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

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## Abstract

The rapid rise of social media has transformed communication and raised concerns about its societal impact, particularly on mental health and well-being. Using data from a novel EU-wide survey, this study investigates the association between social media usage, loneliness, and emotional distress among young people across 27 European member states. We find that intensive use of social networking sites correlates positively with loneliness and emotional distress, whereas excess use of messaging tools plays a very limited role. These findings are robust to alternative measures of loneliness and emotional distress and to a variety of model specifications. Young adults who either grew up with smartphones during their teenage years or their twenties are particularly vulnerable to excessive use of social network sites. Further analysis suggests that the harmful effects of excessive social networking site consumption may arise from its predominantly passive nature, while instant messaging tools, which primarily involve active engagement, do not exhibit this detrimental impact.

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

**JEL:** L82; D91; I12; I31.

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## Declarations

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# 1 Introduction

The rise of social media (SM) over the past decade has changed the way individuals, especially younger generations, interact, socialize, and consume information. While SM provides opportunities for communication and building connections, there are growing concerns about its potential effects on the mental health and well-being of young users. Research suggests that social media usage has reduced face-to-face interactions, fundamentally altering how people communicate and spend their time, with wide-reaching societal effects (Thompson, 2024; Blanchflower et al., 2024).

These concerns are pressing given the parallel trends of declining mental health and rising loneliness among young people. Across Europe and beyond, studies consistently indicate an increase in symptoms of sadness, anxiety, and depression (Haidt, 2024; Garriguet, Garriguet; Steffen et al., 2020; Blanchflower and Bryson, 2024). In addition, recent evidence highlights that loneliness is particularly high among younger populations (Baarck et al., 2022; Berlingieri et al., 2023). Social pressures and comparisons, now amplified by continuous digital engagement, might be especially harmful for young people during formative years when identity development is critical (Crone and Konijn, 2018; Orben et al., 2022). Twenge (2017) links the rise in mental health issues and loneliness among teens and young adults since 2012 to the advent of smartphones and the widespread use of SM platforms. However, the empirical evidence supporting this claim remains mixed (Orben et al., 2022). Some studies corroborate a link between increased SM use and psychological distress (Keles et al., 2020), while others find negligible effects when controlling for pre-existing conditions and contextual factors (Heffer et al., 2019).

This paper contributed to this debate by examining the relationship between SM use, loneliness, and emotional distress among young people in the European Union. There is a notable lack of EU-wide data on young people’s social media habits. The 2022 EU-wide Loneliness Survey (EU-LS), used in this paper, fills this gap by providing data on both the time spent on SM and the nature of its use. The survey also includes detailed information on health, loneliness, childhood conditions, in-person interactions, and participation in sports and cultural activities. This enables us to explore how intense SM use in Europe relates to loneliness and health outcomes. While the absence of longitudinal data and robust identification strategies complicates causal analysis, the dataset’s comprehensiveness allows for the investigation of potential pathways linking SM use with loneliness and mental health and assesses the extent to which our findings align with the existence of a

causal effect.

The findings suggest that intensive use of social networking sites (SNS) in Europe is positively associated with loneliness and emotional distress, whereas excessive use of messaging tools (IMT) has limited impact. These findings are robust across various measures of emotional distress and loneliness and alternative model specifications. The analysis also suggests that individuals who grew up with smartphones during their teenage years are particularly vulnerable to the negative effects of intense use of SNS. Differences in usage patterns of IMT and SNS might explain their contrasted effects. IMT use is inherently active, involving interactions and chatting, while SNS use includes both active and passive engagement. With the EU-LS providing data on how SM is used, we find that intense passive SM engagement is positively linked to loneliness and emotional distress, whereas active SM engagement either reduces these effects or has no significant impact.

The results presented in this paper are relevant to the increasing focus of policymakers on the challenges associated with intense use of SM. Recently, the US Surgeon General issued an advisory on social media and youth mental health, urging tech companies, families, and policymakers to establish stronger guidelines to help youth use social media in a safe and healthy manner (US Surgeon General, 2023). Legislation across different countries reflects this global concern: the US Senate has proposed two bills to restrict minors' access to social media and require platforms to adopt protective measures (Protecting Kids on Social Media Act, 2023; Kids Online Safety Act, 2023). Similarly, the Online Harms Act of Canada boosts online safety in general, with specific protections for minors (Online Harms Act, 2024). In November 2024, Australia passed a groundbreaking law prohibiting children under 16 from accessing social media and establishing strong fines for those platforms failing to enforce the ban (Reuters, 2024). In Europe, President Ursula Von der Leyen stated in the latest Political Guidelines for 2024-2029, as well as during the Statement at the European Parliament Plenary, that “(...) *we will convene the first-ever European-wide enquiry on the impact of social media on the wellbeing of young people*” (von der Leyen, 2024). In terms of existing legislation, the UK passed in 2023 the Online Safety Act and studies following stronger measures such as the ones imposed in Australia (Online Safety Act, 2023; BBC, 2024). Additionally, Ireland has introduced an Online Safety Code that mandates age verification and provides parental controls to protect minors from harmful online content (Online Safety Code, 2024). Spain has proposed raising the minimum age for social media accounts from 14 to 16, aiming to enhance online safety

for children (Government of Spain, 2024).

According to UNESCO’s GEM report, students may take up to 20 minutes to refocus after being distracted by a smartphone alert during a lesson (Antoninis et al., 2024; Carrier et al., 2015; Dontre, 2021). To address this, several countries have implemented measures, including nationwide bans. France will ban phones entirely in primary and middle schools (up to age 15) starting in 2025, following a trial in 2024 (Le Monde, 2024). Norway’s Directorate for Education and Training issued 2024 guidelines to limit phones and smartwatches, with a potential law under discussion (Government of Norway, 2024). The Netherlands and Hungary have introduced comprehensive bans (Government of The Netherlands, 2024; Euronews, 2024b), while Portugal recommends limiting phone use, especially in primary schools (Government of Portugal, 2024). Greece enforces school-wide restrictions, and Italy permits phones only for educational purposes under teacher supervision (Euronews, 2024a; Government of Italy, 2024). In Belgium, bans vary by region, while in Germany and Spain, restrictions are often state- or school-specific (VRT Nieuws, 2024; El País, 2024; DW, 2024). In the UK, schools are encouraged to restrict phones during hours, with many implementing such policies independently (UK Government, 2024).

The rest of the paper is structured as follows: Section 2 reviews the existing literature on the rise of SM use, the decline in mental health among young people, and their potential linkages. Section 3 introduces the data, provides descriptive statistics for key variables, outlines the empirical approach, and addresses robustness checks. Section 4 discusses the results, explores potential mechanisms, and highlights limitations. Finally, Section 5 offers concluding remarks.

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

### **Rise of social media use, especially among young people**

The number of SM users has more than doubled over the past decade, going from 2 billion users in 2015 to 4.9 billion in 2023, representing approximately 64% of the world population (Ortiz-Ospina, 2019; Anderson et al., 2023). Platforms like YouTube, WhatsApp, Facebook, Instagram, and TikTok have experienced sustained growth over the years, with particularly rapid expansion in newer networks such as Instagram and Tik-

Tok. Short video content, as opposed to text-based content, has gained considerable popularity, reshaping how users create, consume, and engage with content and others. Since its introduction, SM has also expanded its role globally to include not only socializing but also entertainment, news consumption, job seeking, and professional networking (Aichner et al., 2021).

