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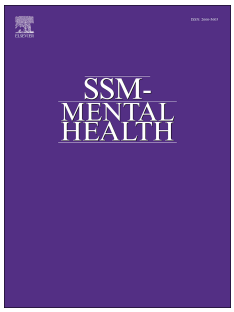

Social media use, loneliness and emotional distress among young people in Europe

Béatrice d'Hombres, Matija Kovacic, Begona Cabeza Martınez

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Group author

1 - Béatrice d'Hombres
European Commission, Joint Research Centre (JRC), Ispra, Italy

2 - Matija Kovacic
University of Verona Faculty of Economics, Italy

3- Begona Cabeza Martinez
European Commission, Joint Research Centre (JRC), Ispra, Italy

Social media use, loneliness and emotional distress among young people in Europe

Abstract

The rapid rise of social media has transformed communication, raising concerns about its association with mental health and well-being. This study investigates the link between social media usage, loneliness, and emotional distress among young people in Europe. We draw on the 2022 Loneliness Survey, the first EU-wide individual-level survey with detailed information on social media usage time and patterns, along with a comprehensive set of socio-economic characteristics and measures of loneliness and emotional disorders. Focusing on individuals aged 16–35 across the 27 EU Member States, we find that intensive use of social networking sites (more than two hours per day) is positively associated with loneliness and with more frequent feelings of emotional distress. In contrast, intensive use of messaging tools shows no consistent association with emotional distress and is, at most, weakly associated with lower levels of loneliness in the main specifications. These findings are robust to alternative measures of loneliness and emotional distress and to various model specifications, including controls for physical health, the use of other digital tools, extracurricular activities (sports and cultural activities), the quality and size of offline social network and pre-existing loneliness and emotional disor-ders during childhood. The results indicate that gender and the strength of offline social networks moderate the association between intensive social media use and loneliness and emotional distress. In particular, the estimated associations are stronger among females and among individuals with smaller offline social networks, the latter being consistent with the *poor-get-poorer* hypothesis. Finally, our results suggest that engagement patterns—namely the distinction between passive and active use—play a limited mediating role.

Keywords: Loneliness; mental well-being; social media use; Europe

JEL: L82; D91; I12; I31.

1 Introduction

Over the past decade social media (SM) has reshaped how especially younger generations interact, socialize, and consume information. While SM facilitates communication and connection, there is increasing concern about its effects on young users, together with the concomitant reduction in face-to-face socialising and broader shifts in communication patterns that have been observed(Thompson, 2024; Blanchflower et al., 2024; Twenge and Spitzberg, 2020).

These concerns coincide with declining youth mental health and rising loneliness trends. Studies across Europe and beyond report increases in sadness, anxiety, and depression (Centers for Disease Control and Prevention, 2024; Garriguet, Garriguet; Steffen et al., 2020; Blanchflower and Bryson, 2024; Boniel-Nissim et al., 2024; Schrijvers et al., 2024). Recent evidence highlights that loneliness is particularly high among younger populations (Baarck et al., 2022; Berlingieri et al., 2023). Some voices argue that the time of these shifts aligns with the diffusion of smartphones and online interaction (Twenge, 2017; Haidt, 2024), yet the empirical evidence on SM effects is mixed (Orben et al., 2022). Some studies report positive associations between SM use and psychological distress (Keles et al., 2020), while others find negligible effects (Heffer et al., 2019).

This paper examines the relationship between SM use and loneliness and emotional distress among young people, and is, to our knowledge, the first to do so using data covering all 27 EU Member States. The EU is a particularly relevant setting given the increasing focus of policymakers in Europe on the challenges associated with intense use of SM. European Commission President President Ursula von der Leyen announced an EU-wide enquiry on SM's impact on youth well-being (von der Leyen (2024)). National efforts include Ireland's Online Safety Code and Spain's proposal to raise the minimum SM age to 16 (Online Safety Code (2024),Goverment of Spain (2024)). Multiple countries have implemented or proposed school phone restrictions. France banned phones at school for students up to 15 in 2025. Norway issued guidelines, with legislation under consideration. Bans have been adopted in the Netherlands and Hungary, while Portugal and Greece recommend or enforce restrictions, particularly in primary education. Italy limits phone use to educational purposes under supervision. In Belgium, Germany, and Spain, policies vary regionally, and in the UK, many schools have adopted independent phone bans following government encouragement.

Within this context of national and EU-level initiatives, the 2022 EU-wide Loneliness Survey (EU-LS), used in this paper, offers a uniquely suitable empirical setting, as it combines harmonised data from all 27 EU countries with detailed measures of SM use, loneliness and mental health outcomes. More specifically, the EU-LS provides information on SM time and usage patterns, allowing a distinction between instant messaging tools (IMT) and social networking sites (SNS)—an approach rarely adopted, particularly in Europe. It also records specific user activities, enabling a distinction between passive and active use. Furthermore, the dataset includes a rich set of respondent characteristics, allowing adjustment for a broad set of potential confounders that are often overlooked or not considered jointly (Zhu et al., 2025). These include information on physical health, sociodemographic characteristics, time spent on other digital media (e.g., gaming and television), the quantity and quality of social networks, participation in sports and cultural activities, and pre-existing loneliness and mental health disorders during childhood. To our knowledge, no comparable study has integrated such extensive controls. Although cross-sectional, the dataset's comprehensiveness allows us to examine robust relationships between SM use and loneliness and emotional distress, assess whether these relationships vary systematically across population subgroups as moderating factors, and explore whether they operate through plausible behavioural mechanisms proposed in the literature. In particular, we investigate a potential mediating pathway by distinguishing between passive and active forms of SM engagement.

Results suggest that intensive use of SNS in Europe is positively associated with loneliness and emotional distress, while excessive use of IMT has a weaker link. These findings are robust across various measures of emotional distress and loneliness, alternative model specifications and definitions of intense SM use. We also observe that intensive SNS use is more strongly associated with adverse emotional disorder and loneliness among females than males whereas intensive IMT use shows more mixed patterns, with generally beneficial associations for females and less consistent patterns for males. Intensive SNS use is associated with substantially higher levels of loneliness and emotional distress among individuals with few friends, compared to those with larger social networks, supporting the poor-get-poorer hypothesis that SM use is particularly harmful for individuals with weaker social ties. Finally, the estimated association decreases only slightly when accounting for active and passive use, indicating that these mediating engagement patterns explain only part of the relationship between intensive SNS and IMT use and psychological distress.

The rest of the paper is structured as follows. Section 2 reviews the existing literature on the increase in SM use, the decline in mental health among young people, and their potential links. Section 3 introduces the data and presents descriptive statistics for the key variables. Section 4 outlines the empirical approach and reports the main findings, including robustness checks and an examination of moderating factors and potential mechanisms. Finally, Section 5 summarises the findings, discusses the limitations of the study, and concludes.

2 Social media use, mental health and loneliness among young people

Rise of social media use, especially among young people

Global SM users have more than doubled in a decade, rising from 2 billion in 2015 to 4.9 billion in 2023 -around 64% of the world's population (Ortiz-Ospina, 2019; Anderson et al., 2023). Platforms such as YouTube, WhatsApp, and Facebook grew steadily, whereas newer platforms like Instagram and TikTok expanded far faster as short-video content reshaped interaction. SM now serves not only for socializing but also for entertainment, news, and professional networking (Aichner et al., 2021).

