A cross-sectional examination of the associations between types of recreational screen times and flourishing among a large sample of adolescents

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Abstract

Objectives: Screen time is linked to deteriorating adolescent mental health. However, most evidence comes from studies examining total screen time rather than types of screen use. This study explored functional associations between time spent on five common recreational screen types—social media, video games, television, messaging, Internet browsing—and adolescent flourishing.

Study Design: Cross sectional study.

Methods: We used cross-sectional data from 58 472 participants in the COMPASS study in 2024. Generalized linear models with quadratic and cubic terms assessed associations between screen use and flourishing scores

Results: Results revealed non-linear associations between the different screen types and adolescent flourishing. Negative associations were observed immediately for video games and Internet, while social media, television, and messaging initially showed slight positive associations, reversing after 30 min (messaging) and 60 min (television, social media). Prolonged use (>120 min) of all screen types was associated with lower flourishing scores compared to non-daily users. Among all screen types, video games were most strongly associated with lower flourishing. Associations were generally similar for males and females, except for video games, where females were associated with lower flourishing scores than males as time increased.

Conclusions: All recreational screen types are not equally associated with adolescent flourishing. Public health guidelines regarding youth screen time could be refined to account for differential associations. Screen types more strongly associated with lower flourishing and specific thresholds could be targeted in future guidelines and interventions to promote adolescent well-being.

Introduction

Adolescent mental health has deteriorated over the past 20 years, raising concerns about a growing mental health crisis (1, 2). Screen time has been identified as an important correlate of this phenomenon (3, 4). Excessive use of screens has been associated with an increase in depressive and anxiety symptoms (5), an internalization of behavioral problems (6), reduced socio-emotional and cognitive development (7), and even a decrease in flourishing (8). Several years ago, these findings drove public health officials to recommend limiting total recreational screen time to less than two hours per day (9, 10). However, adolescents continue to increase their screen time (11), highlighting a growing trend of hyperconnectivity that warrants closer examination.

Some experts argue it may not be adequate to base recommendations on total recreational screen time because the various types of screens, such as social media, video games, television, messaging, and Internet (3, 5), do not necessarily involve the same reactions, motivations, and health consequences (5, 12). For example, the interactive and social nature of certain video games or social media may be

differently associated with anxiety and depressive symptoms compared to passive screen time, such as watching videos or television (12, 13). In this regard, a recent meta-analysis found that different types of screens were associated with increases in depression scores among adolescents above different thresholds: 30 min per day for social media, 2 h per day for video games, 4 h 30 min per day for television, and 30 min per day for computers (3). Some studies have suggested these associations can also vary according to sex (4, 14), with females more likely to develop depressive and anxiety symptoms from heavy screen use (14, 15). However, the findings are inconsistent (12), as some studies found no differences based on sex (16, 17), highlighting the complexity of these relationships.

Studies relevant to this topic have mostly focused on anxiety, depression, and self-harm, revealing heterogeneous findings depending on the outcome examined. Less attention has been paid to positive mental health concepts among adolescents (4, 18). Flourishing, a state of optimal mental well-being characterized by positive emotions, a sense of purpose, personal growth, and good social relationships (19), has gained growing attention as a comprehensive approach that extends beyond the absence of mental illness (20). It reflects an expanded understanding of well-being that encompasses both hedonic aspects (e.g., positive emotions, happiness, life satisfaction, and overall quality of life) and eudaimonic aspects (e.g., self-realization, personal growth) (19). Research shows that flourishing has been linked to important developmental outcomes in adolescence, such as higher resilience, better academic functioning, and healthier social engagement (21). Evidence also suggests that adolescents who flourish are more likely to adopt adaptive coping strategies and maintain long-term mental and physical health advantages (21, 22). It provides a salutogenic approach to mental health (23), increasingly considered to be a key measure of societal progress by policymakers and governments (24).

To date, few studies have examined the association between screen time and flourishing (4, 5). Weatherson et al. showed that compliance with screen time guidelines was associated with higher flourishing scores (25), whereas Faulkner et al. found no association at this level (26). Brown and colleagues (8) suggested that high levels of screen time are negatively associated with flourishing in adolescents. Similarly, Gilchrist et al. showed that replacing screen time with homework, physical activity, or sleep may may be better for mental health outcomes in adolescents (27). To date, however, no study has comprehensively examined the functional association between the time spent on different recreational screens (e.g., social media, video gaming, television, online streaming) and adolescent flourishing. Little is known regarding the duration threshold at which different forms of recreational screen use—whether passive (e.g., watching videos, television) or interactive (e.g., gaming, social media)—are linked to positive or negative changes in flourishing. Studies to date have often categorized screen time into predefined time intervals (3, 4), such as “0–2 h” or “2–4 h,” which are not standardized across studies. This approach may oversimplify the complex association between types of screen time and mental health outcomes. By adopting methods that treat screen time as a continuous variable and examining non-linear associations, researchers may be able to gain a more accurate understanding of the functional association between screen use and adolescent mental health (28, 29). This approach could facilitate the identification of precise duration thresholds where the association between screen time and flourishing shifts, whether positively or negatively.

