CHANGES IN SOCIAL MEDIA USE PATTERNS AMONG CZECH ADOLESCENTS: HBSC STUDY 2018–2022

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SUMMARY

Objectives: Previous studies have identified four distinct patterns of adolescent social media use (SMU): non-active users abstain from social media or engage in online interactions only once a week or less; active users connect with others online daily without any functional impairments related to their SMU; intense users frequently engage with others online but do not meet criteria for problematic use; problematic users report six or more addiction-like symptoms. The following study aimed to assess the prevalence of these SMU patterns among Czech adolescent, examine changes between 2018 (pre-COVID-19) and 2022, and explore age and gender differences to identify at-risk subgroups.

Methods: Data were drawn from the Health Behaviour in School-aged Children (HBSC) study among 11-, 13- and 15-year-olds. The study analysed Czech data from the 2017/18 and 2021/22 waves (n = 26,450).

Results: Findings revealed marked changes in SMU patterns between 2018 and 2022 among Czech adolescents, which varied by gender and age category. Girls and older adolescents reported higher rates of problematic SMU. The share of non-active users declined, most notably among 11-year-olds.

Conclusions: The marked increase in both intense and problematic SMU among Czech adolescents highlights a growing public health concern. Given the established associations between problematic SMU and poorer mental health outcomes, these findings call for the integration of digital behaviour monitoring and education into school-based mental health and prevention programmes. Particular attention should be given to early adolescence and to gender-specific vulnerabilities.

Key words: social media use, adolescents, Czechia, problematic social media use

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https://doi.org/10.21101/cejph.a8698

INTRODUCTION

Social media use (SMU) has risen sharply, particularly among adolescents (1). Given its ubiquity and mounting concerns about its effects on youth wellbeing, it is essential to track changing usage patterns, especially in the wake of the COVID-19 pandemic, which intensified adolescents' reliance on social media for social connection (2). The current study examines changes in social media use patterns between 2018 and 2022 among Czech adolescents.

Previous studies have identified four distinct categories of adolescent SMU (3–5): non-active users are adolescents who abstain from social media or engage in online interactions only weekly or less; active users connect with others online on a daily basis, but do not exhibit any functional impairments related to their SMU; intense users frequently engage with social media, yet without signs of addictive behaviour; problematic users report six or more symptoms resembling addiction (6), such as preoccupation, tolerance, withdrawal, escapism, deception, and conflict, which interfere with everyday life.

While most studies focus on the level of social media engagement, it is important to gain a better understanding of specific user patterns along a continuum from non-active use to problematic use, as it provides more in-depth knowledge that may lead to more practical applications. Distinguishing between these user patterns will provide a crucial foundation for diagnosing problematic use, developing preventive digital literacy programmes, and creating tailored interventions for at-risk groups. For instance, previous studies identify intense users as presenting more psychological and somatic complaints and more negative body images compared to active users (3, 5). In addition, of all four categories, problematic users consistently display the lowest mental and social wellbeing levels. Consistent with previous research, engaging in active and even intense non-problematic social media use appears to offer important benefits for young people's social functioning (7). Therefore, avoiding social media may not be the best strategy for these youngsters (3).

Alongside the importance of identifying different social media usage patterns, it is also important to consider adolescents' age and gender, as they play an essential role in identifying populations

at risk. Prior studies show consistent links between age, gender, and adolescent SMU (8, 9). Girls tend to report higher SMU intensity and are more often at risk of problematic use compared to boys (6, 10, 11). Problematic SMU is especially prevalent among 13- and 15-year-old girls compared to younger girls and the same-aged boys (12).

Additionally, we must acknowledge the broader global changes that influence adolescents' patterns of social media use. On the one hand, we can observe technological acceleration driven by factors such as increased access to smartphones and the internet, platform innovations, and the rise of algorithm-driven content. On the other hand, conditions such as the COVID-19 pandemic necessitated reliance on digital tools, including social media. During the COVID-19 pandemic, adolescents increasingly turned to social media to cope with stress, anxiety, and social isolation – a pattern consistent with Compensatory Internet Use Theory (13). While this behaviour may have supported the short-term wellbeing of adolescents, it may also have fostered maladaptive use patterns, contributing to problematic SMU.