The rapid rise of digital technologies is especially pronounced among young people.[1] In the US, 93% of teens (13–17) use YouTube, and around 60% are active on TikTok, Instagram, and Snapchat (Anderson et al., 2023). Across Europe, online social networking is widespread among young people, as documented both in EU-wide official statistics and in adolescent-focused survey evidence (Smahel et al., 2020; Eurostat, 2023). Data from the Health Behaviour in School-aged Children study (HBSC) show that 30–40% of adolescents maintain continuous online contact with friends, and over 10% exhibit signs of problematic use (Boniel-Nissim et al. (2024)).

Mental health conditions of young people are worsening

Over the past decade, numerous studies have documented a global decline in young people's mental health, with evidence spanning late adolescence and young adulthood. Recent US data indicate rising levels of psychological distress among high-school students

[1]Gottfried (2024) highlights generational differences in platform use, noting TikTok's dominance among younger users compared to Facebook's popularity with older demographics.

(Centers for Disease Control and Prevention, 2024). Adolescent-focused cross-natioanl evidence is consistent with this pattern; for instance, HBSC data point to a decline in life satisfaction and an increase in health complaints among adolescents, particularly older girls (Boniel-Nissim et al., 2024; Schrijvers et al., 2024). Importantly, evidence of worsening mental health is also observed beyond adolescence, including in young-adult or broader adult samples in the US (Udupa et al., 2023; Blanchflower and Bryson, 2024), Canada (Garriguet, Garriguet), and Australia (Botha et al., 2023). In Europe, recent panel evidence further suggests a worsening mental health and links it to higher screen time (Blanchflower et al., 2024).

Loneliness prevalence of young people is high

Loneliness, defined as "the unpleasant experience that occurs when a person's network of social relationships is significantly deficient in quality or quantity" (Perlman and Peplau, 1981), is often seen as an issue of older age. However, research shows a more complex, often U-shaped or non-linear relationship between loneliness and age (Yand and Victor, 2011; Mund et al., 2020; Luhmann and Hawkley, 2016). Recent cross-national studies highlight high levels of loneliness among young people in Europe and worldwide (Berlingieri et al., 2023; Barreto et al., 2021). The COVID-19 pandemic intensified this trend; in Europe, youth loneliness increased from 9% to 36% during its first months (Baarck et al., 2022). Adolescent-focused evidence points in the same direction. For instance, HBSC data show 14% of adolescents report feeling lonely and just 68% report strong family support (Boniel-Nissim et al., 2024), and cross-national evidence among 15- and 16- year-olds from 37 countries finds increasing loneliness and friendlessness at school (Twenge et al., 2021).[2]

Growing concerns about the impact of social media use on loneliness and mental health conditions

Many wonder whether increasing SM use is directly linked to worsening mental health and loneliness, especially among young people. A central concern is that online interactions lack the depth of face-to-face relationships. According to the "displacement hypothesis" (Kraut et al., 1998), replacing offline with online connections can increase loneliness and mental distress. Limited non-verbal cues in digital communication can hinder connect-

[2]Loneliness is not only emotionally distressing, but also a serious public health issue. It has been associated with depression, anxiety, and lower subjective well-being (Casabianca and Kovacic, 2024; Surkalim et al., 2022; McClelland et al., 2020). When chronic or severe, especially during the early years, loneliness can have lasting effects, including increased risk of mortality and long-term negative outcomes into adulthood.

edness and reduce social skills. SM platforms may also promote rumination, negative comparisons, and emotional contagion, especially through visible social metrics and idealized images (Feltman and Szymanski, 2018). As Twenge and Spitzberg (2020) note, shifting norms toward digital interaction may further reduce opportunities for in-person contact, contributing to isolation. Early work also emphasised a potential "stimulation" pathway, where online tools help maintain and create social ties (Gross, 2004; Valkenburg and Peter, 2007). However, the effect of SM use may not align perfectly with either hypothesis. Przybylski and Weinstein (2017) propose the "digital Goldilocks hypothesis", which suggests that moderate use of SM can support well-being, but excessive use can have adverse effects, such as psychological dependency and the displacement of alternative activities.

Consistent with the "rich-get-richer hypothesis", individuals with strong social networks may benefit more from SM (Valkenburg and Peter, 2013), while, according to the "poor-get-poorer hypothesis", those experiencing loneliness or low social confidence might often use it passively, which could worsen their sense of isolation (Nowland et al., 2018; Luijten et al., 2022). Similarly, the link between SM use and loneliness could be bidirectional: rather than causing loneliness, SM may sometimes be a coping mechanism for those already feeling socially disconnected.

What is the empirical evidence?

The debate on the effects of SM use on mental health and loneliness remains polarized. On one side, some researchers argue that digital media, especially in adolescence, has contributed to an epidemic of mental health issues (Haidt, 2024). In contrast, others argue that existing evidence does not yet support strong claims that SM use drives deteriorating mental-health outcomes, emphasizing the need for stronger causal evidence(Odgers and Jensen, 2020; Ferguson et al., 2024).

Recent meta-analyses and literature reviews offer a nuanced perspective and generally conclude that the association between time spent on SM and mental health outcomes is small and positive (Hancock et al., 2022; Blasko and Castelli, 2022; Orben, 2020; Nowland et al., 2018; Huang, 2017). Until recently, most of these studies relied on correlational data, small and convenient samples, a limited number of control variables (Zhu et al. (2025)), and often failed to distinguish general screen time from SM-specific use, which limits the strength of their conclusions. To address these limitations, experimental and quasi-experimental designs, which often involve randomly restricting or eliminating access

to SM for a treatment group, have been carried out in recent years to allow for stronger causal inference. For example, studies by Hunt et al. (2018); Brailovskaia et al. (2020) and Reed et al. (2023) find that limiting SM use leads to improvements in life satisfaction and mental health. Similarly, Allcott et al. (2020) observe that deactivating Facebook for four weeks reduces levels of depression and loneliness, alongside improved life satisfaction. Similar findings have been reported by Braghieri et al. (2022). A recent study by Burnell et al. (2025) finds a positive, though very small, effect of SM restriction on subjective well-being. Some other experimental studies find no evidence of a causal relationship (Przybylski et al. (2021), van Wezel et al. (2021)). Yet these experimental or quasi-experimental studies have recently been criticised because they typically capture only very short-term effects, often assume a linear relationship between SM use and psychological outcomes, and lack a clear theoretical framework to guide the design of intervention features (Vanden Abeele et al. (2025)).

The way people use SM may indeed influence its impact on loneliness and well-being. Passive use, such as scrolling through feeds without active participation, has been linked to upward social comparisons and increased feelings of loneliness (Verduyn et al. (2015), Roberts and David (2022)). In contrast, Deters and Mehl (2013) show that an active use of SM, such as interacting with friends, helps people maintain relationships, form new connections, and reduces loneliness. Recent evidence distinguishing problematic (addictive-like) SM use from time spent online finds that the former is associated with worse mental-health outcomes among adolescents and young adults (Shannon et al., 2022). More generally, how SM is used, together with users' characteristics, contextual factors, and patterns of engagement, plays a crucial role in shaping observed outcomes (Orben, 2020; Hancock et al., 2022).