The aim of this study was to explore the functional associations between time spent on five common recreational screen types—social media, video games, television, messaging, and Internet browsing—and adolescent flourishing. We also aimed to examine how these associations vary based on adolescents' sex.

Methods

Data sources

Cross-sectional data collected in 2024 as part of the COMPASS study (https://uwaterloo.ca/compass-system/) were used. Each year, youth in participating high schools in Canada complete a questionnaire about their lifestyle and behaviors. In the province of Quebec, school surveys have been conducted since the spring of 2017 in partnership with school communities and the regional public health departments. Since 2020, data collection has been conducted online using Qualtrics XM (Seattle, WA, USA). All COMPASS procedures are approved by the University of Waterloo Ethics Committee (ORE#30118), the CIUSSS de la Capitale-Nationale–Université Laval (#MP-13-2017-1264), and the participating school boards when applicable. More detailed information about the COMPASS study is publicly available online (30).

Participants

The study population included all high school students (equivalent to grades 7 to 11 in the rest of Canada and the United States) attending the 134 participating high schools in Quebec. Of the 77 584 adolescents solicited, 65 245 (91.1%) answered the online questionnaire between March and May 2024. Parents' active refusal rate was less than 0.01% (416 participants). A total of 58 472 adolescents provided responses to the variables of interest (flourishing, social media time, video game time, television time, messaging time, Internet time) and covariates (e.g., age, family affluence) and were therefore included in our analysis.

Measures

Mental health

The Diener flourishing scale (31) was used in this study. This 8-item scale is built around five dimensions : relationships, life purpose and satisfaction, engagement and interest in daily activities, self-esteem and competence, and optimism. All item statements are positively framed (e.g. "I am competent and capable in the activities that are important to me"). Adolescents are asked to respond to each item on a Likert scale from 1 to 5, giving a final score of flourishing ranging from 8 (lowest level of flourishing) to 40 (highest level). Evidence supporting the construct validity and reliability of the Flourishing Scale has been well established in adolescent populations (32, 33) including within the COMPASS cohort (34). In

our sample, internal consistency was excellent (α = 0.89), consistent with both Diener's original validation study (α = 0.87) and with reliability estimates reported in the COMPASS sample (α = 0.87).

Screen time

Students reported the usual time spent per day, in 15-min increments, on five types of screens: 1) social media (e.g., Instagram, TikTok); 2) video games (playing video games on a console or computer); 3) television (watching television programs or films); 4) messaging (texting, chatting, emailing); and 5) Internet time (browsing). Previous studies using such screen time data reported one-week test-retest intraclass correlation coefficients ranging from 0.54 to 0.86 (30).

Sociodemographic variables

Students reported their age (grouped < 14 or ≥ 14 years) and sex (male, female). We used a score of family affluence based on adolescents' responses regarding: 1) the average amount of money they received each week for personal spending or savings; 2) skipping breakfast because there was nothing to eat at home; 3) going to bed hungry at night because there was not enough money to buy food; 4) having the feeling that they and their family were less financially comfortable than the average student in their class; 5) having their own bedroom; 6) the number of people in their household; and 7) being worried about their family's ability to pay bills and expenses. Composite scores were dichotomized into two groups (more affluent = 0, less affluent = 1) based on the last two quintiles considered to be less affluent.

Other variables for complementary analysis

The 7-item Generalized Anxiety Disorder Self-Report Questionnaire (GAD-7) (35) was used to perform a sensitivity analysis. Anxiety is one of the most widely measured variables for assessing adolescents' mental health (4, 36). This scale was selected because it is correlated to the Diener flourishing scale (37). Adolescents were asked seven questions about how often in the past two weeks they had felt nervous, anxious, or worried, had difficulty relaxing, or had been agitated, irritable, or afraid of something happening. The scores were added together to obtain a total score ranging from 0 to 21, where higher scores represented the presence of more anxiety symptoms.

