OR "Young Adult"[Mesh] OR "emerging adult*"[Title/Abstract] OR "young adult*"[Title/Abstract] OR student*[Title/Abstract])

AND ("Mental Health"[Mesh] OR "Depression"[Mesh] OR "Anxiety Disorders"[Mesh] OR "Sleep Wake Disorders"[Mesh] OR "Loneliness"[Mesh] OR "Self-Injurious Behavior"[Mesh] OR "Suicidal Ideation"[Mesh] OR "Happiness"[Mesh])

OR well-being[Title/Abstract] OR "well-being"[Title/Abstract] OR "life satisfaction"[Title/Abstract] OR depression[Title/Abstract] OR anxiety[Title/Abstract] OR distress[Title/Abstract] OR loneliness[Title/Abstract] OR sleep*[Title/Abstract] OR "self-esteem"[Title/Abstract] OR "self-harm"[Title/Abstract] OR suicide[Title/Abstract] OR "suicidal ideation"[Title/Abstract])

AND ("2010/01/01"[Date - Publication] : "2025/12/31"[Date - Publication])

AND English[lang] AND Humans[Mesh]

Longitudinal studies

(longitudinal[Title/Abstract] OR panel[Title/Abstract] OR "panel study"[Title/Abstract] OR "cohort study"[Title/Abstract])

AND ("Social Media"[Mesh] OR "social media"[Title/Abstract] OR "social network*"[Title/Abstract] OR "screen time"[Title/Abstract] OR "problematic social media use"[Title/Abstract] OR "social media addiction"[Title/Abstract] OR "problematic internet use"[Title/Abstract] OR "internet addiction"[Title/Abstract] OR "problematic smartphone use"[Title/Abstract] OR "smartphone addiction"[Title/Abstract])

AND ("Adolescent"[Mesh] OR adolescen*[Title/Abstract] OR teen*[Title/Abstract] OR youth[Title/Abstract] OR "Young Adult"[Mesh] OR "young adult*"[Title/Abstract] OR "emerging adult*"[Title/Abstract] OR student*[Title/Abstract])

AND ("Mental Health"[Mesh] OR "Depression"[Mesh] OR "Anxiety Disorders"[Mesh] OR "Sleep Wake Disorders"[Mesh] OR "Loneliness"[Mesh] OR "Self-Injurious Behavior"[Mesh] OR "Suicidal Ideation"[Mesh] OR "Happiness"[Mesh])

OR well-being[Title/Abstract] OR "well-being"[Title/Abstract] OR "life satisfaction"[Title/Abstract] OR depression[Title/Abstract] OR anxiety[Title/Abstract] OR distress[Title/Abstract] OR loneliness[Title/Abstract] OR sleep*[Title/Abstract] OR "self-esteem"[Title/Abstract] OR "self-harm"[Title/Abstract] OR suicide[Title/Abstract] OR "suicidal ideation"[Title/Abstract])

NOT ("meta analysis"[Title/Abstract] OR "meta-analysis"[Title/Abstract] OR review*[Title/Abstract] OR "literature review"[Title/Abstract] OR "systematic review"[Title/Abstract] OR "systematic literature review"[Title/Abstract])

AND ("2010/01/01"[Date - Publication] : "2025/12/31"[Date - Publication])

AND English[lang] AND Humans[Mesh]

Experimental studies

(experiment*[Title/Abstract] OR "experimental design"[Title/Abstract] OR intervention[Title/Abstract] OR "behavioural intervention"[Title/Abstract] OR "difference-in-difference"[Title/Abstract] OR "diff-in-diff" [Title/Abstract] OR DiD[Title/Abstract] OR "randomised controlled trial"[Title/Abstract] OR "randomised controlled trial"[Title/Abstract] OR RCT[Title/Abstract])

AND ("Social Media"[Mesh] OR "social media"[Title/Abstract] OR "social network*[Title/Abstract] OR "screen time"[Title/Abstract] OR "problematic social media use"[Title/Abstract] OR "social media addiction"[Title/Abstract] OR "problematic internet use"[Title/Abstract] OR "internet addiction"[Title/Abstract] OR "problematic smartphone use"[Title/Abstract] OR "smartphone addiction"[Title/Abstract])

AND ("Adolescent"[Mesh] OR adolescen*[Title/Abstract] OR teen*[Title/Abstract] OR youth[Title/Abstract] OR "Young Adult"[Mesh] OR "young adult*[Title/Abstract] OR "emerging adult*[Title/Abstract] OR student*[Title/Abstract])

AND ("Mental Health"[Mesh] OR "Depression"[Mesh] OR "Anxiety Disorders"[Mesh] OR "Sleep Wake Disorders"[Mesh] OR "Loneliness"[Mesh] OR "Self-Injurious Behavior"[Mesh] OR "Suicidal Ideation"[Mesh] OR "Happiness"[Mesh] OR well-being[Title/Abstract] OR "well-being"[Title/Abstract] OR "life satisfaction"[Title/Abstract] OR depression[Title/Abstract] OR anxiety[Title/Abstract] OR distress[Title/Abstract] OR loneliness[Title/Abstract] OR sleep*[Title/Abstract] OR "self-esteem"[Title/Abstract] OR "self-harm"[Title/Abstract] OR suicide[Title/Abstract] OR "suicidal ideation"[Title/Abstract])

NOT ("meta analysis"[Title/Abstract] OR "meta-analysis"[Title/Abstract] OR review*[Title/Abstract] OR "literature review"[Title/Abstract] OR "systematic review"[Title/Abstract] OR "systematic literature review"[Title/Abstract])

AND ("2010/01/01"[Date - Publication] : "2025/12/31"[Date - Publication])

AND English[lang] AND Humans[Mesh]

b. Scopus

Literature reviews

TITLE-ABS("meta analysis" OR "meta-analysis" OR "literature review" OR "systematic review" OR "systematic literature review")

AND TITLE-ABS("longitudinal" OR "panel study" OR "cohort study" OR experiment* OR "experimental design" OR "behavioural intervention" OR "behavioral intervention" OR "difference-in-difference" OR "diff-in-diff" OR DiD OR "randomised controlled trial" OR "randomised controlled trial" OR RCT)

AND TITLE-ABS("social media" OR "social network*" OR "screen time" OR "problematic social media use" OR "social media addiction" OR "problematic internet use" OR "internet addiction" OR "problematic smartphone use" OR "smartphone addiction" OR "smartphone use")

AND TITLE-ABS("Adolescent" OR adolescen* OR teen* OR "young adult*" OR youth OR young* OR student* OR "emerging adult*")

AND TITLE-ABS("Mental Health" OR "Depression" OR "Anxiety Disorders" OR "Sleep Wake Disorders" OR "Loneliness" OR "Self-Injurious Behavior" OR "Suicidal Ideation" OR "Happiness" OR well-being OR "well-being" OR "life satisfaction" OR depression OR anxiety OR distress OR loneliness OR sleep* OR "self-esteem" OR "self-harm" OR suicide OR "suicidal ideation")

AND (PUBYEAR > 2009) AND LIMIT-TO(LANGUAGE, "English")

Longitudinal studies

TITLE-ABS("longitudinal" OR "panel study" OR "cohort study")

AND TITLE-ABS("social media" OR "social network*" OR "screen time" OR "problematic social media use" OR "social media addiction" OR "problematic internet use" OR "internet addiction" OR "problematic smartphone use" OR "smartphone addiction" OR "smartphone use")

AND TITLE-ABS("Adolescent" OR adolescen* OR teen* OR "young adult*" OR youth OR young* OR student* OR "emerging adult*")

AND TITLE-ABS("Mental Health" OR "Depression" OR "Anxiety Disorders" OR "Sleep Wake Disorders" OR "Loneliness" OR "Self-Injurious Behavior" OR "Suicidal Ideation" OR "Happiness" OR well-being OR "well-being" OR "life satisfaction" OR depression OR anxiety OR distress OR loneliness OR sleep* OR "self-esteem" OR "self-harm" OR suicide OR "suicidal ideation")

AND (PUBYEAR > 2009) AND LIMIT-TO(LANGUAGE, "English")

Experimental studies

TITLE-ABS(experiment* OR "experimental design" OR "behavioural intervention" OR "behavioral intervention" OR "difference-in-difference" OR "diff-in-diff" OR DiD OR "randomised controlled trial" OR "randomised controlled trial" OR RCT)

AND TITLE-ABS("social media" OR "social network*" OR "screen time" OR "problematic social media use" OR "social media addiction" OR "problematic internet use" OR "internet addiction" OR "problematic smartphone use" OR "smartphone addiction" OR "smartphone use")

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AND TITLE-ABS("Mental Health" OR "Depression" OR "Anxiety Disorders" OR "Sleep Wake Disorders" OR "Loneliness" OR "Self-Injurious Behavior" OR "Suicidal Ideation" OR "Happiness" OR well-being OR "well-being" OR "life satisfaction" OR depression OR anxiety OR distress OR loneliness OR sleep* OR "self-esteem" OR "self-harm" OR suicide OR "suicidal ideation")

AND (PUBYEAR > 2009) AND LIMIT-TO(LANGUAGE, "English")

Annex 2. Table of evidence

This table of evidence summarises key information of the studies included in this literature review: design, sample, age of the participants, operationalisation of exposure (social media/screen time use) and outcome (well-being/mental health) measures, and findings.