This fast rise of digital technologies is particularly acute among young people.<sup>1</sup> Pew Research Center data shows that 93% of teenagers (13-17) in the US use YouTube, and around 60% are active on TikTok, Instagram, and Snapchat (Anderson et al., 2023). In Europe, the EU Kids Online survey confirms YouTube and Instagram’s growing popularity among teenagers, with over half of all children and teenagers using social networking sites at least weekly (Smahel et al., 2020). Similarly, the World Health Organization’s Health Behaviour in School-aged Children (HBSC) survey (Boniel-Nissim et al., 2024) study shows that between 30% and 40% of adolescents in a broad sample of European countries have continuous online contact with friends. Moreover, more than 10% of adolescents were classified as having ”problematic” SM use based on addictive-like symptoms. Notably, girls are more likely to report both continuous online contact and problematic use of social media than boys, and this effect widens with age.

### **Mental health conditions of young people are worsening**

Over the past decade, numerous studies have documented a substantial decline in young people’s mental health across the globe. In the United States, data from the Centers for Disease Control and Prevention (of Health and Services, 2024) indicate that nearly 4 in 10 high school students reported persistent feelings of sadness or hopelessness in 2023, while 3 in 10 experienced poor mental health involving stress, anxiety, and depression. Even more troubling, 2 in 10 considered suicide, and 1 in 10 attempted it.<sup>2</sup> In his latest book, Haidt (2024) shows a clear trend in the US toward a deterioration in the mental health of young people, with a sudden and large upturn in major depressive symptoms occurring since 2012. This mental health crisis is not isolated to the United States. In Canada, Garriguet (Garriguet) highlights similar trends of rising depressive symptoms and anxiety among adolescents. In Australia, Botha et al. (2023) report comparable findings, while Steffen et al. (2020) identify increasing mental health challenges in Germany. A broader,

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<sup>1</sup>Gottfried (2024) highlights generational differences in platform use, noting TikTok’s dominance among younger users compared to Facebook’s popularity with older demographics.

<sup>2</sup>Female and LGBTQ+ students are particularly affected, displaying disproportionately higher rates of distress and suicidal behaviours.

cross-national analysis conducted by Blanchflower and Bryson (2024) underscores the consistency of these patterns across Europe and the UK, where young women are particularly vulnerable. The HBSC survey (2021-2022) provides further evidence of these worrying trends (Boniel-Nissim et al., 2024). Across multiple European countries, a decline in life satisfaction among adolescents has been documented, especially for older girls. The survey also reports an increase in multiple health complaints, including nervousness, irritability, sleep difficulties, feelings of sadness, and headaches (Schrijvers et al., 2024). Notably, this decline in self-reported mental health disorders coincides with documented increases in objective indicators such as suicide rates and emergency room visits for self-harm, particularly among young people (Udupa et al., 2023). While some researchers argue that rising mental health issues may partly reflect reduced stigma and increased reporting, the concurrent increase in severe outcomes like suicide attempts suggests the phenomenon is not merely a reporting artifact. For instance, studies conducted in the UK, Germany, France, Sweden, Norway, and the Czech Republic confirm significant increases in depressive symptoms and anxiety, especially among young women (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 either quality or quantity" (Perlman and Peplau, 1981), is often perceived as an issue of older generations, driven by reduced social networks and health problems (Hansen and Slagsvold, 2016). However, a number of studies have shown that the relationship between loneliness and age is more complex and does not necessarily follow a linear and monotonic path but rather a U-shaped pattern (Yand and Victor, 2011; Mund et al., 2020) or non-linear pattern (Luhmann and Hawkey, 2016). In particular, cross-national evidence has drawn attention to the concerning levels of loneliness experienced by younger people in both Europe and globally. For instance, Berlingieri et al. (2023, 2024) report that loneliness is notably high among young individuals in Europe. Barreto et al. (2021), relying on worldwide data, confirm that loneliness disproportionately affects young people relative to older adults. Furthermore, the COVID-19 pandemic exacerbated this trend. Baarck et al. (2022) find that the share of young people in Europe experiencing loneliness quadrupled in the first months of the pandemic, going from from 9% to 36%. Recent data from the HBSC survey reveal that 14% of adolescents reported feeling lonely, while only 68% of adolescents report high levels of family support (Boniel-Nissim et al., 2024). Similarly, Twenge et al. (2021), using data from 37 countries, observe a sharp increase in loneliness and feelings of friendlessness at



school among 15- and 16-year-olds in recent years.

Loneliness is not only a distressing emotional state but also a significant public health concern. Studies have linked loneliness to a range of negative health outcomes, including increased risks of suicidal ideation, depression, anxiety, and reduced subjective well-being (Casabianca and Kovacic, 2024; Surkalim et al., 2022; McClelland et al., 2020; Wang et al., 2018; Leigh-Hunt et al., 2017). Chronic or severe loneliness, particularly during formative years, can have lifelong consequences, including an increased risk of mortality (Lim et al., 2020; Holt-Lunstad et al., 2015) and negative effects that persist well into adulthood (Blanchflower and Bryson, 2024).

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

Many wonder whether there is a direct relationship between the rise of SM use and the worsening of mental health and loneliness, particularly among younger generations. A key concern is that online interactions lack the closeness and quality of face-to-face relationships. Kraut et al. (1998), in what has been called the "displacement hypothesis", poses that, as SM users increasingly replace offline connections with digital ones, they may experience growing feelings of loneliness and worsening mental health. Some limited aspects of digital connections, such as the lack of physical and non-verbal cues, can hinder feelings of connectedness, foster communication challenges, and reduce social skills. SM platforms can moreover encourage ruminations, negative emotional contagion, and harmful comparisons. Features like visible social metrics (such as the number of likes and comments on posts) and the use of images on platforms like Instagram amplify insecurities and pressure users to conform to unrealistic social or physical appearance standards Feltman and Szymanski (2018). As Twenge and Spitzberg (2020) note, social norms have shifted, with online interactions becoming more common and in-person meetings less frequent. This shift may further isolate individuals, regardless of whether they use social media, as opportunities for face-to-face interactions decline (Twenge et al., 2021).

On the other hand, Gross (2004) and Valkenburg and Peter (2007) have argued that SM can have a positive impact by strengthening existing connections and fostering the development of new ones. Therefore, according to the "stimulation hypothesis", SM provides, for instance, opportunities to maintain relationships with family and friends when offline interactions are limited due to geographical barriers. 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 social media can support well-being, but excessive use can have adverse effects, such as psychological dependency and the displacement of alternative activities.

The complexity of SM's effects lies in the intentions and patterns of its use. Individuals with extensive social networks may benefit more from SM, while those who struggle with social confidence or loneliness may fail to enjoy its advantages. For instance, lonely individuals are more likely to engage in passive social comparisons or use social media less actively, which may further exacerbate their feelings of isolation (Nowland et al., 2018). Similarly, while it is often assumed that SM use causes loneliness, the relationship may also work in reverse. Individuals may turn to SM as a way to compensate for their lack of face-to-face interactions, spending more time online in an attempt to alleviate their social isolation. Yet, this behaviour may not always be effective in reducing loneliness, especially if it remains passive and does not involve meaningful engagement (Twenge et al., 2021).