Data analysis

Descriptive statistics were calculated (e.g., frequencies, medians, means, standard deviations) separately for females and males on all the variables of interest. The outcome variable was the adolescent's flourishing score, as a continuous variable. We used a generalized linear model with quadratic and cubic terms to examine the functional associations between recreational screen times and flourishing. The non-linearity of this association was confirmed using Wald tests (38). A separate

model was carried out for each recreational screen type (social media, video games, television, messaging, Internet). Potential confounders included in the multiple regressions were age, sex, and family affluence. A robust variance estimator (39) was used to account for the fact that students were nested within schools, such that their observations may not have been entirely independent. Predicted values were estimated and represented in two ways. First, we estimated the adolescents' predicted flourishing scores for each screen time (in 30-min increments), highlighting how the score changed as the various screen times increased. Second, for each screen type, we estimated how the predicted flourishing scores differed between adolescents who reported zero screen time and those who reported higher screen times (in 30-min increments). This allowed us, for example, to contrast the predicted flourishing scores of adolescents who spent 3 h per day on social media with the predicted flourishing scores of adolescents who did not use social media (180 min vs. 0 min). These analyses were performed using the margins command (with the contrast option for the second analysis) and the marginsplot command in Stata. We also conducted a sensitivity analysis using the adolescents' GAD-7 scores (35) as an outcome and found that the results showed similar patterns overall (Appendix 1). To address the second objective of this study regarding sex differences, the analyses were stratified for males and females.

The interquartile range method was used to identify outliers that were excluded from the analysis (40). Screen time values were considered to be outliers if $N > Q3 + 1.5\times IQR$. Because the thresholds to be considered outliers varied based on screen types, the analyses were conducted on slightly different samples (see Appendix 2 for details). We conducted a full case analysis using STATA/SE V.18.5 software.

Results

Descriptive characteristics

Among the 58 472 adolescents included in this study, 30 487 (52%) were females. The mean age of participants was 14 years (±1.5). The mean flourishing score for females was 31.6 (±5.8), while that for males was 33.6 (±5.5). The mean flourishing score observed in our sample (M = 32.6) is comparable to that reported in the validation sample (M = 33.3), suggesting a moderate level of flourishing among participants. The most time-consuming screen types were: social media, with an average of 151 min per day (±141); video games, with an average of 97 min per day (±139); and television, with an average 91 min per day (±104). Time spent texting averaged 80 min per day (±116), and time spent on the Internet averaged 74 min per day (±123). Females played video games much less than males (42 min vs. 157 min), but spent more time on social media (175 min vs. 126 min). Detailed descriptive statistics are presented in Table 1.

Table 1
Descriptive characteristics of the study sample by sex

Variables	**Total (*N* = 58 472)**	**Females (*N* = 30 487)** **(52.1%)**	**Males (*N* = 27 985)** **(47.9%)**
Age (years), mean ± SD	14.46 ± 1.5	14.45 ± 1.5	14.47 ± 1.6
Family affluence			
More affluent	40 415 (69.1%)	21 315 (69.9%)	19 100 (68.2%)
Less affluent	18 057 (30.9%)	9 172 (30.1%)	8 885 (31.8%)
Screen times in minutes per day	*Mean ± SD (median)*	*Mean, ± SD (median)*	*Mean ± SD (median)*
Social media	151.2 ± 141 (120)	174.6 ± 144.1 (120)	125.7 ± 133 (90)
Video games	97 ± 138.8 (60)	41.6 ± 90.2 (0)	157.4 ± 156.3 (120)
Television	90.5 ± 103.9 (60)	92.2 ± 96.8 (60)	88.6 ± 111.1 (60)
Messaging (chatting, texting, emailing)	80 ± 116.1 (45)	92.4 ± 118.6 (60)	66.6 ± 111.7 (30)
Internet browsing	74.4 ± 122.5 (30)	77.9 ± 123.8 (30)	70.7 ± 120.9 (30)
Flourishing (8–40), **mean ± SD (median)**	32.6 ± 5.7 (33)	31.6 ± 5.8 (32)	33.6 ± 5.5 (34)

Functional associations between time spent on different types of screens and flourishing

Figure 1 and Table 2 highlight that the nature of the functional associations varied depending on the type of screen activity. The first few minutes (15 min) of playing video games (β: -0.02, 95% CI: -0.02 to -0.02) and browsing the Internet (β : -0.02, 95% CI: -0.03 to -0.01) were negatively associated with flourishing scores. In contrast, the first minutes of surfing social media (β: 0.01, 95% CI: 0.01 to 0.02), watching television (β: 0.02, 95% CI: 0.02 to 0.03), and messaging (β: 0.02, 95% CI: 0.01 to 0.03) were positively associated with flourishing. However, even for these types of screens the associations become negative after a certain period of use: 60 min for surfing social media or watching television and 30 min for messaging.

Notes: Results are adjusted for sex, age, and family affluence.