Table 3. Evidence table.

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
1	Barry et al. (2024)	USA	Lab randomised experiment (3×20-min): TikTok vs other screen (no TikTok) vs no-screen; pre/post state measures; typical-use measures collected post.	N=252 undergrads (18–30; 69.8% women); M age 19.35 (SD 1.61).	18–30 years (M=19.35, SD 1.61).	Experimental assignment to 20-min TikTok vs 20-min screen/no-TikTok vs 20-min no-screen; typical TikTok engagement also self-reported (incl. daily-activities use and duration).	State mood, stress, boredom, and connectedness (0–10 single items, pre/post). Post: loneliness (UCLA-3), FOMO (FOMOS), life satisfaction (SWLS).	Within conditions ($p<0.004$): stress ↓ in all groups; TikTok also connectedness ↓; screen/no-TikTok boredom ↑. Between groups: post stress and mood favoured no-screen vs screen/no-TikTok; screen/no-TikTok had highest boredom; TikTok did not differ from others on post mood. Typical-use: daily-activities TikTok use correlated with FOMO and longer duration with loneliness; within TikTok condition, more daily-activities use leads to mood improvement and longer duration to boredom decrease.
2	Beeres et al. (2021)	Sweden	Sweden school cohort (grades 8–10), 3 annual waves; RI-CLPM separating between- vs within-person links between daily SM hours and SDQ scores.	Baseline N=3,501 (age 14–15; 51.5% girls) from 101 schools; 3-wave n=2,339 (66.8%).	14–15 years at Grade 8; followed annually Grades 9 and 10 (2-yr follow-up).	Self-reported daily social media hours via weekday + weekend items (0 to ≥7h); weighted mean hours/day computed.	Self-reported SDQ: total difficulties, internalizing (emotional+peer), externalizing (conduct+hyperactivity) at each wave.	High ICCs indicated strong trait-like clustering. Between-person: higher average SM use associated with higher SDQ problems. Within-person cross-lagged paths small and non-significant in both directions; concurrent within-person associations weak. Association mainly reflects between-person differences, not within-person increases over time.
3	Beyens et al. (2020)	Netherlands	ESM design: 7 consecutive days, 6 surveys per day, N=63 with 2,155	N=63 adolescents (2,155 ESM observations)	M=15.12 years (SD 0.51).	Active and passive use of each adolescent's three self-selected	Momentary affective well-being (single validated item).	Average within-person effect of passive SM use on momentary well-being is non-significant, but masks marked person-specific heterogeneity: 44% of adolescents

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
			ESM observations; multilevel models with FE and random slopes; categorical and dose-response models estimated separately for overall use, Instagram, and WhatsApp.	); single secondary school; 54% female.		favourite social media platforms (most commonly Instagram, WhatsApp, Snapchat); minutes per hour, ESM self-report.		are unaffected, 46% feel better and 10% feel worse after passive SM use. ESM evidence on between-person heterogeneity in within-person effects.
4	Boer et al. (2021)	Netherlands	Dutch Digital Youth 3-wave (2016–2018) self-report; RI-CLPM testing bidirectional links among SM intensity, SM problems, depression, life satisfaction; tested mediators (upward comparison, cybervictimization, school achievement, face-to-face contact).	n=2,109 secondary students (9 schools); T1 ages 10–16 (M 13.1, SD 0.8), 43.1% girls; participation 77.9%/75.0%/40.5% across waves (FIML/plausible values).	10–16 years at T1 (mean 13.1); first two years of secondary school	Problematic SMU: Social Media Disorder Scale items (yes/no domains incl. displacement, deception, escape, conflict). Intensity: frequency of SNS viewing/liking/responding/messaging-sharing.	Depression (Depressive Mood List, 6 items) and life satisfaction (Student's Life Satisfaction Scale, 7 items); mediators as above.	SMU intensity showed no longitudinal links with depression or life satisfaction. Increases in SMU problems predicted increased depression and decreased life satisfaction one year later; reverse paths nonsignificant. SMU problems predicted later upward comparisons and cybervictimization but mediation of mental-health change not supported. Authors argue problematic/addiction-like use (not high intensity alone) is the key risk marker.
5	Booker et al. (2018)	UK	UK Understanding Society youth survey; 5-wave longitudinal; parallel latent growth models (ages 10–15) run separately	Pooled N=9,859 (girls 4,869; boys 4,990) aged 10–15 across first 5 waves	10–15 years	Self-report: has social networking profile + hours/day chatting/interacting on school day; recoded to no	Happiness scale (6 items; 6–42) and SDQ total difficulties (20 items; 0–40).	Use increased with age; girls higher. Girls: higher SM at age 10 correlated with lower happiness and higher SDQ at 10; increases in SM correlated with lower happiness and higher SDQ over time; SM at 10 predicted steeper SDQ increases with age. Boys: weak/absent linked trajectories. Heavier early

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
			by sex to link SM interaction trajectories with well-being.	(rolling entry at 10, exit at 16).		access/profile, ≤1h, 1–3h, ≥4h.		interaction more consistently tied to worsening well-being among girls.
6	Braghieri, Levy & Makarin (2022)	USA	Natural experiment: staggered Facebook rollout across US colleges (2004–2005) analysed with generalized difference-in-differences using NCHA survey waves (2000–2008), college and wave fixed effects.	Rollout dates for 775 colleges; 17 semi-annual NCHA waves; preferred spec uses 359,827 full-time undergraduate observations (unbalanced panel).	College students (full-time undergraduates; typical ages ~18–23).	Exposure = Facebook available at respondent's college at survey time (intent-to-treat; no individual use measured).	Primary: standardized index of poor mental health (symptoms + other mental-health condition items). Sub-indices incl. depression-related symptoms and service take-up (diagnosis/therapy/antidepressants). Downstream: mental-health-related academic impairment index.	Facebook introduction associated with worse mental health; share of students reporting depression/anxiety/seasonal affective disorder impaired their academic performance. Effects larger in groups plausibly more exposed to adverse social comparisons; authors report no evidence effects driven solely by reduced stigma in reporting.
7	Brailovskaia et al. (2020)	Germany	Germany RCT: 2-week intervention reducing Facebook by 20 min/day vs usual; surveys at baseline, day 7, day 15, 1-month, 3-month; repeated-measures ANOVAs.	EG n=140 (80.7% women; M 24.15, SD 5.06, 18–51); CG n=146 (74.7% women; M 25.39, SD 6.69, 18–59); mostly	Adults; mean age 24.15 years (SD 5.06) in the experimental group and 25.39 years (SD 6.69) in	Daily Facebook minutes plus passive use, use intensity, and Facebook Addiction Disorder; general internet-use frequency also measured.	Life satisfaction (SWLS) and depressive symptoms (DASS-21 depression). Secondary: physical activity frequency and smoking behaviour.	Intervention reduced Facebook time and passive use, use intensity, and addiction indicators. Group×Time interactions for life satisfaction and depression reflected within-EG improvement over time (between-group post-hocs nonsignificant). Physical activity increased; smoking interaction n.s.

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
				university; smoking subsample EG 33, CG 32.	the control group.			
8	Chu et al. (2024)	USA	ABCD prospective cohort: baseline 2016–2018 (age 9–10) to year-2 (2018–2020). Logistic regressions: baseline screen time associated with year-2 eating-disorder symptoms; cross-sectional year-2 problematic use linked to symptoms.	N=10,246 (ABCD; 21 US sites) after excluding missing screen-time/eating-disorder data.	Mean 9.9 years at baseline (SD 0.6); ages 9–14 across study period	Baseline Youth Screen Time Survey (weekday/weekend hours across modalities incl. social media; total summed). Year-2 problematic use: SMAQ (6-item) and MPIQ (8-item).	Year-2 KSADS-5 eating-disorder symptoms (fear of obesity, weight-based self-worth, compensatory behaviours, binge eating/distress); covariates including sociodemographics, BMI, anxiety, impulsivity.	Each additional hour of baseline total screen time and baseline social media time predicted higher odds of all eating-disorder symptoms 2 years later. Year-2 problematic social media and mobile-phone use were cross-sectionally associated with all symptoms. Effects were positive but relatively small; problematic use was not examined prospectively (not measured at baseline).
9	Collis & Eggers (2022)	Netherlands	Field RCT (~8 months) with 3 blocks: baseline tracking; 2.5-month 10-min/day cap on FB/IG/Snap with monitoring/blocking; post-treatment follow-up; DiD/regression analyses.	N=122 students (60 treatment, 62 control); objective tracking on devices; post-treatment analyses n=106 with complete activity data	Mean 22.1 years (SD≈3.2)	Objective minutes/day on FB+IG+Snap plus total/detailed digital categories; cap enforced after 10 min (alerts then blocking).	SWLS and SWEMWBS (4 surveys); academic records (grades, ECTS attempted, courses passed).	Treatment cut social networking to ~8.1 min/day vs ~24.2 control in Block 2 (baseline ~21.1 vs 27.9). Total digital time unchanged; substitution (notably instant messaging). No significant effects on life satisfaction/mental well-being or academic outcomes; more credits attempted but no more passed; no lagged effects and use rebounded after cap removed.