### **What is the empirical evidence?**

The debate on the effects of SM use on mental health and loneliness remains polarized. On one side, researchers such as Haidt and Twenge argue that SM use has fundamentally rewired childhood, contributing to an epidemic of mental health issues. Haidt (2024) argues that empirical evidence highlights the harms caused by SM addiction, including negative effects on attention span, sleep, socialization, and ultimately mental health. Adolescents, due to the developmental stage of their brain and other age-specific factors, are particularly susceptible to the excessive use of social media, leading Haidt to advocate for phone-free schools as a solution to mitigate these harms. In contrast, researchers such as Odgers and Jensen (2020) and Ferguson et al. (2024) pose that there is a lack of robust evidence to support such claims, emphasizing the need for stronger causal evidence proving that social media use drives deteriorating mental health outcomes.

Recent meta-analyses and literature reviews offer a more nuanced perspective and generally conclude that the association between time spent on SM and mental health outcomes is small and positive (Orben, 2020; Hancock et al., 2022; Blasko and Castelli, 2022; Huang, 2017; Nowland et al., 2018). Some reviews report that the effects tend to be larger for girls compared to boys. However, until recently, most of these studies relied heavily on correlational data, small and convenient samples, 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 social media 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); Tromholt (2016); 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 results in reduced levels of depression and loneliness, alongside improved life satisfaction. Similar findings have been reported by Braghieri et al. (2022) in their work examining Facebook’s impact on well-being. Despite these findings, not all experimental studies find evidence of a causal relationship. Przybylski et al. (2021) and van Wezel et al. (2021) report no significant effects of reduced SM use on mental health outcomes. In a longitudinal study, Steinsbekk et al. (2023) tracked a cohort of Norwegian adolescents aged 10-16 over several years and concluded that there was no within-individual relationship between social media usage and symptoms of anxiety or depressive disorders.

The way people use SM may also 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. This was confirmed in an experimental setting, where Verduyn et al. (2015) found that passive use of SM worsened loneliness by boosting unrealistic comparisons and perceptions of others’ success. 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. Roberts and David (2022) similarly conclude that excessive passive SM use is detrimental for social connectedness.

In sum, while there is growing experimental evidence that reducing SM use may have positive effects on mental health, particularly among adolescents, conflicting findings and methodological limitations make it difficult to draw definitive conclusions. Notably, the vast majority of studies rely on small sample sizes and measure the impact of reduced SM usage over very short periods, typically a week or, at most, a few weeks following the SM manipulation. Furthermore, nearly all studies are based on data from the US or UK.

## 3 Data and descriptive statistics

### 3.1 Survey characteristics

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.<sup>3</sup> By the end of 2022, 25,646 individuals aged 16 and above were interviewed for the EU-LS, with approximately 1,000 respondents per country except for Cyprus, Luxembourg and Malta (around 500)..<sup>4</sup> The survey was designed by researchers at the Joint Research Centre of the European Commission and contains three well-established and reliable measures of loneliness (one direct question and two indirect, *.i.e.*, the University of California Los Angeles Loneliness (UCLA) Scale (Russell, 1996; Hughes et al., 2004) and the De Jong Gierveld (DJG) scale (de Jong-Gierveld and Kamphuls, 1985; Gierveld and Tilburg, 2006). It also collects detailed information on health (physical and mental/emotional) as well as a wide range of individual- and household-level data. The EU-LS also has a section dedicated to the use of SM, in terms of time, patterns, motivations, and potential overuses. 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. To the best of our knowledge, there are no other EU wide data sources which simultaneously cover loneliness, health and SM consumption. In addition to reliable and comparable loneliness scales, the survey also includes several items on social connectedness, such as the frequency of contacts with family members and friends (either in person or via internet), the number of close friends and family members, engagement in community and sportive activities, as well as a battery of multiple-choice questions on stressful life events and adverse childhood experiences. These additional aspects represent important controls that allow to separate loneliness from social isolation, as well as to analyse the possible impact of SM usage on loneliness and individuals' mental health conditions.

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<sup>3</sup>For more information on the survey and the underlying pilot project on "Monitoring loneliness in Europe", see [https://joint-research-centre.ec.europa.eu/scientific-activities-z/survey-methods-and-analysis-centre-smac/loneliness/eu-loneliness-survey\\_en](https://joint-research-centre.ec.europa.eu/scientific-activities-z/survey-methods-and-analysis-centre-smac/loneliness/eu-loneliness-survey_en)

<sup>4</sup>Quotas based on the population of each member state were used for sample selection from the online consumer panels to reflect the target population in terms of age, gender, education and region of residence (NUTS). In addition, ex-post weights were calculated to account for possible further under-representation of the above-mentioned socio-economic groups.

## 3.2 Variables and sample selection

### Loneliness

The EU-LS contains three measures of loneliness: the direct question, the UCLA 3-item scale, and the DJG 6-item scale. The direct question explicitly mentions "loneliness" or "feel lonely" 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." Those answering "all" or "most of the time" are classified as lonely.<sup>5</sup> Indirect questions, on the other hand, do not explicitly refer to loneliness or feeling lonely but ask about personal experiences closely related to loneliness. As for the 3-item UCLA scale (Hughes et al., 2004), the exact wording of the items is the following: How often do you feel isolated from others?, How often do you feel you lack companionship?, How often do you feel left out?. In each case, the available responses are: (1) Hardly ever or never, (2) Some of the time, (3) Often. A sum score was computed; therefore, the final scale ranges from 3 (not lonely, *i.e.*, those answering (1) to all three items) to 9 (very lonely, *i.e.*, those answering (3) to all three items). The 6-item DJG scale (Gierveld and Tilburg, 2006), on the other hand, contains three positively worded items that measure feelings related to 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 another three negatively worded ones capturing the emotional side of loneliness: "I experience a general sense of emptiness", "I miss having people around" and "I often feel rejected". The response options are (1) Yes, (2) More or less, and (3) No. The six items were dichotomised into six binary variables (with the value of 1 indicating the "Yes" option) and added up to obtain a scale ranging from 0 (not lonely in either social or emotional aspects) to 6 (very lonely in either social or emotional aspect).

Both direct and indirect measures have their strengths and weaknesses. While direct questions are simple and concise 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 they may under-report their true feelings of loneliness when asked about it directly due to "stigma".<sup>6</sup> Indirect measures, on the other hand, do not directly

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<sup>5</sup>This question is included the EU Statistics on Income and Living Conditions (EU SILC), namely in the 6-year rolling module on Quality of Life.

<sup>6</sup>This latter aspect is particularly relevant since its effect may differ across gender or age groups, leading to incorrect conclusions about the prevalence of loneliness in the population. Yet stigma bias is less relevant with online surveys compared to other survey modes.

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 availability of multiple loneliness measures enables us to consider both the direct question and the two indirect psychometric scales in an effort to improve the accuracy and robustness of the main results. Our baseline specifications refer to the dichotomised version of the direct measure of loneliness. We define "lonely" individuals as those feeling lonely most or all of the time over the past 4 weeks. The robustness of the main results is further checked by means of 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.<sup>7</sup> 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 our main empirical analysis. In addition, following the example of the widely used EURO-D scale (Prince et al., 1999)<sup>8</sup>, 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.<sup>9</sup>

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<sup>7</sup>The original Kessler scale does not inquire about "feeling angry", and does refer to "feeling that everything was an effort". However, anger is closely related to psychological distress and can be a significant indicator of health issues (Suls and Bunde, 2005; Averill, 1983). On the other hand, while all other items in the scale directly refer to emotional distress, "feeling that everything was an effort" refers to a functional limitation instead, and is likely already captured in "feeling hopeless" and "feeling depressed".