* *Although the flourishing scale ranges from 8 to 40, the scale is presented from 15 to 40 in part (A) because 99% of the sample is between these values.*

Table 2
Final models examining the association between screen types and flourishing scores

	Social media	Video games	Television	Messaging	Internet
Intercept (95% CI)*	34.77 (33·37 to 36·16)	36.88 (35·39 to 38·38)	34.01 (32·57 to 34·44)	34.15 (32·74 to 35·56)	35.03 (33·55 to 36·51)
β (95% CI)					
Screen time (linear) per 15-min increments	0·01 (0·01 to 0·02)	-0·02(-0·02 to -0·02)	0·02 (0·02 to 0·03)	0·02 (0·01 to 0·03)	-0·02 (-0·03 to -0·01)
Screen time^2 (quadratic) per 15-min increments	-1·4 e^{-4} (-1·7 e^{-4} to -1·2 e^{-4})	0·02 e^{-5} (2·5 e^{-5} to 9·4 e^{-5})	-2·4 e^{-4} (-2·9 e^{-4} to -1·8 e^{-4})	-0·3 e^{-4} (-0·4 e^{-4} to -0·2 e^{-4})	2·5 e^{-4} (2·2 e^{-5} to 4·8 e^{-4})
Screen time^3 (cubic) per 15-min increments	2·6 e^{-7} (2 e^{-7} to -3·2 e^{-7})	-8.7 e^{-8} (-1·7 e^{-7} to -1·9 e^{-9})	5·7 e^{-7} (3·9 e^{-4} to 7·4 e^{-4})	1·1 e^{-6} (7·1 e^{-7} to -1·5 e^{-6})	-1·1 e^{-6} (-2·4 e^{-6} to -2·7 e^{-7})
Bayesian indicators					
Loglikelihood	-169564	-169147	-172691	-166168	-154331
AIC	339157	338322	345411	332364	308691
BIC	339282	338446	345535	332488	308815

β = Coefficient, CI = 95% confidence interval, AIC = Akaike information criterion, BIC = Bayesian information criterion

Notes: Models are adjusted for sex, age, and family affluence. *Reference values for the intercept: Screen time type = 0; Sex = Male; Age = “13 years or less”; Family affluence = Less affluent

The following section provides a more detailed examination of these functional associations, focusing on the predicted marginal changes for adolescents who reported higher screen times compared to non-daily users (i.e., those with an average of 0 min per day) (Fig. 2).

Social media: Predicted flourishing scores for adolescents who did not surf social media on a daily basis were 0.4 (95% CI: 0.2 to 0.5) points lower than for adolescents who surfed 60 min per day on these

platforms and similar (95% CI: -0.2 to 0.2) to those who surfed 120 min per day. Predicted flourishing scores for adolescents who spent 240 min per day surfing social media were 1.5 (95% CI: 1.3 to 1.7) points lower than those of non-daily users. Similarly, associated predicted flourishing scores for adolescents who spent 300 min per day on social media were 2.0 (95% CI: 1.8 to 2.2) points lower than for non-daily users.

Video games: Predicted flourishing scores for adolescents who played an average of 120 min per day were 1.7 (95% CI: 1.5 to 1.9) points lower than for adolescents who reported an average of 0 min per day. After a daily average of 60 min of play, predicted flourishing scores decreased by an average of 0.3 (95% CI: 0.2 to 0.3) points every 30 min. Predicted flourishing scores for adolescents who played 300 min per day on average were 3.0 (95% CI: 2.7 to 3.3) points lower than for non-daily players.

Television: Associated predicted flourishing scores for adolescents who did not watch television on a daily basis were 0.5 (95% CI: 0.3 to 0.6) points lower than for adolescents who watched television 60 min per day, and almost similar (95% CI: -0.2 to 0.1) to those who watched television 120 min per day. Associated predicted flourishing scores for adolescents who watched television for 210 min per day on average were 1.1 (95% CI: 0.9 to 1.3) points lower than for those who did not watch television on a daily basis and 1.5 (95% CI: 1.4 to 1.6) points lower than those who watched 60 min of television.

Messaging: Associated predicted flourishing scores for adolescents who did not engage in messaging were 0.3 (95% CI: 0.2 to 0.5) points lower than for adolescents who engaged in messaging 60 min per day. Adolescents who spent 120 or 150 min engaged in messaging had associated predicted flourishing scores that were, respectively, 0.4 (95% CI: 0.2 to 0.6) points and 0.7 (95% CI: 0.5 to 0.9) points lower than those of non-daily users.

Internet browsing: Predicted flourishing scores for adolescents who spent 30 min per day browsing the Internet were 0.4 (95% CI: 0.3 to 0.6) points lower than for those who did not browse the Internet on a daily basis (see Appendix 3). After this 30-min threshold, predicted flourishing scores decreased by 0.1 (95% CI: 0.05 to 0.09) points for every 30 min of browsing.

Time spent playing video games was associated with a greater decrease in associated predicted flourishing scores compared to other recreational screen types. Compared to those who did not use these screens, adolescents who played 120 min of video games had lower associated predicted flourishing scores of 1.7 (95% CI: 1.5 to 1.9) points, while those who browsed the Internet or who engaged in messaging (e.g., texts, emails) for 120 min had lower associated predicted flourishing scores of 0.7 (95% CI: 0.5 to 1) and 0.4 (95% CI: 0.2 to 0.6) points, respectively. Similarly, compared to adolescents who did not use these screens, adolescents who spent 300 min playing video games had lower associated predicted flourishing scores of 3.0 (95% CI: 2.7 to 3.3) points, while those who spent the same amount of time surfing social media had lower associated predicted flourishing scores of 2.0 (95% CI: 1.8 to 2.2) points.