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
				+ all surveys.				
10	Coyne et al. (2020)	USA	Flourishing Families Project; 8-year annual cohort (ages 13–20); ALT-SR models separating between- vs within-person and testing bidirectional links between SM time and depression/anxiety.	Original N=500 (51.6% female); analytic n=487 after excluding 13 outlier cases; annual Waves 3–10; 83% retention over 8 years.	Ages 13–20 years (mean age at first study wave = 13.82, SD=1.03)	Annual self-report daily time on social networking sites (none to >8 h/day; platform examples updated).	Annual depression (CES-DC, 20 items) and anxiety (Spence Child Anxiety Inventory GAD subscale, 6 items).	Between-person: higher typical SM time associated with higher depression/anxiety (some sex differences). Within-person: changes in an individual's SM time generally did not predict later depression/anxiety, and vice versa (one exception: age-16 depression predicted lower SM at 17). Time spent alone not consistently linked within-person across adolescence.
11	Davis & Goldfield (2025)	Canada	Parallel-group RCT (1-week baseline + 3-week intervention); intervention group capped smartphone social media use at 60 min/day; daily screen-time screenshots submitted for objective compliance monitoring.	N=220 (168 women, 50 men, 2 other); intervention n=117, control n=103; university students reporting ≥2 depression/anxiety symptoms	17–25 years.	Objective daily minutes on FB/IG/TikTok/Snap/Twitter/Pinterest/Tumblr via built-in smartphone screen-time screenshots submitted daily; messaging apps (e.g., WhatsApp, Reddit) excluded from restriction and measurement. Intervention target: ≤60 min/day.	Depressive symptoms (CES-D 10-item revised; clinical threshold score ≥10); generalized anxiety (GAD-7; clinical threshold ≥8); fear of missing out (FoMO scale, 10 items, Przybylski et al. 2013); sleep duration estimated from self-reported weekday and	Compared with controls, the intervention group showed greater reductions in depression, anxiety, and FoMO, and greater increases in sleep after the 3-week intervention. No gender moderation was detected.

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
				at recruitment; all used SM ≥ 2 h/day at baseline.			weekend bedtime/wake-time.	
12	de Valle and Wade (2022)	Australia	3-arm pilot RCT (1-week, self-guided PDF modules): self-criticism/self-compassion CBT modules vs social-media curation modules vs waitlist; assessments baseline, 1-week post, optional 2-week follow-up.	Randomised n=130 (age 17–25; M 19.29, SD 1.88; 89.2% women). Attrition 23.1% at 1 week; 59.2% at optional 2-week follow-up.	17-25 years (Mean 19.29; SD 1.88)	Self-report appearance-motivated SM use and appearance comparison; interventions provided SM problem-solving/self-compassion strategies or feed curation plans.	Appearance motivation (Motivations for SM Use—Appearance, 5 items); appearance comparison (PACS-R, 11); self-criticism (RDEQ subscale, 9); body image flexibility (BI-AAQ, 12); disordered eating (short EDE-Q, 12; past 7 days).	Feasibility: ~82% modules and ~77% homework completed; high attrition at optional follow-up. 1-week: self-criticism arm vs waitlist showed moderate improvements (lower appearance motivation/comparison, lower disordered eating, higher body-image flexibility); curation vs waitlist showed moderate reduced appearance comparison. 2-week: most gains maintained; disordered eating no longer significantly different in self-criticism arm; curation benefit retained. No moderation by baseline clinically significant disordered eating; larger powered RCT recommended.
13	Faulhaber et al. (2023)	USA	2-week randomised experiment: self-monitor + limit SM to 30 min/day (daily reminders) vs usual use; pretest and 2-week posttest.	N=230 undergrads (Midwestern US); intervention n=99, control n=131; M age 22.0 (SD 5.2, 18–52); 73% female.	Mean 22.0 years (SD 5.2; range 18–52)	Self-report minutes/day on top 3 platforms + phone usage-time screenshots pre/post; intervention targeted ≤ 30 min/day total across top 3.	Anxiety (STAI-state), depression (CES-D), loneliness (UCLA-3), FOMO scale, affect (PANAS positive/negative).	After 2 weeks, limiting/self-monitoring group showed decreases in anxiety, depression, FOMO, loneliness, and negative affect, and increased positive affect vs controls. Authors note the intervention is feasible (self-monitoring + reminders) but effects of limiting vs self-monitoring/self-control cannot be fully disentangled.

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
14	Gingras et al. (2023)	Canada	2-wave adolescent longitudinal study (1-year) with CLPM; tested bidirectional links between passive/active/problematic SM use and depression/anxiety; moderators sex and extraversion.	Analytic N=257 (T1 n=228; T2 n=218; 48.65% girls).	Mean 13.70 years at T1; followed 1 year to ages 14-15	Passive vs active use via 3 email diaries/week per wave (frequency 0–9; posting/sharing). Problematic use: Bergen Social Media Addiction Scale (6 items).	Depression (CDI short, 10 items) and anxiety (RCMAS-2 short, 10 items); extraversion (Big-Five short, 10 items) as moderator.	Passive/active use showed no cross-lagged links with later depression (and depression did not predict use). Problematic use predicted higher anxiety 1 year later; anxiety did not predict problematic use. Active use predicted later anxiety only for low/moderate extraversion (not high extraversion). No sex moderation; passive use not linked to later anxiety or depression.
15	Gordon et al. (2021)	Australia	Cluster-randomised controlled trial (preregistered ACTRN12617000137392); 4 timepoints: baseline, 1-week post, 6-month, 12-month follow-up. Mixed-model ANCOVA with cluster-robust standard errors; sex-stratified analyses.	N=892 students (50.5% female).	11–15 years (M=12.8).	SoMe social media literacy programme (four 50-minute lessons over 4 weeks) vs lessons-as-usual control.	Body dissatisfaction, dietary restraint, muscle-building strategies (primary); self-esteem and depressive symptoms (secondary).	Modest, sex-specific effects. At 6-month follow-up, girls in the intervention reported lower dietary restraint and lower depressive symptoms than the control; few effects emerged for boys. No sustained effects on body dissatisfaction or self-esteem at 12 months. Supports content-curation/literacy intervention as a complement to time-restriction approaches.
16	Hoare et al. (2020)	UK	Millennium Cohort Study (UK) longitudinal: age ~7 parent mental health (2008) and age ~14 self-reported depression/behaviour	N=9,369 (48.1% girls). Mental-health groups: none (6,106), age7 only	Approx. 7 years at baseline and 14 years at follow-up	Age-14 self-report hours/week on social networking sites (<0.5 to ≥7 h/week; treated continuous).	Age7 SDQ (parent; difficulties ≥14) and age14 SMFQ (self; ≥8 depressive symptoms) defining exposure groups; other behaviours	Compared with no problems, age-14-only and both-ages groups reported greater SM use at age 14 and were less likely to meet sleep and fruit/veg recommendations. Note: mental health status is the exposure; SM use is an age-14 behavioural outcome.