Framing of the study

This paper does not claim to identify causal effects of SM use on loneliness or emotional distress, given the cross-sectional nature of the data. Rather, it contributes to the existing literature by leveraging a uniquely rich and harmonised EU-wide dataset to examine whether observed associations are robust to an extensive set of individual, social, and contextual factors. In particular, we assess the extent to which these associations may be confounded with broader patterns of digital engagement rather than reflecting SM-specific associations *per se*, and whether the relationship between SM use and loneliness or emotional distress can be accounted for by the displacement of potentially beneficial activities (such as participation in sports or cultural activities), by differences in the quantity

and quality of offline social networks, or by prior vulnerability to loneliness or emotional distress. We further examine whether these associations vary systematically across population subgroups and are consistent with plausible behavioural mechanisms discussed in the literature. Finally, we explore one plausible mediating pathway by distinguishing between passive and active types of engagement with SM.

3 Data and descriptive statistics

3.1 Survey characteristics

Survey purpose and scope. The European Union Loneliness Survey (EU-LS) is the first ad-hoc survey specifically designed to gather detailed information on the prevalence of loneliness, its determinants and associated risks in all 27 member states of the European Union.[3]

Survey design, recruitment and fieldwork. The EU-LS is a non-probabilistic online survey targeting residents aged 16+ in each Member State, implemented using online consumer panels accessed via the Cint platform. Samples were quota-based, with quotas set to reflect each country's target population in terms of age, gender, education and geographic distribution (NUTS; no regional quotas were applied in Cyprus, Latvia, Luxembourg and Malta). Fieldwork ran from 11 November to 9 December 2022 and yielded 25,646 interviews (approximately 1,000 respondents per country except for Cyprus, Luxembourg and Malta, around 500).[4]

Survey content. The survey contains three well-established and reliable measures of loneliness and detailed information on health (physical and mental/emotional). It also includes a section dedicated to the use of SM. In particular, the survey provides information on the time spent on SM, the modalities of SM usage, the motivations that underlie such usage, and SM addiction.[5]

Additional covariates. In addition, the survey includes several items on social connectedness and a broad set of questions on life circumstances and activities, and adverse

[3]For more information on the survey and the underlying pilot project on "Monitoring loneliness in Europe", see https://joint-research-centre.ec.europa.eu/projects-and-activities/survey-methods-and-analysis-centre/loneliness/eu-loneliness-survey_en

[4]Quotas were used for the sample selection from the online consumer panels to reflect the target population in terms of age, gender, education and region of residence. Ex-post weights based on socio-demographic variables underlying the quotas are applied to correct for any remaining under-representation of these groups. For more detail, see (Berlingieri et al., 2024).

[5]Although the survey instruments followed harmonised protocols, we cannot fully exclude cross-country differences in the interpretation of survey items due to cultural and linguistic variation.

childhood experiences. These additional aspects represent important controls that allow us to separate loneliness from social isolation, as well as to analyse the association of SM usage with loneliness and individuals' mental health conditions.

3.2 Variables and sample selection

Loneliness

The EU-LS contains three measures of loneliness: one direct question and two indirect scales, namely the University of California Los Angeles Loneliness Scale (UCLA) (Russell, 1996; Hughes et al., 2004) and the De Jong Gierveld scale (de Jong-Gierveld and Kamphuls, 1985; Gierveld and Tilburg, 2006).[6]

The direct question explicitly mentions "loneliness" and asks about the frequency of such a feeling in a specific time period preceding the survey. More precisely, the respondents were asked, "How much of the time, during the past 4 weeks, have you been feeling lonely?" with responses ranging from "all of the time" to "none of the time." Following common operationalisations in the literature (e.g. Berlingieri et al., 2024; World Health Organization, 2023; Organisation for Economic Co-operation and Development, 2024), respondents answering "all" or "most of the time" are classified as *lonely*.

Indirect questions, on the other hand, do not explicitly refer to loneliness but ask about personal experiences closely related to loneliness. The UCLA scale comprises three items measuring feelings of isolation, lack of companionship, and social exclusion, with responses summed to form a score ranging from 3 to 9 (Hughes et al., 2004). The six-item DJG scale (Gierveld and Tilburg, 2006) includes three positively worded items measuring social loneliness ("There are plenty of people I can rely on when I have problems," "There are many people I can trust completely," and "There are enough people I feel close to") and three negatively worded items capturing emotional loneliness ("I experience a general sense of emptiness," "I miss having people around," and "I often feel rejected"). Responses are given on a three-point scale ("yes," "more or less," and "no"), dichotomised into binary indicators , and summed to obtain a scale ranging from 0 to 6. For both indirect scales, we rely on the scale constructions developed by the original authors and commonly applied in the literature (Hughes et al., 2004; Gierveld and Tilburg, 2006).

Both direct and indirect measures have strengths and weaknesses. While direct questions are simple and relatively easy to implement in large-scale surveys, their use is subject to reporting bias since individuals' understanding of loneliness may differ and/or because

[6]See Paris et al. (2025) for a discussion on the psychometric properties of the three-item UCLA Loneliness Scale.

they may under-report their true feelings of loneliness when asked about it directly due to "stigma".[7] Indirect measures, on the other hand, do not directly refer to loneliness and reflect more closely the core definition of loneliness as a perception of deficiency in social relationships, offering a more objective picture of loneliness and attenuating potential reporting biases. Despite the above-mentioned weaknesses, the correlation between the direct question and the other two indirect scales is relatively high, suggesting that all can be considered as reliable and valid measures of loneliness (Mund et al., 2022; Schnepf et al., 2024).

The baseline specifications in the empirical analysis rely on the dichotomised version of the direct measure of loneliness (*lonely*) as outcome variable. The robustness of the main results is further checked using the UCLA and DJG loneliness scales.

Health outcomes

The individuals' mental health conditions are measured in the EU-LS by means of an adaptation of the Kessler Psychological Distress Scale (Kessler et al., 2002) capturing the frequency of different feelings related to emotional distress, namely feeling angry, nervous, hopeless, restless, depressed, and worthless.[8] The answer options available were (1) Always, (2) Very frequently, (3) Occasionally, (4) Rarely, (5) Very rarely, and (6) Never. We dichotomise each item into a binary variable that equals 1 whenever an individual reports (1) or (2) and 0 otherwise. As depression and anxiety have been recognised as the defining mental health illnesses for young people today (Haidt, 2024), we focus on *nervousness* and *depression* as the primary indicators of mental health in the main empirical analysis. In addition, following the example of the widely used EURO-D scale (Prince et al., 1999), we will employ in the robustness analysis an additional mental health indicator obtained as the sum of each of the 6 dichotomised single-item scores.[9]

Social media use

To measure SM consumption, we rely on the following indicators. The first two indicators capture *the time spent per day on SM*. More specifically, respondents were asked how much time they spent per day using, respectively, social network sites (SNS) and instant

[7]Note that stigma bias is less relevant with online surveys compared to other survey modes.

[8]See (Kessler et al., 2010; Alsubheen et al., 2021, 2023) for a discussion Kessler Psychological Distress Scale.

[9]The final scale yields a potential range from 0 to 6, with the number of emotional distress symptoms denoting the score.

messaging tools (IMT), with eight potential responses ranging from ”Never” to ”More than 5 hours”. SNS are online applications that allow users to create and share personal profiles. They may be centred on images (such as Instagram and TikTok), text (such as X), or both (such as Facebook). IMT, on the other hand, are web services that enable individuals to have private, real-time conversations online. They typically rely on text messages, *e.g.* WhatsApp, MSN Messenger (Facebook), and Snap messaging. Despite the increasing convergence of functionalities and the evolution of communication platforms, we have opted to create two indicators of *intense use of SNS and IMT*, respectively.[10] This two-hour threshold to define the intense use of SM was chosen based on recent empirical findings and aligns with the so-called ’Goldilocks hypothesis’, which suggests that the relationship between digital screen use and psychosocial outcomes is not linear ((Przybylski and Weinstein, 2017, 2019; Przybylski et al., 2020)). Specifically, in an increasingly digital world, moderate screen time is associated with better psychosocial functioning than lower levels of SM engagement. In contrast, excessive use is associated with adverse outcomes. Several empirical studies either operationalise or empirically identify higher or potentially problematic use at around two hours per day (e.g. (Choi et al., 2025; Haidt, 2024; Twenge et al., 2019; Twenge, 2017; Carson et al., 2017)). Given that any single time-based threshold is to some extent arbitrary, we will examine the robustness of our conclusions to alternative definitions of intense SM use.