<sup>8</sup>The EURO-D scale was shown to correlate well with other well-known health measures (Prince et al., 1999), and its validity has been examined and confirmed by several studies (Larraga et al., 2006).

<sup>9</sup>The final scale yields a potential range from 0 to 6, with the number of emotional distress symptoms denoting the score. The original EURO-D depression scale consists of 12 elements connected to mental/psychological health: depression, pessimism, willingness to die, guilt complexes, sleeping difficulties, lack of interests, irritability, lack of appetite, fatigue, lack of concentration, inability to take pleasure

## Social media use

To measure social media consumption, we will rely on the indicators described below. 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 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. 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. 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. Specifically, in an increasingly digital world, moderate screen time is associated with better psychosocial functioning than lower levels of SM engagement (Przybylski and Weinstein, 2017, 2019; Przybylski et al., 2020). In contrast, excessive social media use may replace in-person social activities, with several studies indicating this displacement effect occurs when daily usage exceeds two hours (Sala et al., 2024; Haidt, 2024). We will discuss the robustness of the conclusions to alternative definitions of intense social media use.

A second set of social media-related indicators provides information on the *type of social media 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

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from normal activities, and a tendency to cry. Each item is reported with a 0 if the symptom is absent and a 1 when it is present.

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 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 social media 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

Our focus is on the relationship between social media use and mental health and loneliness outcomes for young generations who grew up with smartphones and social media platforms. This includes individuals belonging to Generation Z (born from 1997 onwards) and partially Generation Y (born between 1981 and 1996). The EU-LS, however, targets individuals aged 16 or older (born in 2006 or earlier), so we are unable to capture the youngest generation in full. To balance sample size considerations with our goal of studying respondents exposed to the widespread adoption of smartphones during adolescence or young adulthood, we select individuals aged 16 to 35 in 2022. We also assess the sensitivity of our findings to this age group. Ultimately, the final sample consists of 6,316 individuals with complete information on both direct and indirect loneliness, as well as on the demographic and socioeconomic characteristics, attitudes towards social media use, and health outcomes.<sup>10</sup>

### 3.3 Descriptive statistics

Before presenting our main empirical results linking SM use, loneliness, and individual health conditions, in what follows we first report some descriptive statistics. Figure 1 shows the prevalence of loneliness (panel a), feeling nervous, restless, and depressed (panel b), and the aggregate mental health score (panel c), by gender. The prevalence of loneliness and emotional distress is generally higher for female respondents compared to that of men. Among girls and young women, 20.6% experienced feelings of loneliness most or all of the time in the four weeks preceding the survey, against 15.5% of male respondents. The gender disparity among emotional indicators is highest for nervousness

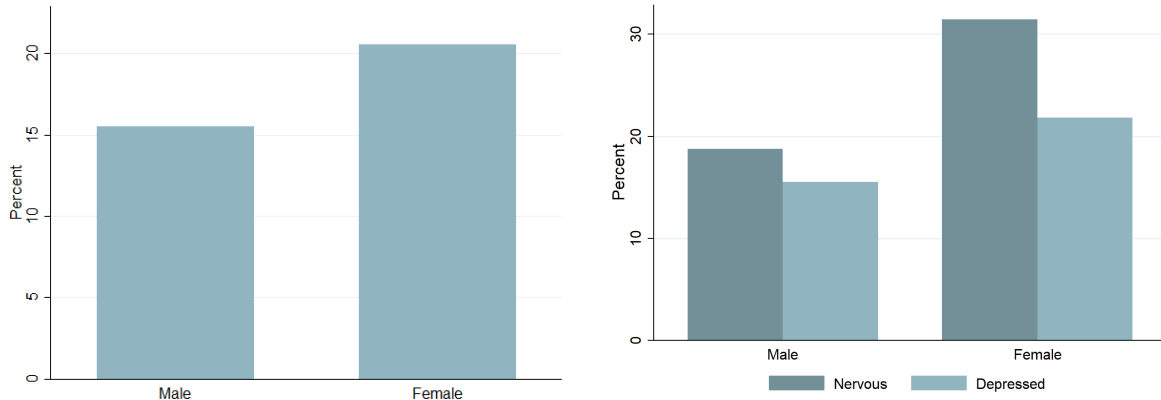
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<sup>10</sup>Non-binary individuals (*i.e.*, those that do not identify with the male or female gender identity) are excluded from the analysis due to insufficient sample size to allow for meaningful comparison between groups (0.37%).



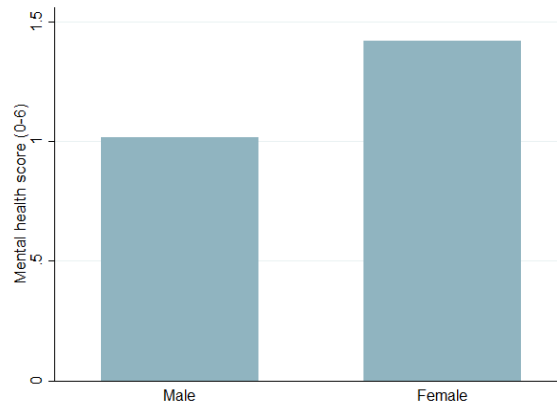
(12.6 pp), followed by feeling depressed (6.3 pp). In terms of overall mental health, female respondents also present higher vulnerability, as measured by the index aggregating six emotional disorders (scored individually with 0 if absent and 1 if present, total scores ranging from 0 to 6). On average, women scored 1.35 on the index, indicating a greater number of reported emotional disorders, compared to an average score of 1.04 for men. As for the overall mental health score, female respondents seem more vulnerable, reporting, on average, 1.35 emotional disorders compared to 1.04 registered by men.

Figure 1: Loneliness and mental health indicators, by gender



(a) Loneliness (direct question)

(b) Nervousness and depression

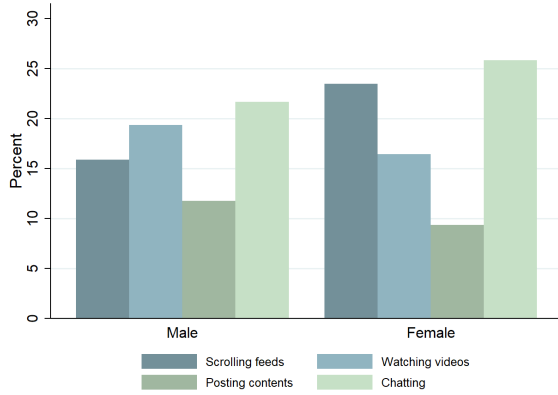


(c) Overall mental health score (0-6)

**Notes:** The figure shows the weighted unconditional averages of loneliness and emotional disorders, by gender. Number of observations: 6,870 (53.38% females and 46.62% males).

Young female respondents also engage more frequently than men in SNS and video streaming (Figure 2). More precisely, 35% of girls and young women spend more than 2 hours per day on social networking, compared to 25% of boys and young men. The prevalence of intense use of IMT (video streaming), on the other hand, is still higher among female respondents (26.2%) but the gap with male respondents is somewhat narrower (5.4 pp).