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
			rs (2015–16). Survey-weighted regressions used mental-health-change groups to predict age-14 behaviours.	(693), age14 only (2,197), both (373).			(sleep, diet) also measured.	
17	Hökby et al. (2016)	Estonia, Hungary, Italy, Lithuania, Spain, Sweden, UK	SUPREME multicountry school cohort (baseline, 2mo, 4mo). Baseline hierarchical regressions and longitudinal regressions predicted 4-month change in psychopathology, adjusting for sex/age/trial condition.	Baseline N=2,286 (33 schools, 7 countries); longitudinal analytic n=1,544 (56% female; M age 15.8, SD 0.91).	Adolescents aged 14–16 years; longitudinal sample mean age 15.8 years (SD 0.91).	Weekly internet hours; relative time across 7 online activities (incl. socializing, gaming, gambling, pornography, targeted searches); perceived positive/negative consequences (e.g., withdrawal, sleep loss).	DASS-42 depression/anxiety/stress combined into overall psychopathology score.	Cross-sectional: internet time/activity mix explained little variance, while perceived consequences added substantially. After accounting for consequences: gaming protective, gambling and targeted searches risk; strongest correlates were negative consequences. Longitudinally, only sleep loss and withdrawal predicted worse mental health over 4 months.
18	Houghton et al. (2018)	Australia	Australian school cohort; 6 waves over 2 years (2013–2015). Latent growth models for depression trajectories; RI-CLPM for within-person reciprocal links between	N=1,749 adolescents (47% female) aged 10–17 from 38 schools (Perth region).	10–17 years	Screen Based Media Use Scale: weekday/weekend total screen time + time on social media, gaming, web use, TV/passive; weighted averages.	Depressive symptoms via CDI-2 (12 items; standardized T-scores).	Depression trajectories: low-stable 79.9%, high-decreasing, low-increasing. Low-increasing group showed largest increases in screen use. RI-CLPM: total screen time and depression had statistically significant but very small reciprocal cross-lags; by activity, only web use predicted later depression; social media/gaming/TV showed no consistent cross-lags. No evidence for nonlinear 'Goldilocks' threshold; overall associations modest. In sex-stratified

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
			depression and screen use.					analyses, males showed reciprocal cross-lagged associations between SMU/depressive symptoms;
19	Hunt et al. (2023)	USA	3-arm RCT over 4 weeks (1-week baseline + 3-week intervention) during remote learning: usual use vs 60 min/day cap across major platforms vs same cap + mute IG acquaintances/strangers and abstain from TikTok.	182 enrolled; 142 completed (103 women, 39 men).	University undergraduates; exact mean age not reported	Objective weekly phone Screen Time screenshots for FB/IG/Snap/Twitter/TikTok; baseline self-report use/network size; muting arm provided evidence of muted accounts.	FOMO, loneliness (UCLA), depression (BDI-II), self-esteem (Rosenberg), social comparison orientation (INCOM).	60 min/day limit reduced depression only among those with higher baseline depression (condition×baseline depression interaction). Cap + muting/TikTok abstinence produced clearest FOMO reductions (mainly among highly depressed). Muting reduced social comparison; loneliness did not change significantly. Conclusion: benefits depend on reducing exposure to stranger/influencer content as well as time.
20	Kandola et al. (2022)	UK	UK Millennium Cohort Study prospective: age-14 time-use diaries (weekday+weekend) predicting age-17 emotional symptoms. Compositional data analysis modeled 24h time reallocations (1–60 min/day); tested sex interaction and sensitivity excluding baseline elevated depression.	Analytic N=4,599 (55% female) with diaries at age 14 (38.7% of Sweep 6).	Age 14 at baseline exposures; age 17 at outcome assessment.	Two 24h diaries across 44 activities; screen categories included TV, social media, videogames, general computer use; minutes/day weighted to week. Exercise split into team sports vs individual exercise.	Outcome: SDQ emotional symptoms at 17 (0–10); baseline SDQ emotional symptoms at 14 included; confounders including deprivation, BMI, social support, self-esteem, maternal mental health.	Modelled reallocation 60 min/day from total screen time to exercise at 14 associated with lower emotional symptoms at 17. Effects were specific to reallocations to team sports; reallocations to individual exercise showed no change. No sex moderation; sensitivity excluding baseline elevated depression similar.

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
21	Kohler et al. (2021)	USA	Lab RCT with pre/post: 10-min scrolling on Instagram feed (image-conscious fitness/model/beauty) vs neutral feed; mood and state anxiety measured pre/post; trait anxiety explored as moderator.	N=81 undergrads (53 women, 28 men); 38 image-conscious, 43 control; ages 18–30 (M 19.07, SD 1.56).	College students / emerging adults; ages 18–30 years (M=19.07, SD 1.56).	Experimental Instagram exposure condition (not habitual use).	State anxiety (adapted GAD-2), mood (abbreviated POMS positive/negative composites), trait anxiety (BFI-2 anxiety facet).	Image-conscious feed increased negative mood and decreased positive mood vs neutral; state anxiety increase marginal. Change-score analyses similar. Exploratory moderation: among low trait anxiety participants, condition×baseline state-anxiety interaction significant; low trait anxiety + high baseline state anxiety showed increased post state anxiety.
22	Kurten et al. (2025)	UK	Ten-wave (2009–2019) UK household panel (Understanding Society); Latent Class Analysis (LCA) to derive deprivation groups; cross-sectional multilevel multinomial regressions and multi-group Random-Intercept Cross-Lagged Panel Models (RI-CLPM) for within-person longitudinal associations.	N=23,155 adolescents aged 10–21 (79,486 measurement points); 16,582 completed ≥2 waves; deprivation measured via parent-reported Household and Childhood Material Deprivation Indices.	10–21 years across 10 waves (2009–2019).	Social media access (binary, annual: has social media profile/account). Social media use (ordinal hours/day categories: none to ≥7h on a normal school day), measured annually. Note: questionnaire item wording changed slightly between waves 7 and 8.	Life satisfaction: 7-point scale. 10–15-year-olds: visual analogue scale ('which best describes how you feel about your life as a whole?', 1=very happy to 7=very sad, reversed). 16–21-year-olds: satisfaction with life overall (1=completely dissatisfied to 7=completely satisfied).	Deprived adolescents were less likely to have social media access, but those with access spent slightly more time using it. Deprivation was associated with lower life satisfaction overall, but did not appear to moderate the longitudinal within-person link between time spent on social media and life satisfaction.

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
23	Lee et al. (2022)	USA	4 waves (2013–2018); multi-group latent growth curve models, sex-stratified; uses Population Assessment of Tobacco and Health (PATH) cohort.	N=5,114 adolescents (48.7% female).	12–14 years at baseline.	Frequent social media use (yes/no, self-report).	Internalising mental-health trajectory (GAIN-SS internalising subscale, 4 items, 0–4).	Boys showed an improving mental-health trajectory; girls showed a deteriorating trajectory. Frequent social media use accounted for the trajectory in Waves 1–3 for boys, but only at Wave 1 for girls.
24	Li et al. (2022)	China	Prospective 2-wave cohort, 9-month follow-up; incident-design (depression-free at baseline); multilevel logistic regression adjusted for baseline depressive symptoms, age, sex, academic performance and family characteristics.	N=3,196 secondary-school adolescents.	Secondary school students.	SNS intensity (function-specific): Social Function Use Intensity (SFUI), Entertainment Function Use Intensity (EFUI), Emotional Connection (EC).	Incident depression (CES-D ≥ 21 on 20-item) among adolescents depression-free at baseline (CES-D < 21).	SFUI and EFUI prospectively predicted incident depression at 9 months; the Emotional Connection dimension was non-significant.
25	Mader et al. (2025)	Switzerland	Two datasets: HBSC repeated cross-sectional trends 2002–2022 (ages 11–15) and TREE cohort panel 2016–2019, 2021–2022 (ages 15–22) using FE/FEIS causal	HBSC N=59,662 observations ; TREE N=19,809 observations from 4,232 individuals (≥ 3	HBSC: 11–15 years. TREE: 15–22 years.	HBSC problematic SM use: Social Media Disorder Scale (9 items). TREE: SM use > 2 h/day (controls for other media) and parental-	Life satisfaction via Cantril Ladder (0–10) in both datasets.	HBSC: life satisfaction declined from 2002 until 2022 (larger for girls); problematic SM use increased from 2018 to 2022. HBSC pooled OLS (2018–2022): problematic SM use associated with ~ -0.88 ladder points, little moderation. TREE FE/FEIS: > 2 h/day social media/email use was associated with lower life satisfaction only among females with low/middle parental education;

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
			models and subgroup analyses (gender × parental education) with age interactions.	observations).		education subgrouping.		estimates were largest before age 18 and close to zero from 18–22; no comparable association for males or females with high parental education.
26	Maheux et al. (2024)	USA	3-wave) 8th-grade longitudinal; RI-CLPM separating between vs within-person links between appearance-related social media consciousness (ASMC) and depressive symptoms; multi-group gender tests and sensitivity analyses.	n=1,594 8th graders in one Florida district; ~47.5% girls, 46.1% boys; diverse race/ethnicity.	11–15 years at baseline (M=13.15SD=0.48).	ASMC: 13-item scale ($\alpha \approx 0.94–0.96$). Sensitivity covariate: typical-day hours on social media (0 to ≥ 10 h/day).	Depressive symptoms: SMFQ 13 items ($\alpha \approx 0.91–0.92$). Sensitivity covariate: self-objectification (SOBBS items; $\alpha \approx 0.94–0.95$).	Between-person ASMC and depressive symptoms correlated. Within-person: increases in ASMC predicted later increases in depressive symptoms; depressive symptoms did not predict ASMC. No gender differences in cross-lags. Results robust when controlling for time on SM and self-objectification; within-person time-on-SM change was not associated.
27	Marciano et al. (2022)	Switzerland	Natural experiment (pre/post COVID lockdown): MEDIATICO cohort Spring 2019 (T1) vs Autumn 2020 (T2). Bonferroni-corrected paired t-tests and hierarchical regressions predicted T2 mental health from	Analytic N=674 adolescents (56.7% female; M age 14.45, SD 0.50 at T1) with data at both waves (exclusions for	Adolescents; Mage 14.45 years (SD 0.50) at T1.	Time spent (typical weekday + weekend) in categories (0 to ≥ 5 h) for internet, smartphone, social media, videogaming, instant messaging, TV; weighted daily averages and increase of indices computed.	Adapted DSM-5 Cross-Cutting Symptoms plus CES-D (7 items) and UCLA loneliness (3 items); composite overall mental health problems used as main outcome.	Most mental health problems increased from 2019–2020. Screen-media activities increased except TV and gaming. In regressions, increased social media time was the only screen activity linked to worse overall mental health at T2 after covariates/baseline/other changes. More TV viewing associated with lower inattention and lower anxiety.