A second set of SM-related indicators provides information on the *type of SM use*, specifically distinguishing between active and/or passive usage. Active use generally involves actions that enable immediate interaction with other individuals, whereas passive use includes things like scrolling through pictures, videos, and status updates on profiles and personal information in other people’s profiles and chat groups. While the distinction between passive and active use of SM is not always clear-cut, certain activities are more easily categorized. For instance, chatting represents an active use of SM platforms, whereas scrolling through feeds and profiles is considered passive. In the EU-LS survey, respondents indicated how frequently they look through feeds, view videos or publish content or chat with other people with six potential answers ranging from “Never”, “Once a

[10]In the questionnaire, respondents were explicitly informed that SM platforms include both SNS and IMT and were provided with concrete examples of each category : e.g. SNS: Facebook, Instagram, TikTok and IMT: WhatsApp, Messenger, Snapchat). Intense use of SNS (IMT) is equal to 1 if the respondent indicates spending more than 2 hours per day on SNS (IMT) and 0 otherwise. The instructions also specified that respondents should consider their use across all devices (mobile phone, computer, tablet). These examples and instructions were intended to guide respondents in distinguishing between SNS and IMT use.

day or less", "Two to five times a day", "16 times to 30 times a day" to "over 30 times per day". In the discussion section, we define intense passive SM users as respondents who report scrolling through SM feeds 16 times or more per day. Conversely, respondents who report posting or chatting on SM 16 times or more per day will be classified as intense active SM users.

Sample selection

We focus on the relationship between SM use, mental health, and loneliness among young people who grew up with smartphones and SM platforms—mainly Generation Z (born from 1997) and part of Generation Y (1981–1996). Since the EU-LS includes individuals aged 16 and above (born in 2006 or earlier), we cannot fully capture the youngest cohort. To balance relevance and sample size, we restrict the analysis to those aged 16–35 in 2022. The sample size for the main estimations varies between 6,316 and 6,325 observations. [11]

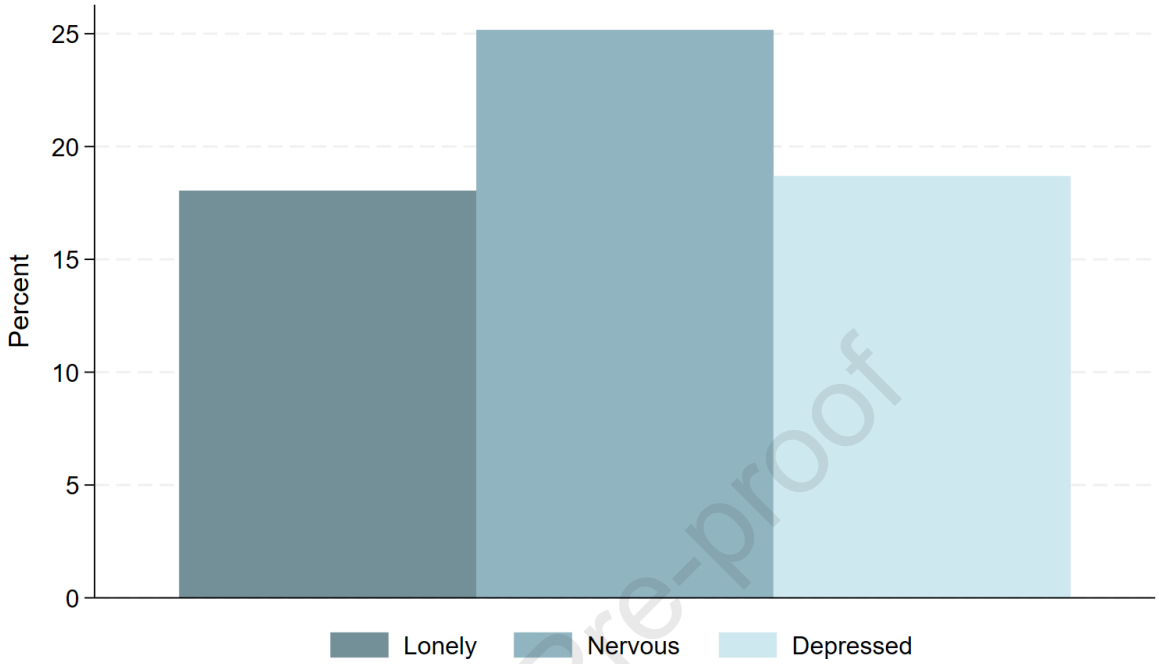
3.3 Descriptive statistics

Figure 1 shows the prevalence of loneliness, feeling nervous, and depressed. Approximately 18% of respondents reported feeling lonely most or all of the time during the four weeks preceding the survey. One in four respondents indicated feeling nervous always or very frequently, while nearly 19% reported experiencing feelings of depression with the same frequency. [12].

[11]Observations with missing values on the outcome under scrutiny or on the covariates were excluded using listwise deletion, resulting in a reduction of about 19.4% of the original sample.

[12]Note that the prevalence of loneliness and emotional distress is higher for female respondents compared to that of men (not reported for the sake of brevity)

Figure 1: Loneliness, nervousness and depression

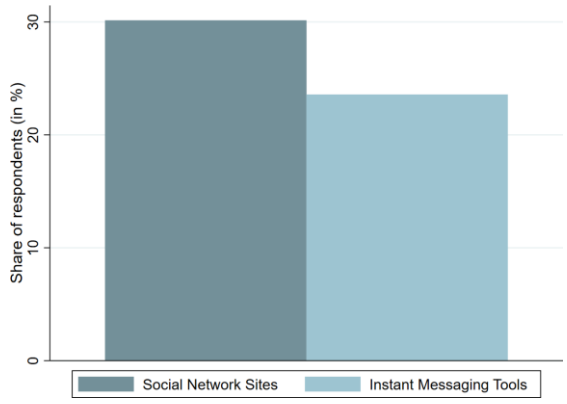


Notes: The figure shows the weighted unconditional averages of loneliness and emotional disorders. The weights account for unequal selection probabilities and to ensure representativeness of the target population. Weights are based on gender, age, education, and geographical location.

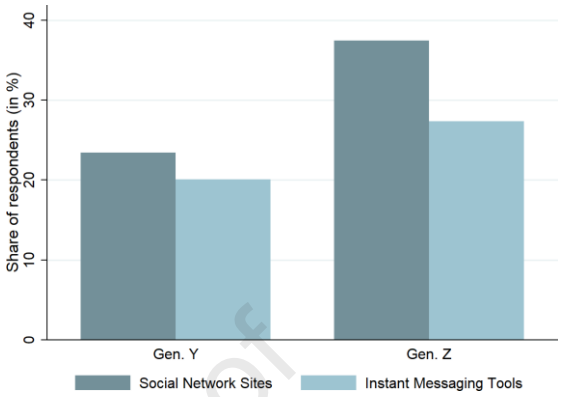
Figure 2 displays patterns of SM use among young people in Europe. Specifically, 30% of EU-LS respondents report spending more than two hours per day on SNS, while approximately 24% indicate using IMT for more than two hours daily. The prevalence of intense SM use is significantly higher among Generation Z (born from 1997) compared to Generation Y (1981–1996), with nearly 38% of the former reporting more than two hours of daily SNS use, compared to 24% of the latter.