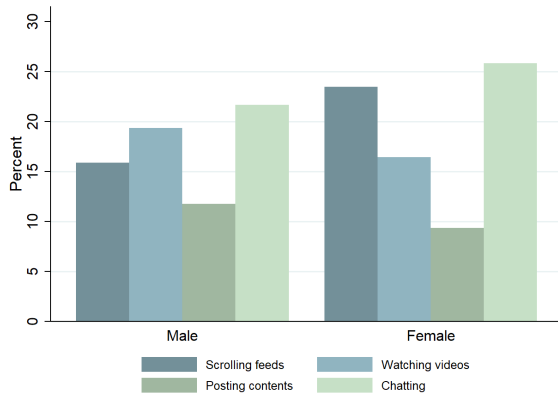
Figure 2: Frequency of use of social media, by purpose, gender and cohort



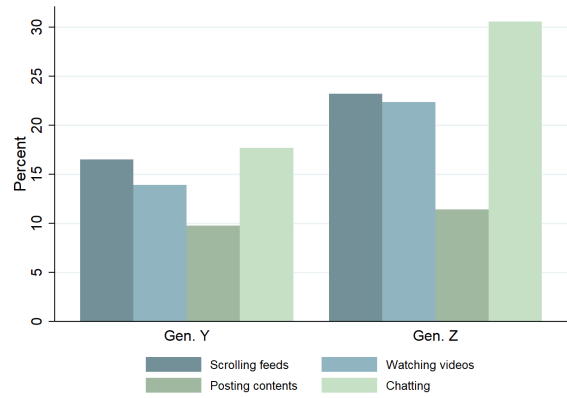
(a) SNS and IMT (> 2hrs)



(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 social media users by gender, type of activity and cohort. Number of observations: 6,870 (53.38% females and 46.62% males; 56.15% gen. Y and 43.85% gen. Z).

When it comes to the distinction between active and passive users, the situation is less

clear. Among passive users, girls and young women tend to be more involved than men in scrolling feeds 16 times or more per day, while a slightly larger portion of men engage in watching videos. Active users, on the other hand, register slightly more female respondents involved in chatting, while the shares of those posting contents are quite similar.

### 3.4 Empirical Analysis

As already mentioned in Section 2, the mechanisms linking SM usage to loneliness and mental health are not straightforward, with several factors at play, such as strengthening existing connections and making new ones *versus* face-to-face contact replacement and unfavourable social comparisons at play. In addition, overuse of social media may simultaneously lead to both loneliness and emotional distress, as there is a positive relationship between the two (Beutel et al., 2017; Richard et al., 2017; Mann et al., 2022; Casabianca and Kovacic, 2024).

Given the endogenous nature of individual attitudes towards loneliness, SM use, and self-reported emotional disorders, any empirical exercise aimed at separating the underlying mechanisms must deal with reverse causality and/or omitted variables problems. The primary goal of our analysis cannot be to disentangle a clear cause-in-effect relation given the cross-sectional nature of EU-LS data. Nonetheless, conditional associations, when approached cautiously, can provide valuable insights and conclusions. This is particularly true given the richness of the dataset allowing for the consideration of a wide range of individual and environmental factors that may simultaneously influence SM usage and the outcome indicators (loneliness, nervousness, and depression). In addition, the main findings will undergo robustness tests and sub-analysis to ensure the consistency of the observed relationship of SM consumption and loneliness and mental well-being in adolescents and young adults.

In Table 1, we regress loneliness on the intense use of SNS and IMT. The baseline specification in column (1) controls for the full set of individual socio-demographic characteristics, such as age, gender, education, household composition, occupational status, relationship 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 positively associated with lone-

liness. This latter evidence may indicate that more communication and active exchange of information with friends or relatives through IMT may improve the overall perception of relationship quality, a fact that will indeed be discussed in Section 4. Tables 2 and 3 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 as in Table 1. The 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, respectively. In contrast, intense use of IMT does not seem to play any significant role.

Table 1: Loneliness and social media consumption

	(1)	(2)	(3)	(4)
Intense use of SNS	0.105*** (0.023)	0.105*** (0.021)	0.105*** (0.021)	0.102*** (0.021)
Intense use of IMT	-0.051** (0.026)	-0.032* (0.018)	-0.032* (0.018)	-0.035* (0.019)
Country FE	Yes	Yes	Yes	Yes
Socio-Demo	Yes	Yes	Yes	Yes
Network Quality and Quantity	No	Yes	Yes	Yes
Sport and Culture	No	No	Yes	Yes
Intense use of digital tools	No	No	No	Yes
N	6,333	6,333	6,333	6,333

**Notes:** The method of estimation is Logit. The reported coefficients are marginal effects. Demographic and socio-economic controls include: age, gender, household size, number of kids, employment status, and self-reported health. Network quality and quantity controls include: network size (family and friends), and frequency of face-to-face contacts with friends and family members. Sport and culture controls include: participation in culture or sport events and weekly physical activity. Intense use of digital tools controls include: gaming and watching TV. Robust standard errors clustered at the country level are reported in parentheses. Significance levels: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table 2: Depression and social media consumption

	(1)	(2)	(3)	(4)
Intense use of SNS	0.068*** (0.022)	0.064*** (0.024)	0.062*** (0.023)	0.050** (0.020)
Intense use of IMT	-0.017 (0.024)	0.001 (0.019)	0.000 (0.019)	-0.013 (0.020)
Country FE	Yes	Yes	Yes	Yes
Socio-Demo	Yes	Yes	Yes	Yes
Network Quality and Quantity	No	Yes	Yes	Yes
Sport and Culture	No	No	Yes	Yes
Intense use of digital tools	No	No	No	Yes
N	6,316	6,316	6,316	6,316

**Notes:** The method of estimation is Logit. The reported coefficients are marginal effects. Demographic and socio-economic controls include: age, gender, household size, number of kids, employment status, and self-reported health. Network quality and quantity controls include: network size (family and friends), and frequency of face-to-face contacts with friends and family members. Sport and culture controls include: participation in culture or sport events and weekly physical activity. Intense use of digital tools controls include: gaming and watching TV. Robust standard errors clustered at the country level are reported in parentheses. Significance levels: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table 3: Nervousness and social media consumption

	(1)	(2)	(3)	(4)
Intense use of SNS	0.095*** (0.023)	0.094*** (0.022)	0.093*** (0.022)	0.092*** (0.024)
Intense use of IMT	-0.029 (0.033)	-0.020 (0.036)	-0.021 (0.036)	-0.023 (0.037)
Country FE	Yes	Yes	Yes	Yes
Socio-Demo	Yes	Yes	Yes	Yes
Network Quality and Quantity	No	Yes	Yes	Yes
Sport and Culture	No	No	Yes	Yes
Intense use of digital tools	No	No	No	Yes
N	6,325	6,325	6,325	6,325

**Notes:** The method of estimation is Logit. The reported coefficients are marginal effects. Demographic and socio-economic controls include: age, gender, household size, number of kids, employment status, and self-reported health. Network quality and quantity controls include: network size (family and friends), and frequency of face-to-face contacts with friends and family members. Sport and culture controls include: participation in culture or sport events and weekly physical activity. Intense use of digital tools controls include: gaming and watching TV. Robust standard errors clustered at the country level are reported in parentheses. Significance levels: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

The above-reported associations, however, may be spurious since lonely individuals may face low-quality social networks, interact less frequently face-to-face with close friends and/or family members, or even be emotionally dissatisfied as singles. Interestingly, these important aspects of individuals' social lives do not alter the strength of the relationship between SM and loneliness and mental health. Indeed, Column (2) in Tables 1, 2 and 3 controls for the number of close friends and close relatives, whether the respondents meet face-to-face with friends and relatives (not living with the respondent) at least once a week, and whether they are in a relationship together with the self-perceived quality of this relationship. The coefficients associated with intense use of SNS are practically unaltered, whereas intense usage of IMT remains not significantly different from zero in the three specifications.