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
			covariates, baseline, and changes in screen activities.	missingness/outliers).				
28	Maurya et al. (2024)	India	UDAYA India 2-wave cohort (2015–16 to 2018–19): cross-sectional logistic models at each wave plus cross-lagged path analysis for bidirectional links between SM use and depressive symptoms among unmarried adolescents/young adults.	Analytic N=12,035 with follow-up (4,428 boys; 7,607 girls).	10-19 years at Wave 1; 13-22 years at Wave 2	Ever SM use (yes/no; platforms listed) plus frequency categories; Wave-2 duration categories (0, 1–2, ≥3 h/day).	Depressive symptoms via 9 PHQ-style items (0–27); categorized and dichotomized (none/minimal vs any) for logistic models.	Cross-sectionally, SM use associated with higher odds of depressive symptoms at Wave1 and Wave2; Wave2 duration also associated. Cross-lagged SEM showed stability of SM use and depression but no significant cross-lagged paths either direction. Conclusion: contemporaneous associations, no supported bidirectional longitudinal effects.
29	McNamee et al. (2021)	UK	UK Understanding Society longitudinal; estimated associations via individual fixed-effects, propensity score matching, and IPWRA with extensive controls.	>23,000 observations from >8,000 children; main outcome models used ~13k observations (varies by model).	Youth questionnaire ages 10-15; some respondents later observed at age 16+ in adult survey	Has SM profile + hours/day chatting/interacting on a normal school day; categories: none, <1h, 1–3h, ≥4h.	Youth mental health index (0–8 distress from 8 self-evaluation items) plus SDQ total/subscales (GHQ in older ages noted but secondary).	Heavy use (≥4h/day) consistently linked to poorer mental health and more difficulties, especially worse self-value and conduct/hyperactivity/emotional symptoms. Moderate use (<3h/day) showed smaller/mixed associations, including some evidence of better peer relations.
30	Nagata et al. (2025)	USA	ABCD cohort (4 annual waves over 3 years). Tested reciprocal links	Baseline N=11,876 (mean age 9.9, SD 0.6;	Ages 9–10 years at baseline (mean 9.9,	Annual Youth Screen Time Survey: weekday/weekend hours+minutes on	Annual caregiver-reported CBCL DSM-oriented depressive	Within-person: above-usual SM use predicted higher later depressive symptoms. Depressive symptoms did not predict later

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
			between SM time and depressive symptoms using panel models (CLPM vs RI-CLPM); final unconstrained RI-CLPM adjusted for demographics/SES.	52.2% male); wave Ns vary; all available data used.	SD 0.6); followed annually for 3 years into early adolescence.	social media; weighted mean daily hours = [(weekday×5 + weekend×2)/7].	problems (raw score).	SM use. Between-person SM differences not associated with depression after covariates.
31	Narita et al. (2025)	Japan	Population-based cohort study (Tokyo Teen Cohort) with data at ages 10, 12, and 16; examined whether problematic internet use at ages 10, 12, and 16 was associated with psychotic experiences and depression at age 16, adjusting for baseline confounders.	N=3,171 at age 10; 3,007 at age 12; 2,616 at age 16.	10, 12, and 16 years.	Problematic internet use assessed using a modified parent-reported Compulsive Internet Use Scale (CIUS).	Psychotic experiences at age 16 (APSS) and depression at age 16 (SMFQ); social withdrawal also assessed as a mediator.	Higher problematic internet use, especially at age 12, was associated with higher risk of psychotic experiences and depression at age 16. Associations were smaller for problematic internet use at age 10. Social withdrawal mediated part of the association with psychotic experiences.
32	Nesi et al. (2021)	USA	2-wave longitudinal study, 1-year follow-up; cross-lagged regression with covariates.	N=687 adolescents (48.6% female).	M=14.3 years.	Positive and negative emotional responses to social media experiences (quality of engagement, not quantity).	Depressive symptoms (validated).	Higher baseline depressive symptoms predicted more negative emotional responses to SM 1 year later. Positive SM emotional responses were also paradoxically associated with later depressive symptoms.

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
33	Ohanessian et al. (2021)	USA	3 waves (Fall 2016, Spring 2017, Fall 2017); 3-wave mediation analysis; covariates include sex, race/ethnicity, baseline mental health.	N=1,205 adolescents (51% female).	M=12.75 years.	Frequency of SMU (Facebook, Twitter, Instagram, Snapchat) on a typical weekend day; Technology Use Questionnaire.	Depression and anxiety (validated scales).	Significant mediation: SM use predicted increased co-rumination with peers, which in turn predicted higher anxiety symptoms (indirect effect significant). Direct effect of SM use on both depression and anxiety were nonsignificant; mediation via co-rumination was significant only for anxiety, with a depression trend.
34	Orben et al. (2019)	UK	UK Understanding Society youth panel (8 annual waves 2009–2016). RI-CLPM plus specification-curve analysis across 2,268 model specifications.	12,672 adolescents aged 10–15; analytic N varied by specification (n=539–5,492; median 1,699).	10–15 years (panel; age varies by wave).	Self-report hours spent chatting/interacting on a social media website on a normal school day (5-point scale).	Life satisfaction across six domains (friends, family, school, schoolwork, appearance, life overall) on 7-point scale; mean score also used.	Across specifications, SM use was not a strong predictor of life satisfaction. Median between-person association; median within-person effects small. Results were sensitive to analytic decisions and gender-specific; authors conclude effects are small at best and method-dependent.
35	Orben et al. (2022)	UK	Preregistered analyses across two UK datasets: latent growth curve and cross-lagged models in the longitudinal sample; cross-sectional sensitivity analyses across the lifespan.	Longitudinal N=17,409; cross-sectional N=84,011.	10–21 years (longitudinal); 10–80 years (cross-sectional).	Social media use (estimated hours per day; self-report).	Life satisfaction (1-item validated).	Identifies age- and sex-specific developmental sensitivity windows in which higher SM use predicts lower life satisfaction: girls 11–13 and 19; boys 14–15 and 19. Outside these windows, effects are weaker or null. Provides preregistered evidence that effects of SM use vary by developmental stage rather than acting uniformly.
36	Pang et al. (2025)	China	School 2-wave longitudinal (Aug 2021→Feb 2022; 6 months). CLPM	Initial n=435; follow-up n=424	Baseline ages 16–18 (initial sample);	SNS usage intensity via 8-item scale (based on Facebook Intensity Scale):	Cyberbullying perpetration (CBI 14 items; past 3 months) and	Cross-lags: cyberbullying T1 linked to depression T2 and to SNS T2; depression T1 linked to cyberbullying T2. SNS T1 did not predict later cyberbullying or depression;