Chatting is the most frequent activity on SM, with almost one in four respondents reporting doing so more than 16 times per day. In contrast, posting content - another indicator of active SM use - is the least common activity. Intensive passive use, such as scrolling through feeds or watching videos, is reported by approximately 18% to 20% of respondents. As expected, individuals from Generation Z are nearly twice as likely to engage in frequent chatting on SM compared to those from Generation Y. Similarly, passive SM use is approximately 8 percentage points higher among the youngest cohort relative to their older counterparts.

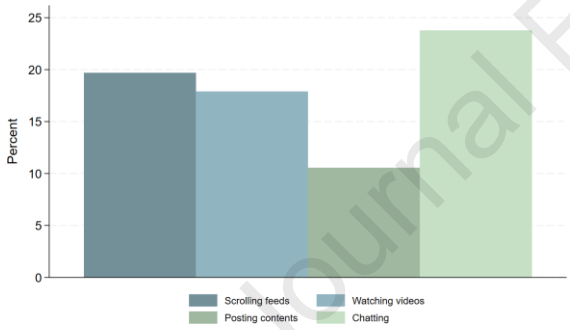
Figure 2: Frequency of use of social media, by purpose and cohort



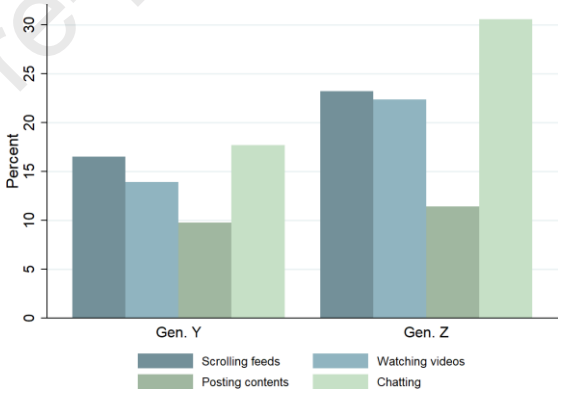
(a) SNS and IMT (> 2hrs)



(b) SNS and IMT (> 2hrs)



(c) Type of activity (> 16 times)



(d) Type of activity (> 16 times)

Notes: The figure shows the weighted unconditional distributions of SM users by gender, type of activity and cohort. The weights account for unequal selection probabilities and to ensure representativeness of the target population. Weights are based on gender, age, education, and geographical location. Approximately 56% belong to Generation Y (born 1981–1996) and about 44% to Generation Z (born from 1997 onwards).

4 Empirical Analysis

4.1 Hypotheses

In the empirical analysis, we test a set of hypotheses on how different dimensions of SM use relate to loneliness and emotional distress among young people in the EU,

whether these associations vary systematically across population subgroups and are consistent with plausible behavioural mechanisms discussed in the literature. More specifically, drawing on the existing evidence, we test the following hypothesis:

- H1: Intensive use of SNS is positively associated with loneliness and emotional distress among young people.
- H2: Intensive use of IMT is expected to show a weaker association with loneliness and emotional distress than intensive use of SNS.
- H3: The association between intensive SNS use and loneliness/emotional distress is stronger among females than males,
- H4: The association between intensive SNS use and loneliness/emotional distress is stronger among individuals with smaller offline social networks.
- H5: The association between intensive SNS use and loneliness/emotional distress is mediated by passive engagement patterns.

Sections 4.2 and 4.3 address H1 and H2, while Section 4.4 examines H3 and H4, and Section 4.5 tests H5.

4.2 Baseline associations and compositional differences

In Table 1 (panel a), we regress loneliness on the intense use of SNS and IMT. In addition to the inclusion of country fixed effects, the baseline specification in column (1) controls for socio-demographic characteristics, namely age, gender, education, household composition, occupational status, as well as self-reported health. The results indicate that spending more than two hours per day on SNS increases the probability of experiencing loneliness by 10.5 percentage points. The magnitude of the association between IMT and loneliness is one-third that of SNS. Moreover, unlike SNS, intense use of IMT is negatively associated with loneliness. This latter evidence may indicate that engagement pattern on SM may be a potential mediator in the relationship between SM use and psychosocial outcomes, an issue that is explored further later on. Panels b and c of Table 1 consider the two indicators of individuals mental health conditions, namely the frequent feelings of depression and nervousness, while keeping the same set of control variables. In line with H1, results indicate that intense use of SNS is significantly associated with a higher probability of reporting experiences of depression and nervousness by 6.8 and 9.5 percentage points (column (1)), respectively. In contrast, intense use of IMT does not seem to play any significant role, confirming H2.

Table 1: Loneliness, Depression and Nervousness, and Social Media Use

Panel a: Loneliness	(1)	(2)	(3)	(4)	(5)
Intense use of SNS	0.105***	0.105***	0.105***	0.102***	0.102***
	(0.023)	(0.021)	(0.024)	(0.021)	(0.021)
Intense use of IMT	-0.051**	-0.032*	-0.052**	-0.035*	-0.042**
	(0.026)	(0.018)	(0.025)	(0.019)	(0.018)
N	6,333	6,333	6,333	6,333	6,333
Panel b: Depression					
Intense use of SNS	0.068***	0.064***	0.058***	0.050**	0.050***
	(0.022)	(0.024)	(0.020)	(0.020)	(0.019)
Intense use of IMT	-0.017	0.001	-0.027	-0.013	-0.017
	(0.024)	(0.019)	(0.025)	(0.020)	(0.018)
N	6,316	6,316	6,316	6,316	6,316
Panel b: Nervousness					
Intense use of SNS	0.095***	0.094***	0.095***	0.092***	0.092***
	(0.023)	(0.022)	(0.025)	(0.024)	(0.024)
Intense use of IMT	-0.029	-0.020	-0.030	-0.023	-0.030
	(0.033)	(0.036)	(0.034)	(0.037)	(0.037)
N	6,325	6,325	6,325	6,325	6,325
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Socio Demo	Yes	Yes	Yes	Yes	Yes
Other Digital Tools	No	Yes	Yes	Yes	Yes
Network Quality & Quantity	No	No	Yes	Yes	Yes
Sport Culture	No	No	No	Yes	Yes
Childhood - Loneliness/Mental Health	No	No	No	No	Yes

Notes: *The method of estimation is Logit. The reported coefficients are marginal effects. "Socio Demo" cover demographic and socio-economic controls, namely age, gender, household size, number of kids, employment status, and self-reported health. "Other digital tools" includes intensive gaming and TV watching (more than two hours per day). "Network quality and quantity" controls include network size (number of close family members and friends), frequency of face-to-face contact with family and friends, relationship status, and self-perceived relationship quality. "Sport/Culture" includes participation in cultural or sports activities at least once a month and weekly physical activity. "Childhood loneliness/mental health" includes childhood loneliness in the loneliness estimates and childhood mental health disorders (own and close relatives') in the depression and nervousness estimates. All estimates are weighted to account for unequal selection probabilities and to ensure representativeness of the target population. Weights are based on gender, age, education, and geographical location. Robust standard errors clustered at the country level are reported in parentheses. Significance levels:* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Given the increasing overlap in functionalities among digital platforms, the observed associations may hide the effect of alternative digital tools not strictly related to intense use of SNS or IMT. Spending more time on gaming, for instance, may affect loneliness and emotional distress. Owen et al. (2010) and Giardina et al. (2021) show that there

are some general cognitive benefits to gaming and that it mitigated anxiety, depression, and loneliness in adolescents and young adults during the Covid-19 pandemics. Other research suggests the opposite (Pallavicini et al., 2022). In Column (2), we control for the intense use (spending more than 2 hours per day) of video games and of watching TV or content on streaming platforms. The previous conclusions are not altered. The negative relationship between SM, loneliness, and emotional distress does not reflect a general influence of digital advice use, such as video games or TV, but rather a specific contribution of prolonged time spent on SNS.