Intense use of SM may displace other social activities that offer direct positive benefits to mental health and foster feelings of social connections such as participating in physical activities or attending cultural and sporting events. The evidence in Column (3), however, shows that controlling for the engagement in this kind of activity and practising sport in the period preceding the interview does not alter the estimated coefficients associated with intense use of SNS and IMT. This latter result, therefore, indicates that excessive SM consumption remains consistently associated with loneliness and worse mental well-being, regardless of participation in the other "real" social activities as opposed to the virtual ones.

Finally, 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. These may include intense use of video games or watching TV or content on streaming platforms. Spending more time on gaming, for instance, may have both positive and negative effects on loneliness and emotional distress. Owen et al. (2010), Ellis et al. (2020) and Giardina et al. (2021), for instance, show that there may be some general cognitive benefits to gaming or that it mitigated stress, anxiety, depression, and loneliness in adolescents and young adults during the Covid-19 pandemics. Other research suggest that adolescent with mobile game addiction have higher self-reported depression, social anxiety and loneliness (Wang et al., 2019; Pallavicini et al., 2022). Controlling for these potentially confounding factors in Column (4), however, does not alter our previous conclusions. In the case of depression, however, prolonged video gaming weakens the association with SNS overuse by 24%, suggesting that gaming may independently affect

depression.<sup>11</sup> All in all, we can conclude that the observed 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 social networking sites.

### 3.5 Robustness checks

The evidence presented so far suggests that individuals who spend excessive time on SNS report higher levels of loneliness and more frequent feelings of depression and nervousness. In contrast, IMT intensive use has a mitigating effect on loneliness while it does not correlate with mental health outcomes. However, loneliness is a complex phenomenon that can be measured differently as discussed in section 3.2. Similarly, Tables 2 and 3 focus on two dimensions of emotional distress, namely depression and nervousness. Other relevant dimensions such as feeling restlessness, worthlessness, angeriness, and hopelessness have not been taken into consideration. The purpose of this section is to check to which extent our findings are robust to alternative measures of loneliness and mental well-being, as well as to a more restricted definition of young people.

Table 4 considers two alternative measures of loneliness, namely the short 3-item UCLA scale and the six-item De Jong Gierveld (DJG) scale. As already mentioned in Section 3.2, indirect UCLA and DJG scales do not directly refer to loneliness and reflect more closely the core definition of loneliness as a perception of deficiency in social relationships and attenuate potential reporting biases due to stigma. The relationship between SNS and loneliness remains robust for both scales. Spending more than two hours on social network sites is associated with a 0.28-point (0.38-point) increase in the UCLA (DJG) scale, which is a considerable effect given the scale of the two measures (ranging between 0 and 6) and the population means of 2.3 (UCLA) and 3.3 (DJG).<sup>12</sup> While including all six items to construct a one-factor DJG scale is commonly used (Geirdal et al., 2021), its main advantage lies in its coverage of two different dimensions of loneliness, namely the social and the emotional ones. Disentangling these two dimensions in Table 5 shows that excessive SNS consumption increases the likelihood of both social and emotional loneli-

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<sup>11</sup>Indeed, only depression significantly correlates with spending more than two hours on gaming and streaming platforms (we don't report these coefficients for space and clarity purposes.)

<sup>12</sup>The inclusion of gaming and TV streaming slightly reduces the associations between social media consumption and loneliness.

ness. However, the effect is more pronounced for emotional loneliness, which stems from a lack of intimacy and attachment in social relationships. Young individuals spending more than two hours on SNS have a 0.22 point higher emotional score compared to a 0.16 point increase in the case of social loneliness. Interestingly, intense use of IMT has a positive effect, although statistically insignificant, effect on social loneliness, which is not surprising since frequent messaging may mitigate the negative effects of having narrower social networks.

Table 4: Loneliness (alternative scales) and social media consumption

Loneliness (UCLA)	(1)	(2)	(3)	(4)
Intense use of SNS	0.283*** (0.072)	0.287*** (0.068)	0.280*** (0.076)	0.263*** (0.079)
Intense use of IMT	-0.093 (0.153)	-0.006 (0.148)	-0.028 (0.151)	-0.048 (0.139)
Loneliness (DJG, overall)				
Intense use of SNS	0.386*** (0.110)	0.386*** (0.091)	0.380*** (0.088)	0.355*** (0.071)
Intense use of IMT	-0.138 (0.129)	0.002 (0.153)	-0.011 (0.152)	-0.042 (0.121)
Country FE	Yes	Yes	Yes	Yes
Socio-Demo	Yes	Yes	Yes	Yes
Network Quality and Quantity	No	Yes	Yes	Yes
Sport and Culture	No	No	Yes	Yes
Intense use of digital tools	No	No	No	Yes
N	6,333	6,333	6,333	6,333

**Notes:** The method of estimation is OLS. Demographic and socio-economic controls include: age, gender, household size, number of kids, employment status, and self-reported health. Network quality and quantity controls include: network size (family and friends), and frequency of face-to-face contacts with friends and family members. Sport and culture controls include: participation in culture or sport events and weekly physical activity. Intense use of digital tools controls include: gaming and watching TV. Robust standard errors clustered at the country level are reported in parentheses. Significance levels: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .



Table 5: DJG social and emotional loneliness, and social media consumption

Loneliness (DJG, social)	(1)	(2)	(3)	(4)
Intense use of SNS	0.161*** (0.053)	0.162*** (0.045)	0.161*** (0.045)	0.152*** (0.046)
Intense use of IMT	-0.040 (0.100)	0.039 (0.124)	0.044 (0.119)	0.032 (0.099)
Loneliness (DJG, emotional)				
Intense use of SNS	0.225*** (0.078)	0.224*** (0.069)	0.219*** (0.061)	0.203*** (0.049)
Intense use of IMT	-0.098 (0.072)	-0.037 (0.062)	-0.054 (0.061)	-0.073 (0.065)
Country FE	Yes	Yes	Yes	Yes
Socio-Demo	Yes	Yes	Yes	Yes
Network Quality and Quantity	No	Yes	Yes	Yes
Sport and Culture	No	No	Yes	Yes
Intense use of digital tools	No	No	No	Yes
N	6,333	6,333	6,333	6,333

**Notes:** The method of estimation is OLS. Demographic and socio-economic controls include: age, gender, household size, number of kids, employment status, and self-reported health. Network quality and quantity controls include: network size (family and friends), and frequency of face-to-face contacts with friends and family members. Sport and culture controls include: participation in culture or sport events and weekly physical activity. Intense use of digital tools controls include: gaming and watching TV. Robust standard errors clustered at the country level are reported in parentheses. Significance levels: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Finally, Table 6 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. Compared to the population averages of the indicator reported in Figure 1, we can conclude that these are actually quite significant associations.

Table 6: Mental health (aggregate index) and social media consumption

	(1)	(2)	(3)	(4)
Intense use of SNS	0.401*** (0.069)	0.401*** (0.058)	0.399*** (0.060)	0.363*** (0.062)
Intense use of IMT	0.089 (0.098)	0.184 (0.115)	0.178 (0.116)	0.134 (0.101)
Country FE	Yes	Yes	Yes	Yes
Socio Demo	Yes	Yes	Yes	Yes
Network Quality and Quantity	No	Yes	Yes	Yes
Sport and Culture	No	No	Yes	Yes
Intense use of digital tools	No	No	No	Yes
N	6,245	6,245	6,245	6,245

**Notes:** *The method of estimation is OLS. Demographic and socio-economic controls include: age, gender, household size, number of kids, employment status, and self-reported health. Network quality and quantity controls include: network size (family and friends), and frequency of face-to-face contacts with friends and family members. Sport and culture controls include: participation in culture or sport events and weekly physical activity. Intense use of digital tools controls include: gaming and watching TV. Robust standard errors clustered at the country level are reported in parentheses. Significance levels: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .*

In addition to alternative measures of loneliness and mental well-being, certain aspects of SM consumption, particularly the means and related purposes, may have disproportionately affected some of the youngest cohorts. More specifically, the respondents in our sample who were over 30 years old in 2022 (35.6 percent) experienced the widespread adoption of smartphones and SM in their twenties. During their adolescence, they witnessed the widespread adoption of home internet (primarily through desktop computers) and used flip phones for communication with family and friends. In contrast, younger respondents grew up with smartphones during their teenage years, marking the shift to continuous 24/7 internet and social media exposure. In order to check whether this particular subset of young individuals is more affected by potential negative effects of SM consumption, in Table 7 we replicate our models for loneliness and emotional distress on the subset of respondents aged 16–30 in 2022. Compared to the entire sample (*i.e.*, 16–35 years old), younger individuals spending more time on SNS register similar probabilities of experiencing loneliness and depressive feelings, while they are slightly more likely to experience feelings of nervousness (12 versus 9 percentage points). As for the entire sample, intense use of IMT do not show any significant correlation with loneliness and emotional distress.

Table 7: Loneliness, emotional distress and social media consumption, 16-30 years old

Loneliness (direct)	(1)	(2)	(3)	(4)
Intense use of SNS	0.091*** (0.019)	0.086*** (0.018)	0.086*** (0.018)	0.086*** (0.018)
Intense use of IMT	-0.029 (0.020)	-0.015 (0.015)	-0.015 (0.015)	-0.015 (0.015)
Nervousness				
Intense use of SNS	0.122*** (0.043)	0.119*** (0.039)	0.119*** (0.039)	0.119*** (0.039)
Intense use of IMT	-0.034 (0.037)	-0.025 (0.042)	-0.025 (0.042)	-0.025 (0.042)
Depression				
Intense use of SNS	0.065*** (0.017)	0.060*** (0.015)	0.060*** (0.015)	0.060*** (0.015)
Intense use of IMT	0.001 (0.026)	0.011 (0.024)	0.011 (0.024)	0.011 (0.024)
Country FE	Yes	Yes	Yes	Yes
Socio Demo	Yes	Yes	Yes	Yes
Network Quality and Quantity	No	Yes	Yes	Yes
Sport and Culture	No	No	Yes	Yes
Intense use of other digital tools	No	No	No	Yes
N	4,271	4,271	4,271	4,271

**Notes:** The method of estimation is Logit. The reported coefficients are marginal effects. Demographic and socio-economic controls include: age, gender, household size, number of kids, employment status, and self-reported health. Network quality and quantity controls include: network size (family and friends), and frequency of face-to-face contacts with friends and family members. Sport and culture controls include: participation in culture or sport events and weekly physical activity. Intense use of digital tools controls include: gaming and watching TV. Robust standard errors clustered at the country level are reported in parentheses. Significance levels: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## 4 Discussion

The robust link between intense use of SNS, loneliness, and emotional disorders evidenced so far cannot obscure a more than obvious "elephant in the room." Although informative and unquestionably useful, the reported evidence is correlational, offering limited insight about the direct mechanisms linking SM consumption to desired outcomes. As previously discussed, testing the existence of a causal effect in our context is especially difficult due to cross-national nature of the data. The absence of a longitudinal dimension and/or a robust identification strategy, such as a quasi-experimental or experimental design, makes

attempts to rule out reverse causality or omitted variable bias challenging. However, in what follows below, we account for additional individual dimensions and explore potential mechanisms linking SM use and loneliness/mental health in order to assess the extent our findings are in line with the existence of a causal effect.

Controlling for social isolation and emotional disorders during childhood should help mitigate reverse causality bias, as these factors are predetermined and precede SM use in young adulthood. This is especially true given the chronic nature of loneliness and emotional distress (Casabianca and Kovacic, 2024). In Table 8 we compare the coefficients from the full model specification for loneliness, depression, and nervousness in Tables 1-3 to those obtained from the respective models after adding loneliness (column 2) and familial mental health conditions of respondents and close relatives in childhood (columns 4 and 6). The relationship between intense use of SNS and IMT, loneliness, and mental health remains unchanged. Although retrospective information can be affected by "colouring," *i.e.*, the potential propensity of actually lonely or depressed individuals to bias their responses by recalling in a more negative fashion the past experiences (Buia et al., 2019; Brugiavini et al., 2023), the fact that we consider the presence of close relatives with mental health issues rather than more subjective indicators of relationship quality with parents should reduce the potential recall bias, making the considered measure relatively accurate and reliable (Campbell et al., 2014; Hardt and Rutter, 2004).

Observing that intense SNS use is associated with a higher likelihood of reporting loneliness and emotional distress, while no such association is found with intense IMT use, suggests that the specific way of how SM platforms are used may account for this difference. Moreover, this distinction might be the underlying causal mechanism through which intense use of SNS impacts loneliness and emotional distress. This would be in line with the existing literature which suggests that a more active engagement in SM (such as chatting or posting) may be less detrimental or even benevolent for individual emotional distress unlike more passive and non-interactive approaches, such as scrolling (Godard and Holtzman (2024), Nguyen et al. (2025), Verduyn et al. (2022)). IMT use is inherently active, as it primarily involves online interactions and chatting. In contrast, SNS use encompasses both active and passive engagement. In order to understand to which extent the way SM usage relates to loneliness, in Table 9 we report an estimate where our SM related variables are now two indicators measuring whether respondents are intensely chatting (*i.e.*, active use) and scrolling (*i.e.*, passive use) on SM platforms (see

section 3.2). Interestingly, passive SM engagement is positively linked to loneliness and emotional distress, with the associations being strongest for nervousness. Active SM use, on the other hand, is negatively associated with the probability of experiencing feelings of loneliness and nervousness, while it does not exert any significant effect on depression. This finding offers consistent evidence that SNS may indeed contribute to increased loneliness and mental health disorders among young individuals, with one of the root causes likely being how SNS platforms are typically used rather than the amount of time spent on them. In contrast, the different results for intense IMT would stem from the distinct ways in which IMT platforms are used.

Interesting patterns and conclusions reported so far referred to specific younger cohorts of individuals in our sample. In order to check whether the potentially negative impact of SM consumption cross over to older cohorts or make only the younger particularly vulnerable, in Table 10 we report the marginal effects of excessive use of SNS and IMT for the entire sample of individuals while distinguishing between younger ( $\leq 35$ ) and older cohorts ( $> 35$ ). The coefficients clearly suggest that the main concerns raised by several scholars (Twenge and Spitzberg (2020), Haidt (2024)) regarding the increased risk of loneliness and emotional distress especially among young individuals, is confirmed by the data. The only dimension that significantly affects both age groups is loneliness, although with a halved effect of older compared to younger cohorts. These findings also suggest that what we observe for young people may be close to a causal effect. If reverse causality were driving the results, similar patterns would likely have been observed across both age groups.