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
			tested paths among SNS usage intensity, cyberbullying perpetration, and depressive symptoms.	(55.9% boys; age 17–19; M 17.07, SD 0.64).	T2 age range 17–19 (Mage=17.07, SD=0.64); 55.9% boys.	friends, time/week categories, and attitudes ($\alpha=0.80$ T1; 0.88 T2).	depression (DASS-21 depression 7 items; past week).	depression T1 did not predict SNS. No gender moderation.
37	Pieh et al. (2025)	Austria	RCT: 10-day baseline, 3-week smartphone screen-time reduction to ≤ 2 h/day vs usual, 6-week follow-up; ITT repeated-measures ANOVAs.	N=111 healthy students (58 intervention, 53 control), age 18–29 (M 22.68, SD 2.56); baseline screen time ~ 277 min/day; inclusion required ≥ 3 h/day and no diagnosed/treated mental disorder.	18–29 years (M=22.68, SD=2.56).	Objective weekly smartphone screen time logs; ≤ 2 h/day enforced during 3-week intervention (no restriction after post-test).	Primary: WHO-5 well-being, PHQ-9 depression, PSQ-20 stress, ISI sleep. Additional: SAS-SV problematic use, GAD-7 anxiety, SCOFF eating, BAS-2 body appreciation.	At post (t1), intervention improved all four primary outcomes with small–medium time $\times$ group effects. At 6-week follow-up, effects remained for depression, stress, and sleep; well-being interaction. No significant effects for anxiety, disordered eating, or body appreciation; problematic smartphone use decreased more in intervention.
38	Plackett et al. (2023)	UK	UK Understanding Society longitudinal household survey (2009–2019). Active	N=3,228 with exposure and	Ages 12–13 at exposure; 13–14 at	Active social media use: membership of a social media account + hours/day	Mental-health problems via SDQ total difficulties at ages 14–15	Unadjusted prospective association: more time spent on social media at ages 12–13 was associated with higher SDQ difficulties two years later. After adjustment for socio-

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
			social media use measured at ages 12–13 (Wave 1); self-esteem and social-connectedness mediators at ages 13–14 (Wave 2); SDQ mental-health outcomes at ages 14–15 (Wave 3). Multilevel linear regression and structural equation modelling for mediation; multiple-imputation sensitivity analysis.	outcome data; adjusted regression sample n=2,603; mediation analytic sample n=2,316; multiple-imputation sensitivity sample n=8,045 (Understanding Society youth panel).	mediator measurement; 14–15 at outcome.	chatting/interacting on a school day (5-point scale: none to ≥7 hours; non-members coded as none). Mediators: self-esteem (Rosenberg), number of close friends, happiness with friendships.	(continuous; clinical-risk threshold ≥20). Baseline SDQ at 12–13 included as covariate. Sociodemographic and household covariates adjusted.	demographic and household covariates the association attenuated to non-significance. Unadjusted SEM mediation suggested ~68% of the effect was mediated by lower self-esteem. Social-connectedness mediators (number of friends, happiness with friendships) were non-significant in both adjusted and unadjusted models. Multiple-imputation sensitivity analyses produced similar results.
39	Puukko et al. (2020)	Finland	Longitudinal cohort (born 2000) with 5 measurement occasions across 2014–2016 and 2018–2019 (gap in 2017). RI-CLPM separating within- vs between-person links; sensitivity with covariates and ≥3-wave subsample.	N=2,891 adolescents (42.7% male), ages 13–14 to 18–19; rolling recruitment and varying wave Ns.	13–14 years at baseline; 18–19 years by the final wave.	Active SNS use: 4-item socio-digital participation inventory (1–7; $\alpha=0.71-0.84$) capturing socially oriented behaviours (posting/updates/likes, etc.).	Depressive symptoms: DEPS 10 items ($\alpha=0.92-0.94$).	No within-person effect of SM use on later depression. Small reverse effect: higher-than-usual depressive symptoms predicted slight increase in SM use 1 year later. Within-person correlated change ~0 and between-person correlation n.s.; sensitivity analyses showed same pattern.

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
40	Salmela-Aro et al. (2017)	Finland	2-wave longitudinal, two cohorts (12–14 and 16–18). SEM cross-lagged models tested reciprocal links among excessive internet use, school burnout, school engagement, and depressive symptoms.	Early cohort N=1,702 (53% female); late cohort N=1,636 (64% female).	Study 1: 12–14 years. Study 2: 16–18 years.	Excessive internet/ICT use scale (7 items T1, 5 items T2; $\alpha=0.72/0.80$) capturing compulsive urge/neglect/late-night use.	School engagement (EDA), school burnout (SBI), and depressive symptoms (DEPS items).	Both cohorts showed reciprocal paths between excessive internet use and school burnout (burnout linked to excessive use). Burnout and depressive symptoms also showed reciprocal associations. Girls reported more depressive symptoms (and more burnout in late adolescence); boys higher excessive internet use.
41	Schemer et al. (2021)	Germany	Biennial panel over 2008–2016 (waves 1,3,5,7,9). Random-effects within-between models separated between- vs within-person change, controlling TV use, self-esteem, satisfaction with friends, time trends, and lagged outcomes.	Baseline N=4,338 adolescents (M age 16.0, SD 0.82; 49.3% female); analyses used all available responses across waves.	Baseline mean 16.0 years; followed for ~9 years (approx. age 16 → mid-20s)	Internet hours last week; SNS profile ownership and frequency (0 none to 6 several times/day); TV hours last week.	Depressive symptoms (State-Trait Depression Scale, 10 items) and life satisfaction (single 0–10); controls self-esteem and satisfaction with friends.	With confounders/time trends, no meaningful within-person or lagged within-person effects of internet or SNS use on depression or life satisfaction; small effects in simpler models largely vanished with controls. Between-person internet use showed tiny associations (more internet linked to slightly higher depression/lower life satisfaction) with near-zero variance explained; SNS profile not related. TV use showed small within-person links to lower life satisfaction. Conclusion: frequency of internet/SNS use not meaningfully harmful/beneficial; confounder control matters.
42	Shoshani et al. (2024)	Israel	5 waves Oct 2019–Jun 2023 (pre/during/post-COVID); growth mixed-effects models; covariates	N=3,697 children and adolescents.	8–14 years (note: lower bound below the	Self-reported use of YouTube, Instagram, TikTok, Facebook, Snapchat, Twitter, WhatsApp and other social media	Depression, anxiety, somatization (Brief Symptom Inventory); positive and negative	SM use rose during the COVID-19 period. Greater SM use was associated with higher psychiatric symptoms and negative emotions, but also with higher positive emotions and life satisfaction in the same sample. Social support buffered harmful effects. Illustrates

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
			include social support, extracurricular activity, age, sex.		review's 10y cut-off).	platforms (hours/day; self-report).	emotions; life satisfaction.	that aggregate associations can mask co-occurring positive and negative outcomes.
43	Smith et al. (2024)	Canada	Parallel-group RCT: 1-week social media break vs usual use; baseline and 7–9 day follow-up; ANCOVAs controlling baseline; moderation by thin-ideal internalization.	Final N=66 female undergrads (break n=34; control n=32).	17–24 years (M=19.1).	Break: no SM apps (IG/FB/Twitter/TikTok) for 7 days; usage tracked via Screen Time/StayFree screenshots; total SM minutes recorded.	State self-esteem (SSES) and body satisfaction (BISS); moderator: thin-ideal internalization (SATAQ-3 subscale).	Break group used far less SM (101 vs 978 minutes). At 1 week, break group had higher total state self-esteem and subscales and higher body satisfaction vs control. Thin-ideal internalization moderated body satisfaction effect, with stronger benefits among women higher in thin-ideal internalization.
44	Smout et al. (2026)	Australia	Health4Life study 2-wave (2021→2022) secondary analysis. Logistic models tested cross-sectional, prospective (T1→T2), and change-based associations, adjusting for trial allocation and confounders; gender interactions tested.	N=3,205 adolescents with Year 9 (T1) and Year 10 (T2) data; M age 14.6→15.7.	T1 mean age 14.6 (SD 0.62); T2 mean age 15.7 (SD 0.66).	Self-reported frequency (weekday/weekend) of messaging/video calling friends, posting own content, and viewing/scrolling others' content; 12-month change categorized.	High psychological distress (K6 ≥13) and high mental well-being (SWEMWBS, binary).	No robust longitudinal associations: baseline levels and 12-month changes in messaging/posting/viewing did not predict high distress or high well-being; no gender interactions. Cross-sectionally at T2, weekday posting associated with higher odds of high distress and messaging/video calling associated with higher odds of high well-being.
45	Steinsb ekk et al. (2023)	Norway	TESS cohort, 4 waves at ages 10,12,14,16. RI-CLPM tested bidirectional within-	Analytic N=810; wave Ns 704/666/635/666 (ages	Ages 10, 12, 14, and 16 years (Mage=10.	Interview-based SM behaviours: self-oriented posting updates/photos (incl. selfies later) and	Semi-structured psychiatric interviews: CAPA at 10/12/14 and Norwegian K-SADS	Within-person changes in SM behaviours did not predict later changes in depression, social anxiety, or GAD symptoms, and symptoms did not predict later SM behaviours. Sex-specific and behaviour-specific sensitivity

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
			person links between SM behaviours (self- vs other-oriented) and symptoms of MDD, social anxiety, and GAD; FDR adjustment and sensitivity analyses.	10/12/14/16); ~52–55% girls.	51, 12.49, 14.35, 16.98 across waves).	other-oriented liking/commenting; frequency scales harmonized; platform info recorded.	at 16; symptom counts for MDD, social anxiety, GAD.	analyses likewise found no significant within-person cross-lagged effects after multiple-testing adjustment.
46	Thai et al. (2024)	Canada	Parallel RCT (4 weeks: 1-week baseline + 3-week intervention). Intervention capped smartphone SM use ≤1 h/day; controls unrestricted; mixed ANOVAs with gender moderation.	N=220 undergrads heavy SM users with depression/anxiety symptoms (intervention 117; control 103; 76% female).	17-25 years (17-19: n=161; 20-22: n=37; 23-25: n=11).	Objective daily SM minutes via built-in screen-time screenshots; tracked FB/IG/TikTok/Snap/Twitter/Pinterest/Tumblr; excluded messaging/video-calling/streaming apps.	Body esteem appearance and weight (BESAA abbreviated 5 items each).	Intervention improved appearance and weight esteem vs control. Intervention group improved; controls little change. No gender moderation; screenshot compliance high.
47	Thorisdottir et al. (2020)	Iceland	LIFECOURSE cohort 3 annual waves (2017–2019; ages 12–14). Linear mixed-effects models related time-varying SM time to depressed mood, social anxiety, and physical anxiety; tested time×SM and	Analytic N=2,211 (birth year 2004) with baseline gender; wave Ns ~2,290 (age12), 2,052 (age13),	12 years at T1, 13 years at T2, 14 years at T3	Single self-report daily time on social media (continuous); no platform-specific or active/passive detail.	Depressed mood (Symptom Checklist items) and anxiety subscales from Icelandic MASC (physical and social); parental support covariate.	Greater SM time associated with higher depressed mood, physical anxiety, and social anxiety. Associations strengthened over time for depressed mood and physical anxiety but not social anxiety. Effects stronger for girls than boys. Authors note effects are small and directionality was not tested.

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
			gender×SM interactions.	2,097 (age14).				
48	Tibbs et al. (2025)	Netherlands	LISS panel: 4 annual waves of SM behaviour (Oct 2019–2022) linked to 4 annual mental-health waves (Nov 2019–2022). RI-CLPM estimated for passive vs interactive behaviours, with added one-month-lag paths.	Analytic N=321 young people (16–25 at baseline; 61.7% female).	16–25 years at baseline; mean age 20.49 years (SD 2.94).	Self-report hours/week passive viewing/reading on SM platforms vs interactive communication (chat/video call/messaging via apps).	Internalizing difficulties via MHI-5 (0–100; higher scores = fewer difficulties).	Within-person: passive viewing not prospectively linked to internalizing (and reverse paths n.s.). Interactive communication had isolated significant prospective effects predicting better MHI-5; other cross-lags n.s. Between-person: higher passive and interactive use associated with greater internalizing difficulties on average.
49	Tsomokos (2025)	UK	Millennium Cohort Study prospective mediation: SM use at 11 → mediators at 14 → outcomes at 17. Survey-weighted SEM with multiple imputation; sex-stratified and secondary outcomes.	Analytic n=8,913 (52% female; 18% non-White) with exposure and primary outcome data.	Age 11 years (exposure) → age 14 years (mediators) → age 17 years (outcomes)	Age-11 frequency of visiting social networking websites (0 never to 4 most days).	Primary: K6 psychological distress at 17. Mediators at 14: distrust, bedtime/time-to-sleep (school nights), negative appearance self-perception. Secondary: SDQ internalizing/externalizing; latent psychiatric problems (diagnosis, self-harm, suicide attempt).	Higher SM use at 11 linked to worse distress at 17 mainly indirectly via greater distrust, later bedtime, and more negative self-perception. Distrust pathway significant for females only; sleep and self-image pathways significant in both sexes. Total/direct effect on distress ~0 and n.s.; similar indirect patterns for secondary outcomes.

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
50	Vernon et al. (2017)	Australia	3 waves, annual; bivariate latent growth curve models with sleep as mediator; reciprocal pathways modelled.	N=874 adolescents (59% female).	M=14.4 years at baseline.	Problematic social networking use (PSMU); validated self-report scale.	Depressed mood and externalising behaviour (validated scales).	PSMU growth predicted growth in depressed mood, with 53% of the association mediated by reduced sleep, and growth in externalising behaviour, with 13% mediated by sleep. Alternative models suggested some reciprocal patterning, especially for externalising behaviour; the hypothesised sleep-mediated pathway was clearer for depressed mood. Identifies sleep disruption as a downstream pathway linking problematic social networking use to internalising and externalising outcomes.
51	Viner et al. (2019)	UK	England Our Futures longitudinal (3 waves, ages 13–16): tested associations between SM use frequency and later distress/well-being separately by gender; mediation by cyberbullying, sleep, physical activity.	N=12,866 followed age 13→16 (example GHQ-12 Ns: 4,429 girls; 4,379 boys).	Wave 1: 13–14 years. Wave 3: 15–16 years.	Wave-1 SM use frequency (weekly or less to very frequent/multiple times daily) and persistent very frequent use across waves 1–2.	Wave-2 GHQ-12 distress (≥ 3). Wave-3 well-being: 1–10 life satisfaction, worthwhile, happiness, anxiety.	Very frequent use increased over time (boys 34.4%→61.9%; girls 51.4%→75.4%). Very frequent use at wave1 predicted wave2 distress in girls and boys. Persistent very frequent use predicted lower well-being among girls only. Mediation by cyberbullying/sleep/activity largely explained girl associations (except anxiety) but only 12.1% of boys' GHQ association.
52	Wang et al. (2018)	Belgium	2-wave school panel (2013→2014). Polynomial regressions tested linear/quadratic associations between active public Facebook use	15 high schools: T1 N=1,866; T2 N=1,577; both waves N=1,188 (64% of T1); M age 14.30	Mean age 14.30 years (SD 1.43) at Time 1; followed 1 year.	Active public FB use: 3-item scale (posting publicly); baseline overall time on Facebook measured as covariate.	Loneliness via de Jong-Gierveld & Kamphuis (11 items) yielding emotional and social loneliness scores.	FB use T1 showed U-shaped links with social and emotional loneliness at T2: low linked to moderate use associated with lower loneliness, moderate linked to high with higher loneliness. Social loneliness T1 predicted higher FB use T2. Emotional loneliness T1 predicted FB use T2 with a U-shaped pattern.

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
			and social/emotional loneliness in both directions, controlling baseline overall FB time, age, gender.	(SD 1.43) at T1; 55% boys.				
53	Winston et al. (2022)	UK	Two-wave longitudinal survey (Oct 2019 -> Oct 2020; 1-year follow-up); latent class analysis (LCA) at T1 to identify social media user types; latent transition analysis (LTA) for stability; bias-adjusted three-step logistic regressions predicting T2 mental health from T1 class membership, adjusted for gender, SES, ethnicity, LLTI, sexual orientation, screen-time, and baseline mental health.	T1 N=2,456 (59.1% female; mean age 13.23 years; 19 schools in south-west England); complete covariate data for outcome analyses n=1,311-1,321.	13 years at T1 (Year 9); 14 years at T2 (Year 10).	Self-reported frequency of 13 platform-agnostic social media activities (4-point scale: never to very often). Participants instructed to consider all SM platforms (IG, Snap, WhatsApp, TikTok, FB, Twitter, YouTube, etc.). Estimated weekday and weekend screen-time collected as covariate.	Past-year self-harm (single item, binary: no/yes in past year; from CASE study). Anxiety (HADS-A, 7 items; clinical threshold score ≥ 9). Depression (HADS-D, 7 items; threshold ≥ 7). Poor well-being (WEMWBS, 14 items; poor = > 1 SD below T2 sample mean, i.e., WEMWBS < 33.60).	A four-class solution was selected: High Communicators, Moderate Communicators, Broadcasters and Minimal users. Broadcasters showed the poorest overall follow-up profile, especially for depression, but pairwise contrasts varied by outcome. Moderate Communicators generally showed the most favourable profile. Users became more active over time, with increased broadcasting between ages 13 and 14.
54	Wong et al. (2022)	Hong Kong	HK-YES cohort: baseline (2019–2021) with 1-year	Baseline analyses N=3,033	15–24 years	Smartphone overuse severity via adapted CIAS-R (26 items;	Depression (DASS-D severe ≥ 21), functioning (SOFAS	Smartphone overuse prevalence 29.3%. Baseline overuse predicted 1-year severe depressive symptoms adjusting baseline

	Study	Country	Design	Sample (N)	Age	Exposure measures	Outcome measures	Key findings
			follow-up plus ESM sub-study. Multivariable models predicted 1-year severe depression; multilevel models examined momentary affect.	(from 3,298 recruited); 1-year follow-up complete N=936; ESM subsample N=177 (10 prompts/day × 6 days).	(youth sample).	compulsive use/withdrawal/tolerance/interpersonal/health/time-management problems).	+ productivity days), and ESM momentary positive/negative affect.	severe symptoms and was associated with higher depressive symptoms, poorer functioning, and more reduced productivity days. ESM: overuse associated with higher momentary negative affect but no significant multilevel effect on positive affect.
55	Xiao et al. (2025)	USA	ABCD cohort (2016–2022): latent class mixed models identified trajectories of addictive social media use (years 2–4); adjusted models estimated associations with suicide-related and mental-health outcomes at year 4.	Analytic N=4,285 (mean baseline age 10.0, SD 0.6; 47.9% female) with complete addictive-use data (years 2–4).	Baseline mean age 10.0 years; addictive-use trajectories tracked from roughly ages 11–15, with outcomes assessed at year 4 follow-up.	Child-reported addictive-use scales: SMAQ (6 items), MPIQ (8), VGAQ (6). Social media addictive-use trajectories: high-peaking, increasing, low; baseline non-school screen time measured separately.	Suicidal ideation/behaviours via KSADS (child + parent report); internalizing/externalizing via parent CBCL T scores.	SM addictive-use trajectories: high-peaking 9.6%, increasing 31.3%, low 59.1%. Compared with low, high-peaking and increasing predicted higher suicidal behaviours and ideation. Increasing trajectory linked to higher internalizing; both high-peaking and increasing to higher externalizing. Baseline total screen time not independently associated.

Annex 3. Quality appraisal summary

Quality appraisal of the 55 included studies, applying the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Cohort Studies to longitudinal observational evidence, the Cochrane Risk of Bias 2 (RoB 2) tool to randomised and cluster-randomised trials. Overall judgement is coded as: HIGH (low risk of bias / strong inferential support), MODERATE, LOW (serious concerns).

Table 4. Quality assessment.

Study	Framework	Overall quality	Notes
Beeres et al 2021	JBI-cohort	HIGH	KUPOL school cohort, RI-CLPM, SDQ; SM exposure self-report only
Boer et al 2021	JBI-cohort	HIGH	Digital Youth Project; intensity & PSMU separately measured
Booker et al 2018	JBI-cohort	MOD	UKHLS sample; parallel growth (not RI-CLPM); one SM frequency item
Chu et al 2024	JBI-cohort	HIGH	ABCD nationally representative; only 2 waves limit dynamic modelling
Coyne et al 2020	JBI-cohort	HIGH	BYU sample (not nationally representative); 8-yr follow-up
Gingras et al 2023	JBI-cohort	MOD	Small N=257; CLPM not RI-CLPM; convenience sample
Hoare et al 2020	JBI-cohort	MOD	MCS large nationally representative; reversed design (MH→SM)
Houghton et al 2018	JBI-cohort	MOD	WA school sample; 6-wave strength; SDQ-style; limited covariate set
Hökby et al 2016	JBI-cohort	MOD	SUPREME 7-country; internet (not SM-specific); 4-mo follow-up short
Kandola et al 2022	JBI-cohort	HIGH	MCS time-use diary; compositional substitution approach

Kurten et al 2025	JBI-cohort	HIGH	10-wave; large N; deprivation/inequality focus
Lee et al 2022	JBI-cohort	HIGH	PATH nationally representative; SM exposure binary
Li et al 2022	JBI-cohort	HIGH	Incident-design (depression-free at baseline); function-specific SNS
Mader et al 2025	JBI-cohort	HIGH	HBSC + TREE dual-dataset; very large; conceptual extension of Orben 2022; subgroup-specific TREE finding
Maheux et al 2024	JBI-cohort	HIGH	ASMC scale validated; 3-wave RI-CLPM; diverse US sample
Maurya et al 2024	JBI-cohort	MOD	UDAYA India two-state cohort; not nationally representative; SM binary/coarse; CLPM; not nationally representative
McNamee et al 2021	JBI-cohort	HIGH	Large UKHLS; FE design; dose-response 4hr threshold
Nagata et al 2025	JBI-cohort	HIGH	ABCD nationally representative; CBCL parent-report; 4-wave
Narita et al 2025	JBI-cohort	MOD	PIU not SM-specific; psychotic experiences outcome unique; long follow-up
Nesi et al 2021	JBI-cohort	HIGH	Diverse US; quality not quantity of SM; 2 waves
Ohannessian et al 2021	JBI-cohort	HIGH	3-wave mediation (co-rumination); diverse US sample
Orben et al 2019	JBI-cohort	HIGH	PNAS landmark; RI-CLPM; UKHLS panel
Orben et al 2022	JBI-cohort	HIGH	Nat Comms; preregistered; two UK datasets; developmental windows
Pang et al 2025	JBI-cohort	MOD	Small N=424; Two-wave CLPM; cyberbullying perpetration/depression pathway; SNS use not directly predictive of depression
Puukko et al 2020	JBI-cohort	MOD	5-wave Finnish; RI-CLPM separating within- vs between-person links; selection > socialization finding

Salmela-Aro et al 2017	JBI-cohort	MOD	EIU not SM-specific; school burnout mediator
Schemer et al 2021	JBI-cohort	HIGH	9-yr 5-wave; null result robust; controls TV use
Shoshani et al 2024	JBI-cohort	HIGH	5-wave pre/during/post COVID; ages 8–14; harm + benefit dual
Smout et al 2026	JBI-cohort	MOD	2 waves only; active/passive distinction; null replicates Steinsbekk/Beeres
Steinsbekk et al 2023	JBI-cohort	HIGH	NTNU birth cohort; psychiatric interview outcomes; 4 waves
Thorisdottir et al 2020	JBI-cohort	HIGH	Iceland LIFECOURSE pop.; gender moderation
Tibbs et al 2025	JBI-cohort	MOD	LISS NL panel; small N=321; 4-wave RI-CLPM
Tsomokos 2025	JBI-cohort	HIGH	MCS; controlled MH at age 7; 3 mediators tested
Vernon et al 2017	JBI-cohort	HIGH	27-school cluster; sleep mediator; reciprocal
Viner et al 2019	JBI-cohort	HIGH	Lancet CAH; UK Our Futures nat. rep.; mediation
Wang et al 2018	JBI-cohort	MOD	High-school sample; FB-specific; curvilinear analysis
Winstone et al 2022	JBI-cohort	MOD	19 Bristol schools; 13-activity latent classes; COVID between waves
Wong et al 2022	JBI-cohort	MOD	HK epi.; smartphone overuse not SM-specific; ESM substudy
Xiao et al 2025	JBI-cohort	HIGH	JAMA; ABCD; trajectory class approach; suicidal outcomes
Beyens et al 2020	JBI-cohort	MOD	ESM 7-day; N=63 single school (rep weak); person-specific effects
Plackett et al 2023	JBI-cohort	MOD	JMIR 2023; UK Understanding Society youth panel; multilevel regression + SEM mediation; strong but limited inferential strength.

Barry et al 2024	RoB2	MOD	3-arm lab; state mood (single session); ages 18–30 partly above 24
Brailovskaia et al 2020	RoB2	MOD	FB-only; mean age 24-25 borderline; 3-mo FU strength; self-reported
Collis and Eggers 2022	RoB2	HIGH	Objective RescueTime monitoring; multi-month study with a shorter restriction period; null result rigorous
Davis and Goldfield 2025	RoB2	HIGH	Objective screen-tracker; distressed youth; same RCT as Thai 2024, different outcomes
de Valle and Wade 2022	RoB2	MOD	Pilot N=130 randomised; 3 arms; 2-wk FU short; eating disorder focus
Faulhaber et al 2023	RoB2	HIGH	Self-monitoring 30-min; 2-wk; multiple validated outcomes
Gordon et al 2021	RoB2	HIGH	Cluster-RCT 8 schools; preregistered; 12-mo FU
Hunt et al 2023	RoB2	HIGH	3-arm content-curation; depressed subgroup moderation; ~4 wk
Kohler et al 2021	RoB2	LOW	Single lab session; N=81; appearance content manipulation; analogue
Pieh et al 2025	RoB2	HIGH	Preregistered; 6-wk follow-up; smartphone total (not SM-only)
Smith et al 2024	RoB2	LOW	N=66 underpowered; female-only; 1-wk; no MH symptom outcome (body image only)
Thai et al 2024	RoB2	HIGH	Same RCT as Davis 2025; objective monitoring; appearance/weight esteem outcomes
Braghieri et al 2022	ROBINS-I	HIGH ¹⁷	AER; staggered DiD; FB rollout as natural experiment; very large N; parallel-trends and heterogeneous treatment effects checks

¹⁷ While ROBINS-I convention reports risk of bias as “low / moderate / serious / critical”, this table inverts the scale so that the judgement reflects inferential quality rather than risk of bias.

Marciano et al 2022	ROBINS-I	MOD	Swiss COVID-period natural experiment; 9 MH indicators; N=674; 2 waves; period-confounding limits causal interpretation
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Source: authors' own elaboration.

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