The associations reported above may, however, reflect additional underlying compositional differences. Individuals with weaker offline social networks may interact less frequently face to face with friends or family, spend more time on SM platforms, and simultaneously report higher levels of loneliness or emotional distress. Similarly, participation in physical, sporting, and cultural activities is known to be beneficial for mental health, and individuals who use SM intensively may also be less likely to engage in such activities (Rutter et al., 2021; Brailovskaia et al., 2023). To address these potential confounding factors, Column (3) of Table 1 additionally controls for indicators of offline social connectedness, including the number of close friends and close relatives, the frequency of face-to-face contact with friends and relatives not living with the respondent, relationship status, and self-perceived relationship quality. Column (4) further accounts for the regular (at least once a month) participation in cultural (museum, cinema, concert, cultural sites) and sporting events, as well as engagement in physical activity during the seven days preceding the interview. The inclusion of these additional controls does not alter the coefficients, except for depression, for which the association with intensive SNS use is slightly reduced by 0.6 percentage points. This suggests that the estimates are unlikely to be primarily driven by omitted individual characteristics or contextual factors correlated with both intensive SM use and the outcomes, and that differences in offline social connectedness and participation in sporting and cultural activities are unlikely to play a major mediating role in the observed associations.

Finally, controlling for pre-existing loneliness and emotional disorders during childhood should help to mitigate reverse causality, as such disorders are often persistent and may contribute to intense SM use (Kovacic and Orso, 2025; Casabianca and Kovacic, 2024; Zhu et al., 2025). Columns (5) of Table 1 control for loneliness (panel a) and individual family mental health conditions (panels b and c) during childhood. The associations between

intensive SNS use and the outcomes remain robust, with the magnitude of the estimates unchanged.[13]

4.3 Robustness of the baseline associations

The evidence reported so far indicates that individuals who spend excessive time on SNS report higher levels of loneliness and more frequent feelings of depression and nervousness. In contrast, intensive IMT use appears to mitigate loneliness without affecting mental health outcomes. However, loneliness is a complex phenomenon, measured in different ways as discussed in Section 3.2, and Table 1 only captures two dimensions of emotional distress. Other relevant aspects, such as restlessness, worthlessness, anger, and hopelessness are not considered. This section examines the robustness of the results to alternative measures of loneliness and emotional disorders. It also assesses the sensitivity of the findings to alternative definitions of intensive SNS and IMT use, as well as to a narrower definition of young individuals.

Table 2 (panels a and b) considers the two indirect measures of loneliness described in Section 3.2, namely the short 3-item UCLA scale and the six-item DJG scale. The relationship between SNS and loneliness remains robust across both scales. Columns (1) of Table 2 show that spending more than two hours on SNS is associated with a 0.28-point (0.39-point) higher score on the UCLA (DJG) scale, a sizeable difference given that both measures range from 0 to 6 and have population means of 2.3 (UCLA) and 3.3 (DJG). Finally, panel c presents an alternative measure of emotional distress, expressed as the total number of emotional disorders reported by each individual.[14] Intensive users have a 0.4-point higher score on the mental health index aggregating emotional disorders than those who do not use SNS or engage for less than two hours. The inclusion of additional controls in columns 2–5 slightly reduces the magnitude of the associations, without altering their statistical significance.

[13]Retrospective data may suffer from "colouring," where lonely or depressed individuals recall past experiences more negatively (Buia et al., 2019). However, columns 3 and 4 use the presence of close relatives with mental health issues—rather than subjective measures of parental relationships—helping to reduce recall bias and improve reliability (Campbell et al., 2014).

[14]See Section 3.2 for more information on the index

Table 2: Loneliness and Emotional Disorder and Social Media Use: Robustness Checks using Alternative Outcome Indicators

Panel a: Loneliness (UCLA)	(1)	(2)	(3)	(4)	(5)
Intense use of SNS	0.283***	0.271***	0.264***	0.263***	0.257***
	(0.072)	(0.069)	(0.071)	(0.079)	(0.085)
Intense use of IMT	-0.093	-0.109	-0.032	-0.048	-0.043
	(0.153)	(0.144)	(0.136)	(0.139)	(0.132)
N	6,333	6,333	6,333	6,333	6,333
Panel b: Loneliness (DJG, overall)					
Intense use of SNS	0.386***	0.371***	0.358***	0.355***	0.348***
	(0.110)	(0.094)	(0.072)	(0.071)	(0.077)
Intense use of IMT	-0.138	-0.158	-0.032	-0.042	-0.036
	(0.129)	(0.112)	(0.121)	(0.121)	(0.116)
N	6,333	6,333	6,333	6,333	6,333
Panel c: Mental Health (overall)					
Intense use of SNS	0.401***	0.376***	0.364***	0.363***	0.361***
	(0.069)	(0.076)	(0.062)	(0.062)	(0.064)
Intense use of IMT	0.089	0.055	0.140	0.134	0.094
	(0.098)	(0.085)	(0.098)	(0.101)	(0.090)
N	6,245	6,245	6,245	6,245	6,245
Country FE	Yes	Yes	Yes	Yes	Yes
Socio Demo	Yes	Yes	Yes	Yes	Yes
Other Digital Tools	No	Yes	Yes	Yes	Yes
Network Quality & Quantity	No	No	Yes	Yes	Yes
Sport Culture	No	No	No	Yes	Yes
Childhood - Loneliness/Mental Health	No	No	No	No	Yes

Notes: *The method of estimation is OLS. Definitions of the control variables (not reported) are provided in Table 1. All estimates are weighted to account for unequal selection probabilities and to ensure representativeness of the target population. Weights are based on gender, age, education, and geographical location. Robust standard errors clustered at the country level are reported in parentheses. Significance levels:* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Finally, panel c of Table 2 presents an alternative measure of emotional distress, expressed as the total number of emotional disorders reported by each individual. Intensive users have a 0.4-point higher score on the mental health index aggregating emotional disorders than those who do not use SNS or engage for less than two hours (column (1)). When additional controls are added, the estimated associations become slightly smaller but remain statistically significant and largely unaltered.