The Present Study

The current study had three goals: to identify the prevalence of the four patterns of SMU among adolescents in Czechia; to examine whether there has been a change in these patterns between 2018, before the outbreak of the COVID-19 pandemic, and 2022; and to examine gender and age differences in the various usage patterns to identify subpopulations at risk.

MATERIALS AND METHODS

Sample

The data were obtained from the Health Behaviour in School-aged Children (HBSC) study (14). The HBSC is a cross-national WHO-collaborative study that investigates health-related behaviours among adolescents aged 11, 13 and 15 years in four-year intervals. The present study used the 2017/18 and the 2021/22 survey data from Czechia. Out of the total sample comprising 27,965 respondents, only those with missing values on both central variables were excluded from the final analytic sample (n = 26,450) (Table 1).

Measures

Electronic media communication (EMC) intensity was measured using four items adapted from the EU Kids Online survey (15). Adolescents indicated how often they communicated via social media with close friends, wider friend groups, online-only friends, and others (e.g., family, classmates, teachers). Responses ranged from "do not know/does not apply" to "almost all the time throughout the day." The highest reported frequency across items was used to classify users into three levels: never or up to weekly; daily/several times a day; and almost constantly (3).

Problematic SMU was assessed with the nine-item Social Media Disorder Scale (6, 7), comprising dichotomous items on addiction-like behaviours (e.g., "In the past year, have you tried but failed to reduce your time on social media?"). Total scores reflect the number of endorsed symptoms; scores ≥ 6 indicate problematic use, while scores ≤ 5 indicate non-problematic use.

SMU four categories: EMC intensity and problematic SMU were combined to form four usage categories (3): non-active users – weekly or less contact and non-problematic; active users – daily use but not constant and non-problematic; intense users – almost constant use yet non-problematic; and problematic users – problematic use regardless of frequency.

Socio-demographic factors: participants reported gender (boy/girl); age was derived from month and year of birth and grouped into the three target age cohorts of the HBSC study: 11, 13 and 15 years, corresponding with 5th, 7th and 9th grades in the Czech schooling system. Lastly, the socioeconomic status was estimated using the well-established Family Affluence Scale (FAS) comprising six items investigating, e.g., ownership of cars, dishwasher or computers in the household (16).

Statistical Analyses

Descriptive characteristics are presented as percentages and means with standard deviations (SD) separately for boys and girls in each age category and by survey year. The differences across categories were analysed using chi-square tests for percentage values and using analysis of variance for mean values, with phi coefficient and eta squared ($\eta 2$) used to assess effect size, respectively.

Multinomial logistic regression analyses were used to assess the change between 2018 and 2022. Four categories of SMU represented dependent variables, while active users were selected as a reference category and survey year served as an independent variable. Regressions were controlled for gender, age category, and family socioeconomic status. In the next step, the interaction terms of survey year with gender and age category were included in the model. The results of the regression analyses are presented using odds ratios (ORs) and 95% confidence intervals (CI). All analyses were conducted using IBM SPSS Statistics for Windows v.29 (IBM Corp. Released 2023. Armonk, NY, USA).

Table 1. *Final analytic sample by gender, grade and survey year*

	Boys			Girls			Total
	11 years n (%)	13 years n (%)	15 years n (%)	11 years n (%)	13 years n (%)	15 years n (%)	
2018	2,067 (16.0)	2,297 (17.7)	2,195 (16.9)	2,057 (15.9)	2,246 (17.3)	2,095 (16.2)	12,957
2022	1,887 (14.0)	2,245 (16.6)	2,660 (19.7)	1,894 (14.0)	2,178 (16.1)	2,629 (19.5)	13,493
Total	3,954 (14.9)	4,542 (17.2)	4,855 (18.4)	3,951 (14.9)	4,424 (16.7)	4,724 (17.9)	26,450

Source: HBSC Czechia 2017/18 and 2021/22
Percentage values indicate relative rate of respondents of given age category and gender in a respective row.