Notes: Results are adjusted for sex, age, and family affluence.

Functional association between time spent on different types of screens and flourishing stratified by sex

The results suggest that the functional associations between recreational screen times and flourishing scores are generally not statistically different between females and males, except in the case of video games.

Adolescents females who play 60 min per day have associated predicted flourishing scores that are 0.8 (95% CI: 0.6 to 0.9) points higher than those of adolescents females who do not play video games, while male adolescents who play 60 min per day have associated predicted flourishing scores that are 0.1 (95% CI: 0 to 0.2) points lower than those of adolescents males who do not play video games (Fig. 3). This difference of 0.7 points in the marginal changes in the predicted flourishing score between females and males rises to 1.0 at 90 min and 1.2 at 120 min, suggesting that flourishing scores are more rapidly negatively associated with time spent on video games among females than males. The differences between males and females observed for other types of screen time in Fig. 3 are primarily due to a consistent gap in average flourishing scores between the two groups.

Notes: Results are adjusted for age, and family affluence.

Discussion

This study revealed three main research findings. First, above a certain threshold, all recreational screen types were negatively associated with adolescent flourishing. Second, the strength and nature of these associations varied depending on the type of recreational screen use. Finally, for most screen types, the adolescents' sex appeared to have little impact on these associations, suggesting all youth are at risk for the negative impacts of spending too much time on screens. With some nuances, these findings are consistent with the results of previous studies on other mental health outcomes (e.g., depression, anxiety) (3, 4).

Time spent playing video games showed the strongest negative association (and requiring the least amount of time) with flourishing. These findings align with previous research showing a positive association between anxiety, depression, and time spent playing video games (4). However, unlike the 2 h playtime threshold identified for anxiety (3), our study suggests that even the first few minutes of video game use are associated with a decrease in flourishing scores. Examining the influence of video game type, content (e.g., violent or not, social or solitary), and whether they are online or competitive could provide valuable insights into these findings (41, 42). Understanding the nature of engagement and the influence of pre-existing psychosocial vulnerability could also be enlightening (43). Future longitudinal studies should explore how emerging online gaming behaviors—such as loot box purchases, microtransactions (44), and 'raging' (i.e., extreme gamer frustration causing aggressive outbursts) (45)—influence adolescents' mental health.

Among the other types of recreational screen times under study, we found that time spent on television, social media, and messaging was negatively associated with flourishing scores only after 2 h or more. A recent meta-analysis found a significant increase in anxiety after 4 h 30 min of use (3). The same meta-analysis indicated that limiting television time to between 30 and 90 min per day was associated with a reduced risk of depression, which aligns with the present study's findings showing no decrease in flourishing scores between 30 and 90 min of use. This association could be explained by the fact that limited television use may (depending on the content watched (4, 42)) provide a break from the stress of daily activities (46), expose viewers to different perspectives and cultures (47), and provide bonding opportunities between family members (48). Future surveillance efforts should measure the specific activities youth are participating in while on screens (e.g., shows, games, social media platforms).

For social media, the present study showed that the flourishing score was lower than that of adolescents who are non-daily users after 1 h 30 min to 2 h of use. This pattern may reflect an initial benefit from connecting and strengthening relationships with friends (49), followed by diminishing returns due to overexposure to anxiety-inducing or addictive content, increased social comparison, and the internalization of personal problems (15). Future research should distinguish among the various specific activities undertaken on social media (e.g., discussions, content creation, doomscrolling) that might be differently associated with flourishing, depending on whether they encourage meaningful interactions or creativity versus passivity or social comparison (50).

To clearly interpret the results, it is useful to understand the significance of a reduction of 1, 2, or 3 points in flourishing scores. However, few studies have evaluated the real life implications of small variations in scores from the adolescent version of the flourishing scale of Diener et al (34). We do know that a 1-point drop has been associated with a 4% increased likelihood of smoking cannabis (51), a 5% greater likelihood of arriving in class with incomplete homework, and a 10% decrease in the likelihood of graduating from higher education (52). Some studies suggest that even modest decreases in flourishing (sometimes referred to as languishing) can influence important life outcomes (53, 54). Moreover, small shifts in flourishing may be meaningful when considered at the population level (55).

These results could inform the development of more precise guidelines and prompt policymakers and public health officials to raise awareness among adolescents, parents, and school practitioners regarding the negative association between some screen times and flourishing. Reducing time spent on highly stimulating digital activities, such as social media or certain video games that expose adolescents to social comparison, cognitive overload, or anxiety-provoking content, may help support better mental health (42, 56). Parents can support healthier practices by setting usage boundaries, establishing screen-free moments, and promoting calming activities, adopting a dialogue-based rather than authoritarian approach (57–59). In educational settings, integrating digital literacy more fully into curricula could strengthen adolescents' understanding of platform attention mechanisms, psychosocial risks, and self-regulation strategies (60). Promoting non-digital alternatives, like physical activity and creative hobbies, may also mitigate the effects of hyperconnectivity and support psychological well-being (61). Finally, implementing stricter regulations on the digital industry and limiting adolescents'

access to some online environments could provide an additional layer of protection for their mental health.

Conclusions

Public health recommendations on screen time for youth could be refined, given that not all screen types are associated with mental health in the same way. Screen types more strongly associated with declines in flourishing, as well as specific duration thresholds for each type, could be targeted in future guidelines and interventions aimed at promoting adolescent well-being. Future longitudinal studies could further examine the association between the specific content and nature of each type of screen and mental health (e.g., video games stimulating violence vs. promoting collaboration and mutual aid; doomscrolling on social media vs. creating content). Our study also underscores the utility of considering positive mental health dimensions across the adolescent lifespan.

Declarations

Author statements

Ethics approval

Each participant provided informed assent. All procedures were approved by the University of Waterloo Ethics Committee (ORE#30118), the CIUSSS de la Capitale-Nationale–Université Laval (#MP-13-2017-1264), and the participating school boards.

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Competing interests

The authors declare that they have no competing financial interests or personal relationships that could have influenced the work reported in this article.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the authors upon reasonable request.

Authors' contributions

AMTT, BT, and SH conceptualized and conducted the analysis. AMTT and BT conducted the literature review. BT led the writing and wrote the first draft of the manuscript. STL conceptualized and leads the larger COMPASS study. AMTT, RB, and SH are the COMPASS-Québec provincial leads. CBD coordinated the data collection and helped with the data interpretation. All authors provided feedback on the manuscript and approved the final version.

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Figures

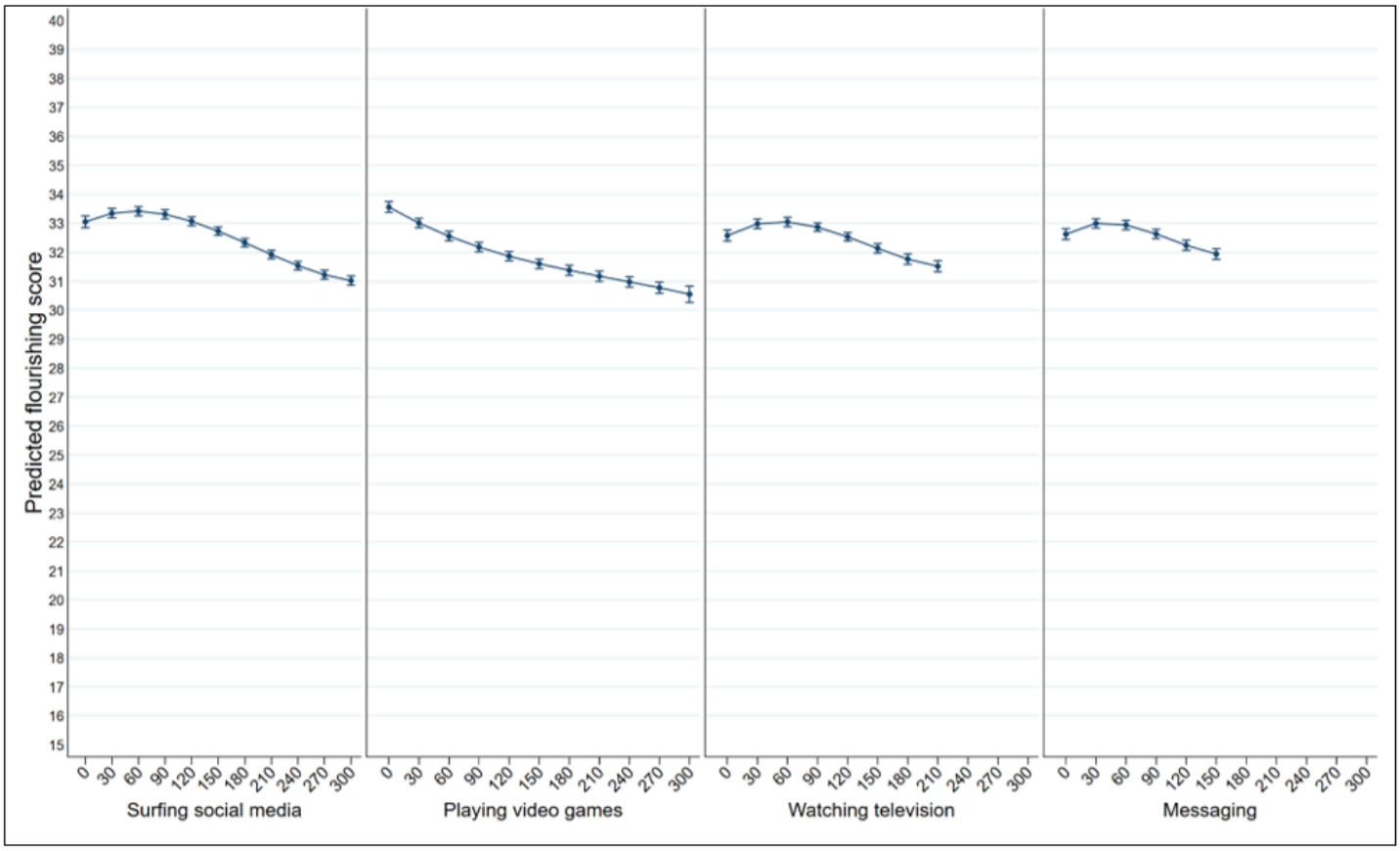

Figure 1

Predicted flourishing scores by average daily screen time (minutes)

Notes: Results are adjusted for sex, age, and family affluence.

* *Although the flourishing scale ranges from 8 to 40, the scale is presented from 15 to 40 in part (A) because 99% of the sample is between these values.*

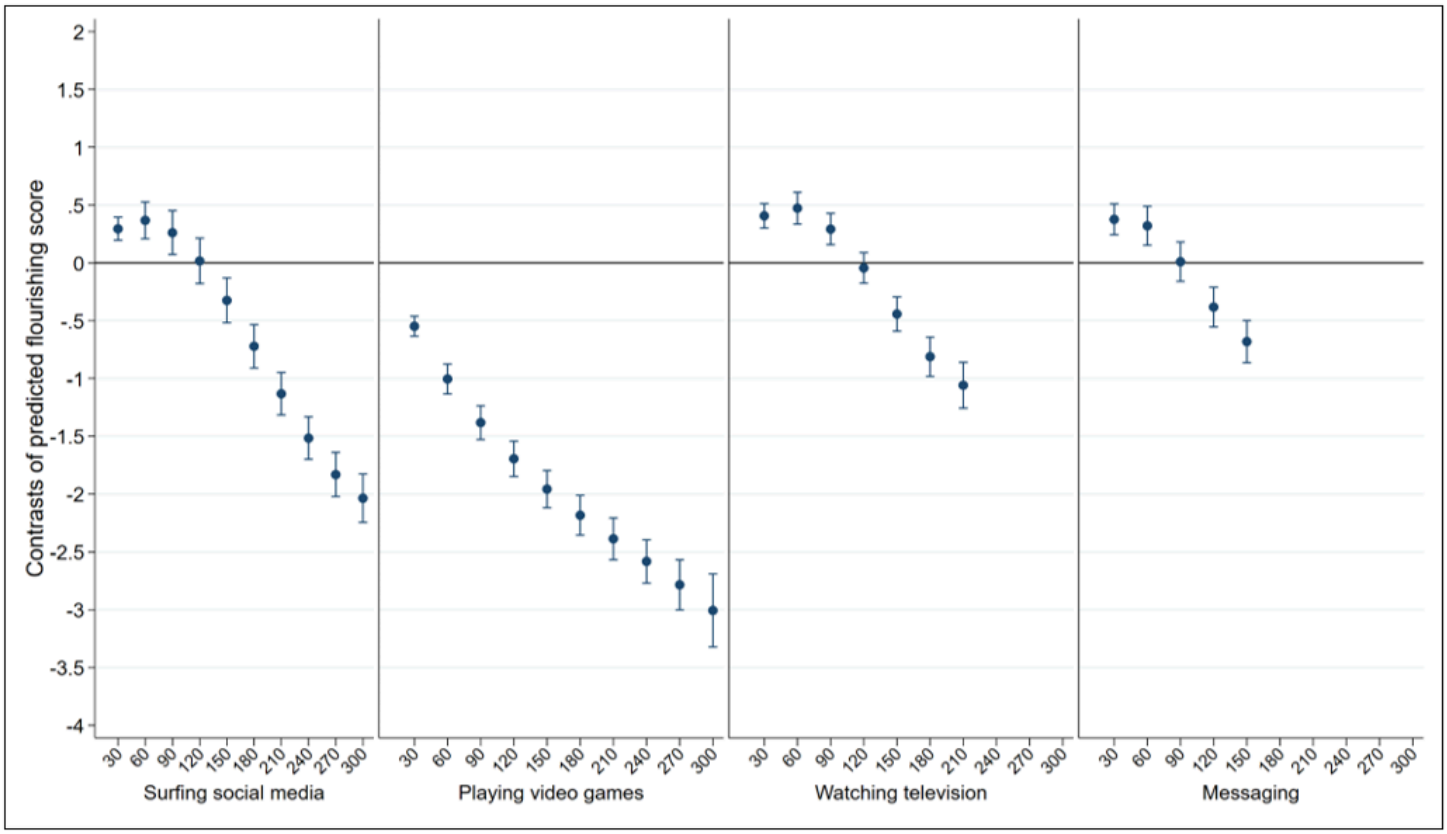

Figure 2

Marginal changes in predicted flourishing scores by average daily screen time (minutes) relative to adolescents with 0 min per day on average