Table 3: Loneliness, Emotional Disorders, and Social Media Use: Robustness Checks Using Alternative Definitions of Intensive Social Media Use and of Young People

	Loneliness	Depression	Nervousness
Panel a: Intense SM:one hour or more per day			
Intense use of SNS	0.058***	0.048*	0.063***
	(0.015)	(0.025)	(0.020)
Intense use of IMT	-0.000	-0.016	-0.035
	(0.022)	(0.023)	(0.032)
N	6,333	6,316	6,325
Panel b: Young people: 16-30			
Intense use of SNS	0.108***	0.032**	0.116***
	(0.019)	(0.013)	(0.036)
Intense use of IMT	-0.030**	-0.010	-0.037
	(0.013)	(0.026)	(0.044)
N	4,071	4,058	4,065
Country FE	Yes	Yes	Yes
Socio Demo	Yes	Yes	Yes
Other Digital Tools	Yes	Yes	Yes
Network Quality & Quantity	Yes	Yes	Yes
Sport Culture	Yes	Yes	Yes
Childhood - Loneliness/Mental Health	No	Yes	Yes

Notes: *The method of estimation is OLS. Definitions of the control variables (not reported) are provided in Table 1. All estimates are weighted to account for unequal selection probabilities and to ensure representativeness of the target population. Weights are based on gender, age, education, and geographical location. Robust standard errors clustered at the country level are reported in parentheses. Significance levels:* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

As explained earlier, the "more-than-two-hour" threshold used to define intensive SM use is motivated by the *Goldilocks hypothesis*, which suggests a non-linear relationship between SM engagement and psychosocial outcomes, as well as by several empirical studies that identify potentially problematic use at around two hours per day (e.g. (Zhu et al., 2025; Choi et al., 2025; Haidt, 2024; Twenge et al., 2019; Twenge, 2017)). However, any single time-based threshold is inherently arbitrary and may be affected by measurement and recall issues. In Table 3 (panel a), we therefore report estimates in which intensive SNS and IMT use is defined using a lower threshold, namely, spending more than one hour *per* day. We use the same set of control variables as in column 5 of Table 1. Spending more than one hour per day on SNS is significantly associated with higher levels of loneliness and emotional distress. However, the magnitude of the association is smaller than that observed with the higher threshold, which is not surprising and suggests that the association becomes stronger as time spent on SNS increases. In contrast, intensive

use of IMT is not significantly associated with loneliness or emotional distress.

Beyond alternative measures of loneliness and well-being, age-related differences in SM exposure may matter. Older respondents experienced the spread of smartphones and SM in early adulthood, whereas younger cohorts grew up with continuous smartphone access during adolescence. To assess whether this affects the findings, we re-estimate the models for respondents aged 16–30. Results are reported in Table 3 (panel b). Relative to the full sample, intensive SNS use is similarly associated with loneliness and depression, but slightly more strongly with nervousness (12 vs. 9 percentage points). As in the full sample, intensive IMT use shows no significant association with loneliness or emotional distress. Both the baseline specifications and the robustness checks support H1 and H2.

4.4 Moderating factors: gender and offline social network

Given the robustness of the findings and building on the baseline estimates presented above, we next test H3 and H4 and, more specifically, examine the heterogeneity in the association between intensive SNS and IMT use and loneliness/emotional disorder outcomes. In line with prior research (e.g. Course-Choi and Hammond, 2021; Liu et al., 2022) suggesting that gender differences in emotional distress and social comparison as well as variation in offline social connected-ness (Lim et al., 2021; Luijten et al., 2022), may condition individuals' vulnerability to intensive SNS use, we focus on heterogeneity by gender and social network quality. To examine heterogeneity, we interact intensive SNS and IMT use with gender and with so-cial network quality, the latter being proxied by whether respondents have fewer than two close friends. Control variables are the same as in column 5 of Table 1. Table 4 reports marginal effects separately by gender (columns 1–3) and by social network size (columns 4–6).

Females are more affected by intensive SNS use than males, with differences particularly pronounced for depression and nervousness. Among males, the association between intensive SNS use and depression is not statistically significant, whereas among females it reaches 8.8 percentage points; gender gaps are smaller for nervousness (3.2 pp) and loneliness (1.3 pp). These results are in line with the literature and support H3, suggesting that women are more sensitive to experiences heightened by SM—such as appearance-based social comparison and exposure to pro–disordered eating content (Choukas-Bradley et al., 2022; Griffiths et al., 2024). Results for intensive IMT use are less clear and vary across outcome variables. In a nutshell, females tend to benefit from

intensive IMT use, showing lower levels of loneliness and depression, whereas results for males are mixed.

Intensive SNS users with few friends are significantly more likely to experience loneliness (14.3 percentage points), depression (9.4 percentage points), and nervousness (15.6 percentage points) than those with two or more friends. Although we control for several indicators of social network quality and quantity—accounting for the possibility that SM use reflects either weak or strong offline ties—these results suggest that social relationships shape how SM use relates to loneliness and emotional disorders, possibly because patterns of online engagement vary with individuals' social networks (Lim et al., 2021; Luijten et al., 2022). This finding supports H4 and is in line with the *poor-get-poorer* hypothesis, according to which intensive SM use is particularly harmful for individuals with low-quality friendships. In contrast, intensive IMT use is associated with lower loneliness and depression among individuals with smaller social networks, consistent with the *poor-get-richer* hypothesis.

Table 4: Loneliness, Nervousness, Depression and Social Media use, by Gender and Offline Social Network

	(1) Lon.	(2) Depr.	(3) Nerv	(4) Lon.	(5) Depr.	(6) Nerv.
SNS - Male	0.095***	0.004	0.076**			
	(0.032)	(0.021)	(0.035)			
SNS - Female	0.108***	0.088***	0.108**			
	(0.025)	(0.029)	(0.045)			
IMT - Male	-0.008	0.038**	-0.017			
	(0.046)	(0.017)	(0.044)			
IMT - Female	-0.058**	-0.053*	-0.032			
	(0.023)	(0.029)	(0.054)			
SNS - Close friends: ≥ 2				0.076***	0.034**	0.066***
				(0.010)	(0.017)	(0.019)
SNS - Close friends: < 2				0.219***	0.128***	0.222***
				(0.075)	(0.045)	(0.057)
IMT - Close friends: ≥ 2				-0.027	0.003	-0.017
				(0.023)	(0.022)	(0.038)
IMT - Close friends: < 2				-0.077*	-0.111***	-0.067
				(0.041)	(0.034)	(0.062)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Socio Demo	Yes	Yes	Yes	Yes	Yes	Yes
Other Digital Tools	Yes	Yes	Yes	Yes	Yes	Yes
Network Quality & Quantity	Yes	Yes	Yes	Yes	Yes	Yes
Sport Culture	Yes	Yes	Yes	Yes	Yes	Yes
Childhood - Loneliness and Mental Health	Yes	Yes	Yes	Yes	Yes	Yes
N	6,333	6,316	6,325	6,333	6,316	6,325

Notes: *The method of estimation is Logit. Reported coefficients correspond to marginal effects, estimated separately by gender and by social network quality. Definitions of the control variables (not reported) are provided in Table 1. All estimates are weighted to account for unequal selection probabilities and to ensure representativeness of the target population. Weights are based on gender, age, education, and geographical location. Robust standard errors clustered at the country level are reported in parentheses. Significance levels:* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

4.5 Social Media Engagement Style as a Potential Mediator

In the remainder of the paper, we test one potential mechanism through which intense SM use, particularly intense use of SNS, may be linked to psychological outcomes. So far, we have observed that intense SNS use is systematically associated with a higher likelihood of reporting loneliness and emotional distress, while no such robust association is found for intense IMT use. This pattern suggests that the type of SM engagement may

constitute a key behavioral pathway.