Table 8: Loneliness, Nervousness, depression, and Social Media Consumption

	(1)	(2)	(3)	(4)	(5)	(6)
	(Lon.)	(Lon.)	(Nerv.)	(Nerv.)	(Depr.)	(Depr.)
Intense use of SNS	0.102*** (0.021)	0.102*** (0.021)	0.092*** (0.024)	0.092*** (0.024)	0.050** (0.020)	0.050*** (0.019)
Intense use of IMT	-0.035* (0.019)	-0.042** (0.018)	-0.023 (0.037)	-0.030 (0.037)	-0.013 (0.020)	-0.017 (0.018)
Full set of controls from column 4, Tables 1-3	Yes	Yes	Yes	Yes	Yes	Yes
Loneliness in childhood	No	Yes	No	No	No	No
MH in childhood (relatives)	No	No	No	Yes	No	Yes
Observations	6333	6333	6325	6325	6316	6316

**Notes:** The method of estimation is Logit. The reported coefficients are marginal effects. Demographic and socio-economic controls include: age, gender, household size, number of kids, employment status, and self-reported health. Network quality and quantity controls include: network size (family and friends), and frequency of face-to-face contacts with friends and family members. Sport and culture controls include: participation in culture or sport events and weekly physical activity. Intense use of digital tools controls include: gaming and watching TV. Robust standard errors clustered at the country level are reported in parentheses. Significance levels: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table 9: and Social Media Consumption

	(1)	(2)	(3)
	(Lon.)	(Nerv.)	(Depr.)
Scrolling (passive use)	0.061*** (0.018)	0.089** (0.035)	0.042** (0.019)
Chattin (active use)	-0.032* (0.018)	-0.022* (0.013)	-0.005 (0.032)
Full set of controls from column 4, Tables 1-3	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Observations	6320	6312	6303

**Notes:** The method of estimation is Logit. The reported coefficients are marginal effects. Demographic and socio-economic controls include: age, gender, household size, number of kids, employment status, and self-reported health. Network quality and quantity controls include: network size (family and friends), and frequency of face-to-face contacts with friends and family members. Sport and culture controls include: participation in culture or sport events and weekly physical activity. Intense use of digital tools controls include: gaming and watching TV. Robust standard errors clustered at the country level are reported in parentheses. Significance levels: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table 10: Loneliness, nervousness, and depression and Social Media Consumption, by age (below 36, 36 and above)

	Loneliness	Nervousness	Depression
Intense use of SNS (> 35 yrs)	0.040** (0.018)	0.016 (0.033)	0.003 (0.013)
Intense use of IMT (> 35 yrs)	0.013 (0.017)	0.007 (0.033)	0.018 (0.029)
Intense use of SNS ( $\leq$ 35 yrs)	0.081*** (0.019)	0.077*** (0.015)	0.046** (0.019)
Intense use of IMT ( $\leq$ 35 yrs)	-0.021 (0.014)	-0.009 (0.027)	-0.007 (0.015)
Observations	21226	21207	21190

**Notes:** The method of estimation is Logit. The reported coefficients are marginal effects. Demographic and socio-economic controls include: age, gender, household size, number of kids, employment status, and self-reported health. Network quality and quantity controls include: network size (family and friends), and frequency of face-to-face contacts with friends and family members. Sport and culture controls include: participation in culture or sport events and weekly physical activity. Intense use of digital tools controls include: gaming and watching TV. Robust standard errors clustered at the country level are reported in parentheses. Significance levels: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

While the evidence of a stronger impact of social media consumption among younger individuals appears clear and in line with the current debates in the literature, the picture emerging from a gender perspective in Table 11 provides slightly mixed results. The negative associations with excessive use of SNS are generally stronger among female respondents, particularly in the case of nervousness and depression. Similarly, in addition to loneliness, which is generally alleviated by intense use of IMT (Table 1), intensive messaging among female respondents appears to be beneficial for depression. Positive associations between passive use of social media, loneliness and emotional disorders, on the other hand, appear to be driven by male individuals, with the exception of depression, which is more prevalent among passive social media female users. This latter evidence aligns with the existing literature, which shows that the excess time spent on SM positively correlates with depressive symptoms for both sexes, with the association being stronger for girls (Liu et al., 2022; Ivie et al., 2020; McCrae et al., 2017). Together with an increased vulnerability to negative self-appraisal, body dissatisfaction, and self-objectification of girls (Course-Choi and Hammond, 2021), they might also be more likely to be bullied online, which is associated with a higher risk of depression (Liu et al., 2022).

Table 11: Loneliness, nervousness, depression and social media consumption, by gender

	Loneliness	Nervousness	Depression
Male: Intense use of SNS	0.104*** (0.035)	0.076** (0.034)	0.005 (0.021)
Male: Intense use of IMT	-0.015 (0.045)	-0.022 (0.042)	0.035** (0.016)
Female: Intense use of SNS	0.102*** (0.026)	0.107** (0.047)	0.087*** (0.028)
Female: Intense use of IMT	-0.065*** (0.025)	-0.038 (0.054)	-0.055** (0.028)
Observations	6333	6325	6316

**Notes:** The method of estimation is Logit. The reported coefficients are marginal effects. Demographic and socio-economic controls include: age, gender, household size, number of kids, employment status, and self-reported health. Network quality and quantity include: network size (family and friends), and frequency of face-to-face contacts with friends and family members. Intense use of digital tools include: gaming and watching TV. Robust standard errors clustered at the country level are reported in parentheses. Significance levels: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## 5 Conclusions

This study investigates the relationship between SM usage and its effects on loneliness and emotional well-being among young people, providing insights into a pressing public health issue. Social media use has become an integral part of daily life, and its implications for mental health claim for further research, particularly given youth vulnerabilities. The analysis exploits a novel, comprehensive EU-wide dataset that includes detailed measures of loneliness, emotional distress, and SM behaviours. By focusing on the distinction between active and passive engagement, our findings highlight how different patterns of SM use are linked to well-being outcomes.

The results indicate that excessive use of SNS is strongly associated with increased levels of loneliness and emotional distress. The conclusions remain unchanged with the inclusion of a battery of explanatory variables and alternative definitions of loneliness and emotional distress. Although the cross-national nature of the data does not allow us to make strong causal statements, its comprehensiveness offers the opportunity to test the robustness of the findings and assess potential causal pathways linking excess use of SM, loneliness, and emotional distress. Differences in usage patterns of IMT and SNS might explain the contrasted effects of these two types of SM platforms. More precisely, the



harmful effects of excessive SNS consumption may arise from its predominantly passive nature, while IMT, which primarily involve active engagement, do not exhibit this detrimental impact.

From a policy perspective, this paper provides evidence supporting the importance of promoting healthy SM practices. Digital literacy initiatives should warn users about the potential risks of passive engagement and encourage more active forms of interaction in SM. Additionally, regulating platform features that drive passive consumption, such as infinite scrolling and algorithmic feeds, could help mitigate harm. Future studies, particularly those employing longitudinal designs, are essential to further disentangle causal relationships and inform effective interventions.

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