RESULTS

Electronic Media Communication Intensity

As shown in Figure 1, between 2018 and 2022, there was a modest increase in the frequency of communication through social media. However, a noticeable decline was identified in the prevalence of participants who communicated 'almost never' through social media (6.7% in 2018 vs. 4.3% in 2022, $p<0.001$). In addition, a significant increase was evident in the prevalence of those communicating through social media 'almost all the time' between 2018 and 2022 (22.1% vs. 26.9%, $p<0.001$).

Age and gender differences in EMC intensity are presented in Figure 2. The data show that the proportion of adolescents communicating via social media 'almost daily' or 'almost all the time' increased with age across both genders and survey years. Notably, the most pronounced change between 2018 and 2022 occurred among 11-year-olds, with the largest increase in daily communication and the most significant decrease in weekly or less frequent communication among boys and girls ($p<0.001$). Effect of all these differences remained small though, with phi coefficients ranging between 0.075 and 0.094.

Problematic Social Media Use

The mean number of symptoms measured using the Social Media Disorder Scale also raised during the last survey cycle from 1.51 (SD = 1.98) in 2018 to 2.03 (SD = 2.17) in 2022. This applied to both boys and girls across all age categories (all at $p<0.001$). However, the relative rise in the 2018–2022 period was especially pronounced among 11-year-olds, regardless of gender – boys from 1.15 (SD = 1.83) to 1.84 (SD = 2.13) and girls from 1.19 (SD = 1.70) to 1.79 (SD = 2.07). Next, we observed a substantial increase in symptoms in 13-year-old girls from 1.95 (SD = 2.09) in 2018 to 2.67 (SD = 2.34) in 2022. The effect size of these changes over time remained small ($\eta 2 = 0.016$).

The increase in the mean number of reported symptoms resulted in a significant increase in the prevalence of problematic SMU (5.3% in 2018 vs. 8.3% in 2022, $p<0.001$) classified by the presence of 6 or more of these symptoms. This increase can be seen in all socio-demographic groups under study. Nonetheless, the most noticeable growth between 2018 and 2022 was seen among 11-year-olds for both girls (from 3.2% to 7.3%, $p<0.001$) and boys (from 4.1% to 7.3%, $p<0.001$).

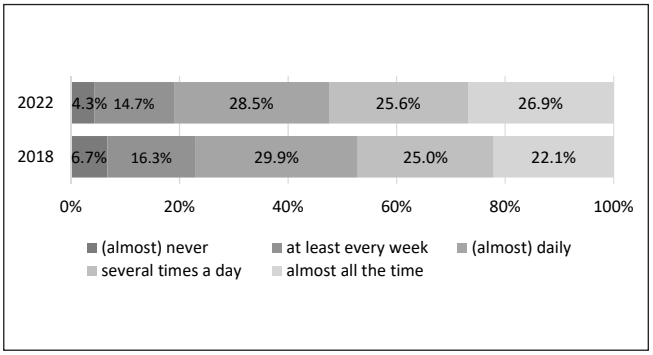

Fig. 1. *Difference in intensity of electronic media communication between 2018 and 2022.*

Source: HBSC Czechia 2017/18 and 2021/22

Four Categories of Social Media Use

Considering the total sample, the proportion of non-active users declined from 22.4% to 17.7% ($p<0.001$), while active users remained the largest group in both survey years (52.9% and 51.0% in 2018 and 2022, respectively). Notably, the share of intense users increased from 19.4% to 22.9%, and the proportion of problematic users rose from 5.3% to 8.3% ($p<0.001$).

Analogous to results derived from both EMC intensity and Social Media Disorder Scale assessing problematic SMU, we observed marked variance in the 2018–2022 trend by age categories (Fig. 3). The proportion of non-active users declined among 11- and 13-year-olds. This decline was accompanied by a rise in both intense and problematic users within these age groups, with the latter user category roughly doubling in girls aged 11 and 13 ($p<0.001$). Among 15-year-old boys, the rate of problematic SMU remained stable, while the proportion of intense users increased from 20% to 25% ($p<0.001$). Among 15-year-old girls, the rate of intense users remained unchanged, but problematic use increased from 7% to 10% ($p<0.001$).

Multinomial regression models controlled for basic socio-demographic factors, with active users acting as a reference category, showed that there were fewer intense (OR = 0.83, 95% CI: 0.78–0.88) and problematic users (OR = 0.83,

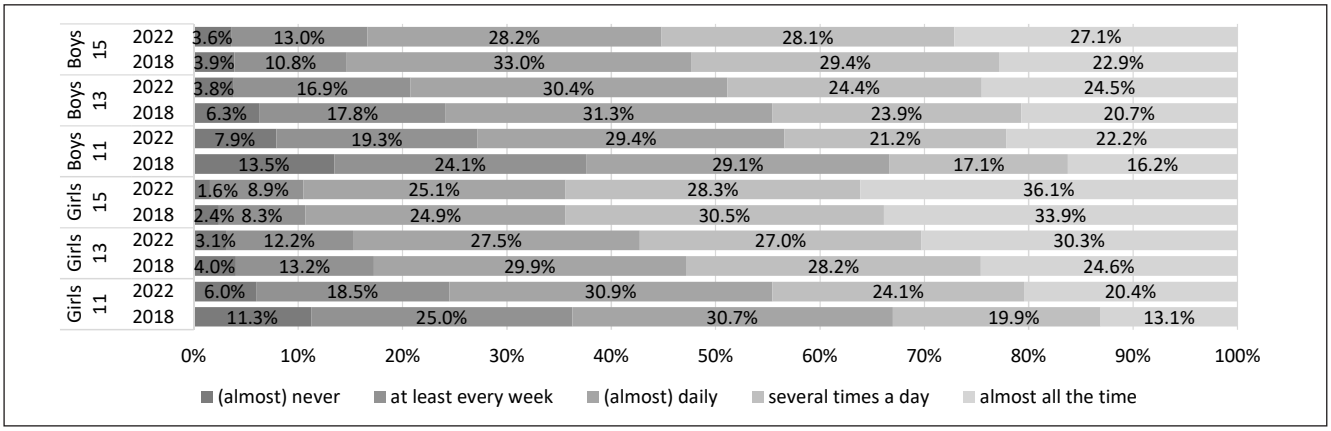

Fig. 2. *Difference in intensity of electronic media communication between 2018 and 2022 split by gender.*

Source: HBSC Czechia 2017/18 and 2021/22

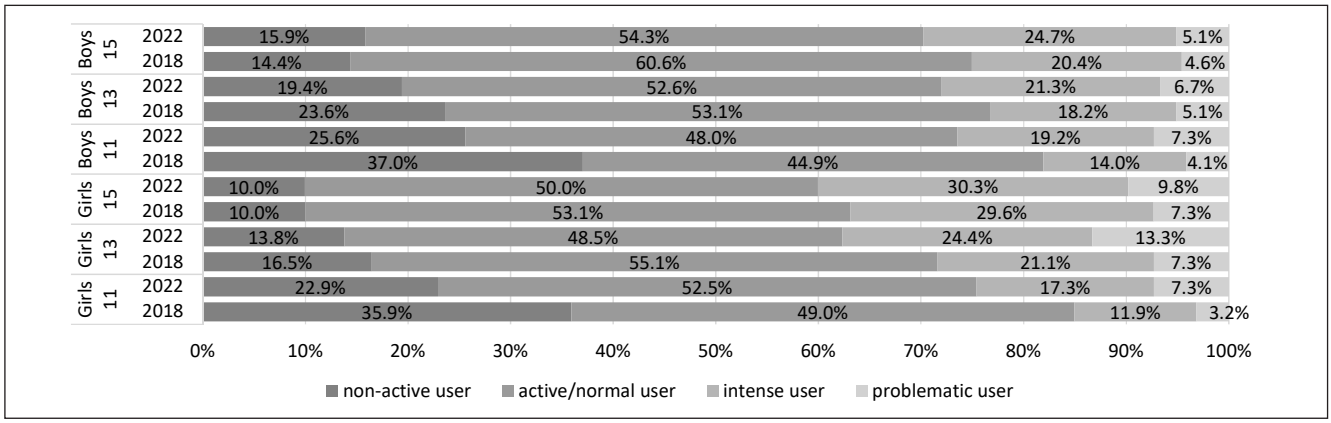

Fig. 3. *Four categories of social media use split by gender.*

Source: HBSC Czechia 2017/18 and 2021/2022

95% CI: 0.78–0.88) in 2018 than in 2022. The trend over time was opposite for non-active users (OR = 1.26, 95% CI: 1.18–1.35). Next, interaction terms were added and the results of the full model are presented in Table 2. Compared to 2022, adolescents in 2018 were significantly less likely to report problematic SMU (OR = 0.66, 95% CI: 0.54–0.80) and the interaction showed that this (i.e., increase in relative numbers between 2018 and 2022) held true especially for 13-year-olds and girls. The main effects for survey for other two categories of users remained non-significant. However, interactions of age with survey year showed significant decline in proportion of non-active users from 2018 and 2022 in two younger age categories – 11- and 13-year-olds).

Gender differences were evident across all usage patterns, boys were less likely than girls to be classified as intense (OR = 0.86, 95% CI: 0.79–0.94) and, in particular, problematic users (OR = 0.59, 95% CI: 0.51–0.67). In contrast, boys showed higher odds of being among non-active users (OR = 1.30, 95% CI: 1.18–1.44). Age-related differences indicated that younger adolescents were more likely to be non-active users. Compared to 15-year-olds, 11-year-olds showed nearly twofold higher odds of non-active use (OR = 1.96, 95% CI: 1.74–2.21) and significantly lower odds of intense use. Thirteen-year-olds also demonstrated elevated odds of non-active and problematic use relative to the oldest age group, but lower odds of classification

Table 2. *Results of multinomial logistic regression analyses: Associations between survey year and sociodemographic factors with patterns of social media use*

	Non-active users			Intense users			Problematic users		
	OR	95% CI	p-value	OR	95% CI	p-value	OR	95% CI	p-value
Survey year									
2022	Ref.			Ref.			Ref.		
2018	0.94	0.81–1.10	0.451	0.89	0.79–1.00	0.054	**0.66**	0.54–0.80	**<0.001**
Gender									
Boys	**1.30**	1.18–1.44	**<0.001**	0.86	0.79–0.94	**<0.001**	**0.59**	0.51–0.67	**<0.001**
Girls	Ref.			Ref.			Ref.		
Age category/grade									
11 yr/5th	**1.96**	1.74–2.21	**<0.001**	0.69	0.61–0.77	**<0.001**	**0.97**	0.82–1.16	0.746
13 yr/7th	**1.34**	1.18–1.51	**<0.001**	0.85	0.77–0.94	**0.001**	**1.35**	1.16–1.57	**<0.001**
15 yr/9th	Ref.			Ref.			Ref.		
FAS									
Low	**1.63**	1.45–1.83	**<0.001**	1.03	0.93–1.15	0.556	**1.09**	0.92–1.29	0.306
Middle	**1.31**	1.19–1.45	**<0.001**	0.88	0.81–0.96	**0.005**	**0.86**	0.75–0.99	**0.036**
High	Ref.			Ref.			Ref.		
Interaction terms									
Gender (boy) × survey year (2018)	0.95	0.83–1.09	0.481	0.93	0.82–1.06	0.303	**1.38**	1.12–1.71	**0.003**
Age (11) × survey year (2018)	**1.79**	1.51–2.12	**<0.001**	0.86	0.73–1.02	0.088	0.76	0.58–1.01	0.060
Age (13) × survey year (2018)	**1.25**	1.05–1.49	**0.012**	0.95	0.82–1.11	0.524	**0.78**	0.61–0.99	**0.044**

Source: HBSC Czechia 2017/18 and 2021/22

*All ORs in bold are significant at $p < 0.05$; FAS – Family Affluence Scale

as intense users. Regarding socioeconomic status (estimated using FAS), adolescents from middle-income families were slightly less likely to be classified as intense or problematic users than their high-FAS peers. Both low- and middle-FAS adolescents had higher odds of non-active use (OR = 1.63 and 1.31, respectively).

DISCUSSION

The findings highlight significant increases of intense and problematic social media users among Czech adolescents aged 11–15 between 2018 and 2022, suggesting a shift toward more digitally embedded social interactions among adolescents in the post-pandemic period. This could be partly an inevitable phenomenon inherently related to rapid technological development but perhaps strengthened by COVID-related lockdowns associated by restrictions of leisure activities and school closures that took longer time in Czechia than in other European countries (17). During these periods, adolescents' opportunities for face-to-face social interaction were substantially reduced, likely increasing reliance on social media as a primary means of maintaining peer contact and coping with social isolation.

Consistent with previous research, boys were less likely to report both intense and problematic SMU and more likely to be classified as non-active users, possibly reflecting gender-based differences in social needs and media use patterns (6, 10, 11). Notably, intense and problematic SMU appears to rise with age, in particular between 11 and 13 years among girls, underlining the importance of monitoring and intervening during middle adolescence (18–20). Socioeconomic disparities were apparent among non-active users, with low- and middle-FAS showing higher odds of using social media on less than daily basis than their more affluent counterparts. Odds of intense and problematic users were markedly less pronounced, though adolescents from middle-income families were slightly less at risk, pointing to potential explanation related to distinct access, supervision, or digital coping strategies compared to adolescents from low- and high-FAS. These findings support the need for age- and gender-sensitive interventions accounting for socioeconomic context and further attention to the long-term psychological effects of increased digital reliance during and after the COVID-19 pandemic.

In addition, the findings indicated substantial shifts across the four SMU categories between 2018 and 2022. Most notably, the proportion of non-active users declined, suggesting that fewer adolescents abstain from social media use altogether. This trend likely reflects the growing digital integration of adolescent life and the increasing normalisation of SMU as a routine aspect of adolescent social interaction. These changes can be interpreted within the broader context of societal digitalisation and may have been further accelerated by the COVID-19 pandemic, which intensified reliance on online platforms for both social and educational purposes (21, 22). At the same time, the increase in problematic SMU raises concerns, as it suggests that more adolescents are not only using social media frequently but are also experiencing negative consequences related to its use, such as compulsive behaviours and impaired functioning.

Limitations

Alongside the significant contribution of the current study, several limitations must be presented. First, the data are based on self-reports, which may be subject to social desirability and recall biases. Second, the cross-sectional design limits causal inferences regarding the directionality of associations. Lastly, the measures used, though widely accepted, rely on adolescents' subjective perceptions and may not fully capture the complexity of their social media experiences.

CONCLUSIONS

The observed increase in problematic SMU among adolescents carries important public health implications. Problematic SMU has been consistently linked to a range of adverse mental health outcomes, including heightened symptoms of anxiety and depression, poor sleep quality, and reduced life satisfaction (6, 23, 24). These findings underscore the need for early prevention and intervention efforts aiming at high-risk groups, particularly girls who appear to be at greater risk. In addition, general public health strategies should promote balanced digital use and enhance digital literacy, especially considering the normalisation of intense SMU post-pandemic (8, 22). Programmes embedded in schools and communities that foster emotional regulation, offline social engagement, and alternative coping strategies may help mitigate the potential long-term harms associated with problematic SMU. On the top of that, healthy SMU needs to be promoted along with guidelines for parents and children what such healthy SMU encompasses.

Acknowledgements

The study was supported by the project "Research of Excellence on Digital Technologies and Wellbeing CZ.02.01.01/00/22_008/0004583," which is co-financed by the European Union.

Conflicts of Interest

None declared

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Received June 24, 2025
Accepted in revised form December 18, 2025