Notes: Results are adjusted for sex, age, and family affluence.

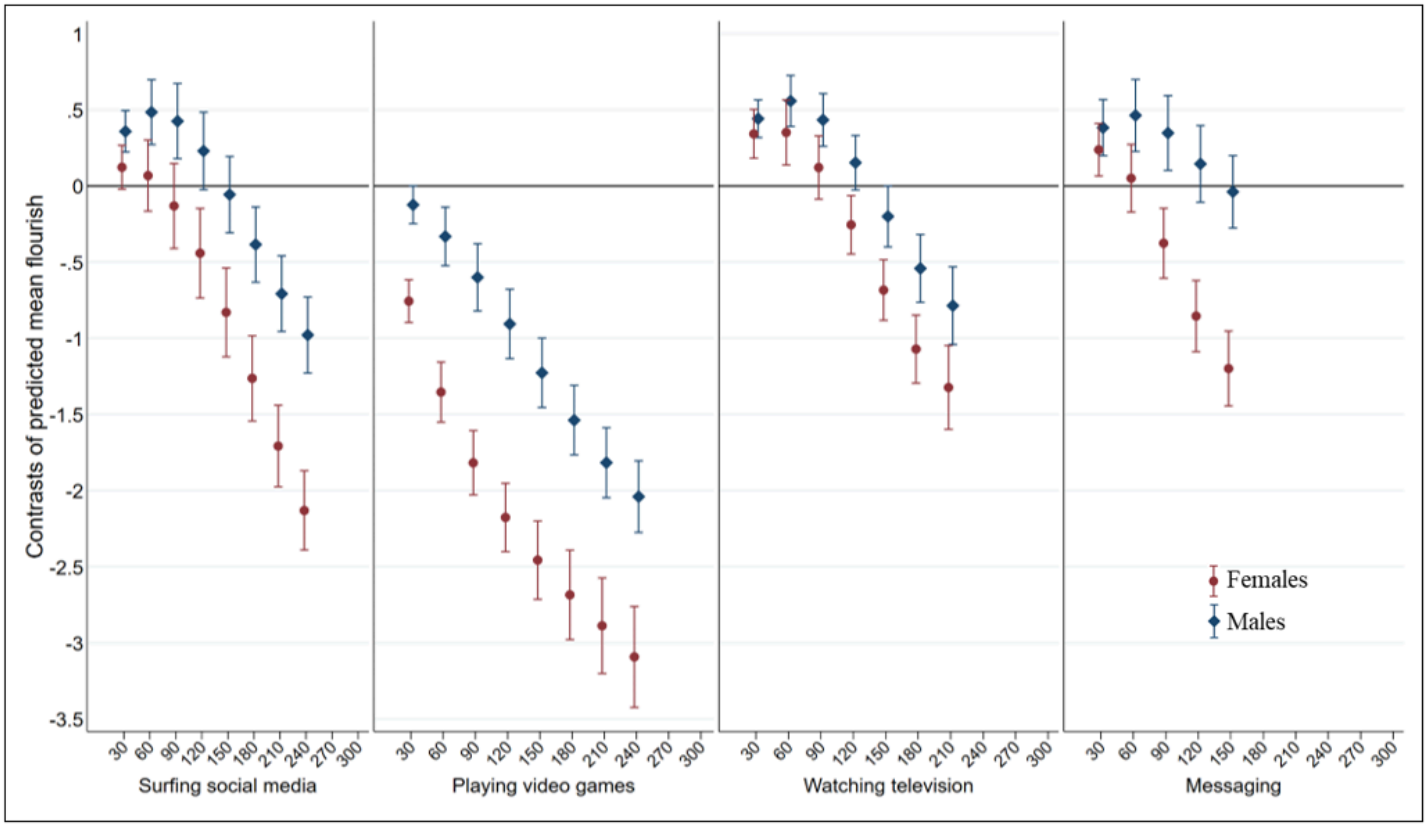

Figure 3

Sex differences in the marginal changes in predicted flourishing scores by average daily screen time (minutes) relative to adolescents with 0 min per day on average

Notes: Results are adjusted for age, and family affluence.