Table 5: SM Engagement Style, SM Use and Loneliness and Emotional disorders

	(1) Lon.	(2) Lon.	(3) Depr	(4) Depr.	(5) Nerv.	(6) Nerv.
Intense use of SNS	0.103***	0.093***	0.047**	0.038*	0.093***	0.075***
	(0.021)	(0.019)	(0.019)	(0.020)	(0.023)	(0.019)
Intense use of IMT	-0.036*	-0.033*	-0.018	-0.020	-0.023	-0.023
	(0.019)	(0.019)	(0.020)	(0.023)	(0.037)	(0.038)
Scrolling		0.037**		0.034		0.073*
		(0.017)		(0.023)		(0.038)
Chatting		-0.021		0.002		-0.015
		(0.017)		(0.034)		(0.011)
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Socio Demo	Yes	Yes	Yes	Yes	Yes	Yes
Other digital tools	Yes	Yes	Yes	Yes	Yes	Yes
Network Quality & Quantity	Yes	Yes	Yes	Yes	Yes	Yes
Sport Culture	Yes	Yes	Yes	Yes	Yes	Yes
Childhood - Loneliness and Mental Health	Yes	Yes	Yes	Yes	Yes	Yes
N	6,303	6,303	6,286	6,286	6,295	6,295

Notes: *The method of estimation is Logit. Reported coefficients correspond to marginal effects. Definitions of the control variables (not reported) are provided in Table 1. All estimates are weighted to account for unequal selection probabilities and to ensure representativeness of the target population. Weights are based on gender, age, education, and geographical location. The number of observations differs slightly from that reported in Table 1 due to the exclusion of observations with missing information on scrolling and chatting. Robust standard errors clustered at the country level are reported in parentheses. Significance levels:* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

In particular, IMT use is inherently active, as it primarily involves online interactions and direct communication, whereas SNS use encompasses both active and passive forms of engagement. The relationship between SNS (IMT) use intensity and loneliness or emotional distress may therefore be partially mediated by passive (active) SM engagement. This interpretation is consistent with the existing literature, which suggests that more active forms of SM use (such as chatting or posting) may be less detrimental, or even beneficial, for emotional well-being, in contrast to more passive and non-interactive behaviors such as scrolling (Godard and Holtzman, 2024; Nguyen et al., 2025; Verduyn et al., 2022). To test this mechanism (corresponding to H5), we estimate a mediation model in which active and passive SM use mediate the association between SNS and IMT use intensity and loneliness or emotional distress. More specifically, in Table 5, we report estimates from specifications that include

two indicators capturing whether respondents engage intensively in chatting (i.e. active use) and in scrolling (i.e. passive use) on SM platforms (see Section 3.2). The set of covariates is identical to that reported in column 5 of Table 1.[15] The results indicate that the coefficient associated with intense SNS use remains statistically significant across all three outcomes after controlling for the type of SM engagement. While the magnitude of this coefficient is slightly reduced following the inclusion of indicators for active and pas-sive SM use, the attenuation is limited, suggesting that differences in engagement patterns explain only part of the observed association between intense SNS use and psychological distress. In addition, we find that intense passive engagement on SM is significantly asso-ciated with higher levels of loneliness and nervousness. By contrast, passive engagement does not exhibit a statistically significant relationship with depression. We also assess the robustness of these findings using alternative measures of intensive use and of active versus passive engagement. Although these results are not reported for the sake of brevity, the conclusions remain unchanged.

These findings only partially support H5 and are consistent with the possibility that the observed associations between intense use of SNS operate through other mechanisms not captured by the active–passive distinction. This points to the relevance of alternative pathways, such as exposure to social comparison, sleep disruption, or broader patterns of problematic SM use that are not well captured by engagement style alone (Shannon et al. (2022); Bérard et al. (2023).

5 Conclusions

This study investigates the relationship between SM use and loneliness and emotional disorders among young people, addressing a pressing public health issue about which EU and national governments are increasingly concerned and on which they are taking action. In this context, robust evidence is needed to inform policy responses and public debate.

This paper contributes to the existing evidence base by exploiting a comprehensive EU-wide dataset that includes detailed measures of loneliness, emotional distress, and SM behaviours, as well as a uniquely rich set of individual-level information. More specifically, the empirical analysis tests five hypotheses on how different dimensions of social media use relate to loneliness and emotional distress among young people in the EU, and whether these associations vary across population subgroups and align

with plausible behavioural mechanisms discussed in the literature.

Results indicate that excessive use of SNS is consistently associated with higher levels of loneliness and emotional distress, while intense use of IMT shows weaker and more heterogeneous association. These conclusions remain unchanged after accounting for a wide range of explanatory variables beyond standard sociodemographic characteristics, including the simultaneous intensive use of other digital tools, the quantity and quality of offline social networks, regular participation in sports and cultural activities, and indicators of pre-existing loneliness and mental health during childhood. The findings are also robust to alternative measures of loneliness and emotional distress, as well as to alternative definitions of intensive SM use. We further find that the association between intensive SNS use and adverse outcomes is more pronounced among females and among individuals with smaller offline social networks. The observed gender differences may reflect greater expo-sure among females to experiences particularly prevalent in social media environments, such as social comparison or appearance-related content, which are known to be associated with emotional distress, although alternative explanations cannot be ruled out. In addition, our findings are consistent with the *poor-get-poorer hypothesis*, suggesting that intensive SNS use may be particularly detrimental for individuals with weaker social ties. Finally, accounting for passive versus active engagement leads to only limited attenuation of the estimated associations, indicating that engagement patterns explain only part of the relationship between intensive SM use and well-being. This points to the relevance of alternative mechanisms—such as social comparison, sleep disruption, or broader patterns of problematic SM use—that are not fully captured by the active–passive distinction.

Before concluding, it is important to acknowledge several limitations of this study. First, the cross-sectional nature of the data requires caution in drawing causal inferences, as the lack of temporal ordering prevents disentangling the direction of the relationship between SM use and mental health/loneliness outcomes. Second, measures of SM use are self-reported and may be subject to recall and reporting bias, including around any threshold used to define intensive use. Third, although we distinguish between SNS and IMT, platform convergence and overlap in functionalities may generate some exposure misclassifications. Future studies, particularly those employing longitudinal designs or stronger identification strategies, will be essential to further disentangle causal relationships and inform effective interventions.

[15]In the Appendix, we report in Table 6 the first-stage estimates, namely the determinants of intensive SNS and IMT use. Intensive scrolling is significantly associated with intensive SNS use, whereas intensive chatting—and to a lesser extent intensive scrolling—is correlated with intensive IMT use.

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6 Appendix

Table 6: Determinants of Intense Social Media Use

	Intense SNS	Intense IMT
Scrolling	0.286***	0.075***
	(0.040)	(0.016)
Chatting	0.029	0.173***
	(0.037)	(0.022)
Country Fixed Effects	Yes	Yes
Socio Demo	Yes	Yes
Other Digital Tools	Yes	Yes
Network Quality & Quantity	Yes	Yes
Sport Culture	Yes	Yes
Childhood- Loneliness/Mental health	Yes	Yes
N	6,303	6,303

Notes: *The method of estimation is Logit. Reported coefficients correspond to marginal effects. Definitions of the control variables (not reported) are provided in Table 1. All estimates are weighted to account for unequal selection probabilities and to ensure representativeness of the target population. Weights are based on gender, age, education, and geographical location. Robust standard errors clustered at the country level are reported in parentheses. Significance levels:* * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Highlights:

1. Intensive use of social networking sites correlates positively with loneliness and emotional distress whereas excess use of messaging tools plays a very limited role.

2. Gender and the strength of offline social networks moderate the association between intensive social media use and loneliness and emotional distress.

3. Social Media engagement patterns—namely the distinction between passive and active use—play a limited mediating role.

Declaration of interests

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

☐ The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: