



Social media addiction among Hong Kong adolescents before and after the pandemic: The effects of parenting behaviors

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ABSTRACT

The increased social media usage during the COVID-19 pandemic raised the concern about social media addiction (SMA), especially among adolescents. The current study aimed to assess the prevalence of adolescents' SMA in Hong Kong before and during the pandemic, to examine the effects of general parenting behaviors and Internet-specific parenting practices by fathers and mothers respectively on adolescents' SMA, and to analyze the moderating roles of general parenting behaviors in the relationship between Internet-specific parental practices and adolescents' SMA. This study employed a two-wave longitudinal design. A total of 878 secondary school students (53.9% were girls, age = 13.19 ± 0.52 years at wave 1) in Hong Kong completed a questionnaire-based survey in 2019 and 2020. Paired-samples proportions tests revealed that there was no significant change in the prevalence of adolescents' SMA between the pre-pandemic (10.7%) and post-pandemic (9.7%) periods. Multiple regression analyses indicated that paternal responsiveness was negatively and maternal responsiveness was positively associated with adolescents' SMA. Surprisingly, both paternal and maternal reactive restrictive mediations were positively associated with adolescents' SMA. Interaction analyses showed that paternal responsiveness moderates the effects of paternal co-use on adolescents' SMA, and maternal demandingness moderates the effects of maternal rule-setting on adolescents' SMA. The findings called for more comprehensive theoretical models that consider the interplay between general parenting behaviors and Internet-specific parenting, and highlighted the need for tailored interventions for fathers and mothers, respectively. Moreover, the counter-productive effect of reactive restrictive mediation deserves attention from researchers, social workers, and parents.

1. Introduction

Widespread lockdowns and stay-at-home mandates during the COVID-19 pandemic led to unparalleled levels of social isolation and emotional distress, especially for adolescents (Tull et al., 2020). Numerous physical activities were either prohibited or shifted online. As a result, there was a surge in social media usage. Studies consistently show that the time adolescents spent on social media during this period was significantly greater than before (Drouin et al., 2020; Nilsson et al., 2022). While appropriate use of social media has shown positive effects on adolescents' psychological well-being (Yu & Du, 2023), researchers have also observed the prevalence of social media addiction across different populations (Cheng & Lau, 2022; Masaeli & Farhadi, 2021; Zhao & Zhou, 2021).

Social media addiction (SMA), also known as social networking sites (SNS) addiction or problematic media use (Kuss & Griffiths, 2017; Sun &

Zhang, 2021), is characterized by being overly concerned about social media, an uncontrollable urge to engage with social media, and to devote excessive time and effort to it, impairing other important social functioning, physical and mental well-being (Andreassen & Pallesen, 2014). Individuals who are addicted to social media typically exhibit core behavioral addiction symptoms such as salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse (Andreassen, 2015; Griffith et al., 2014). Previous research has shown that SMA is associated with various physical and psychosocial problems (Huang, 2022; Wei et al., 2023); perceived enjoyment and prior use of social networking sites/applications have been identified as potential antecedents facilitating the development of Internet addiction (Turel & Serenko, 2012; Vaghefi et al., 2017). Notably, younger individuals, particularly students, have been identified as more susceptible to SMA than other age groups (Abbasi, 2019; Cheng et al., 2021; Yu & Luo, 2021).

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The current research on the prevalence of SMA among adolescents during the pandemic is mixed. While a systematic review in 2020 (Masaeli & Farhadi, 2021) revealed an increase in Internet-based addictive behaviors, including mobile phone addiction, several recent research (Akdağ et al., 2023; Geurts et al., 2023) indicate stable SMA rates among adolescents, even amidst pandemic measures. Notably, there is a lack of direct comparison of SMA in Hong Kong's adolescent population before and after the pandemic, a gap that merits investigation due to several factors. Firstly, SMA prevalence varies culturally. It is more common in collectivist cultures (31%) than in individualist ones (14%) (Cheng et al., 2021). Hong Kong's unique blend of collectivist and individualist traditions (Ng & Lai, 2011) makes it an ideal case for studying SMA in a bicultural context. Secondly, cultural differences in parenting styles and their impact on children's behaviors can influence children's SMA. In Asian contexts, for instance, the negative impact of psychological parental control might be mitigated by family-focused societal values (Wang et al., 2007). This suggests potential unique aspects of Chinese parenting affecting adolescent SMA. Lastly, the high social media penetration in Hong Kong, combined with its dense living conditions—factors heightened during lockdowns—add relevance to studying SMA in this city. Consequently, the primary aim of this study is to investigate and compare the prevalence of SMA among Hong Kong adolescents pre- and post-pandemic. Given the escalation of mental health issues (Yu & Du, 2022), increased feelings of isolation (Zhu et al., 2023), and a heightened need for relatedness during the pandemic (Shek et al., 2022), we hypothesize that the rate of SMA in adolescents will have significantly increased following the onset of the pandemic (Hypothesis 1).

Prior research indicates that parenting behaviors play a significant role in preventing adolescents' Internet addiction. Drawing upon the integrative model of parenting (Darling & Steinberg, 1993), parenting behaviors can be conceptualized into two distinct yet interconnected dimensions: parenting styles, which refer to parents' overarching attitudes and behaviors toward their child, and parenting practices, denoting the specific actions undertaken by parents to socialize their children towards certain objectives. Both dimensions significantly influence adolescent behaviors, including Internet addiction.

Regarding general parenting styles, two key dimensions are responsiveness and demandingness. Responsiveness refers to the extent to which parents attune to, support, and accommodate their children's requests, fostering their individuality and self-assertion. This typically includes warmth, autonomy support, and reasoned communication. Research has revealed that parental responsiveness reduces adolescents' social networking addiction by promoting their children's positive youth development, such as prosocial norms and socio-emotional skills (Yu & Shek, 2021). Moreover, a nurturing parent-child relationship has been negatively associated with youth Internet addiction (Niu et al., 2023). Perceived parental warmth inversely correlates with children's tendencies to overuse social media, possibly through providing timely and sufficient emotional support when young people encounter emotional distress. Adolescents addicted to the Internet reported higher levels of parental rejection and over-involvement (Huang et al., 2010). Furthermore, parental hostility, indifference, and rejection were identified as positive predictors of excessive social media use (Đuricová & Políach, 2023), suggesting that a lack of parental warmth may be a risk factor for adolescents' social media addiction.

Demandingness, on the other hand, refers to the extent to which parents regulate, control, and monitor children's behavior to facilitate their integration into society (Baumrind, 2005). While parental demandingness is generally considered a positive parenting behavior beneficial to youth development (Chen et al., 2019), research on its relationship with children's social media addiction is limited. Baumrind (2005) noted that the positive effects of parental demandingness on children's behavior are likely to be enhanced by parental responsiveness. For instance, the effectiveness of parental limits on adolescents' Internet use was found to be augmented by parental responsiveness

(Chng et al., 2015; Geurts et al., 2023).

Further studies have explored the distinct influences of fathers and mothers on children's Internet behavior. Evidence suggests a positive association between adolescent problematic Internet use and maternal authoritarian parenting (i.e., high demandingness coupled with low responsiveness), paternal neglect, and maternal strictness, but not paternal strictness (Lukavska et al., 2020). Adolescents with Internet addiction often described their parents as emotionally distant, over-involved, or rejecting, but notably, with only mothers perceived as punitive (Huang et al., 2010). It has been posited that perceived strictness and punitive behaviors may be more detrimental when exhibited by mothers than by fathers (Lukavska et al., 2020). Despite these findings, limited research has examined the unique roles fathers and mothers play in influencing adolescent Social Media Addiction (SMA).

The present study seeks to address this issue by investigating the individual impacts of both paternal and maternal general parenting behaviors on adolescent SMA. We hypothesize that fathers' (Hypothesis 2a) and mothers' (Hypothesis 2b) responsiveness will be negatively associated with adolescent SMA; fathers' (Hypothesis 2c) and mothers' (Hypothesis 2d) demandingness will also be negatively associated with adolescent SMA.

Specific parenting practices aimed at regulating children's usage of the Internet and social media were also found to influence adolescents' SMA. According to the parental mediation theory (Koning et al., 2018; Livingstone & Helsper, 2008; Nathanson, 1999), there are three major types of Internet-specific parenting practices: active mediation, restrictive mediation, and co-use. Active mediation involves dialogue and discussion about online activities between children and parents (van den Eijnden et al., 2010). Restrictive mediation includes reactive restrictive mediation, where parents impose time and content restrictions in direct response to their children's Internet use, and rule-setting, where parents establish specific rules about Internet usage. Co-use is characterized by parents and their children using the Internet jointly, like watching online programs together (Koning et al., 2018).

Yet, studies about how these three types of Internet-specific parenting practices impact adolescent SMA have yielded mixed results. For example, Sun and Zhang (2021) found that parents who maintain open communication, provide advice, and guide Internet use (i.e., active mediation) protected adolescents from SMA. Yet, several studies have shown no significant link between parental active mediation and children's SMA (Koning et al., 2018; Yu & Shek, 2021). Moreover, findings concerning the relationship between restrictive mediation and problematic Internet and social media use in adolescents have been reported as positive (Geurts et al., 2023; Yu & Luo, 2021), negative (Chang et al., 2015) and non-significant (Kalmus et al., 2015).

Based on the integrative model of parenting (Darling & Steinberg, 1993), one possible explanation for the varied findings could be that the relationship between Internet-specific parenting practices and adolescent SMA is influenced by broader general parenting behaviors. The overarching atmosphere created by parental day-to-day general parenting can shape how adolescents react to specific Internet-focused parenting practices. Studies examining Internet addiction lend support to this hypothesis. For example, Chou and Lee (2017) reported that the effects of Internet-specific parenting on children's propensity for Internet addiction were influenced by four distinct parenting styles: authoritative, permissive, authoritarian, and neglectful. Similarly, the effectiveness of restrictive mediation in curbing adolescents' problematic Internet use was linked to the family's overall warmth and support, factors like home comfort, open communication with parents, and strong parent-child bonds (Chng et al., 2015).

However, there is a gap in the literature when it comes to exploring the interplay between general parenting behaviors and Internet-specific practices in relation to adolescents' SMA. One of the few exceptions is Geurts et al. (2023), who found that tolerant and supportive parenting behaviors, characterized by low levels of reactive restriction mediation and high levels of parental responsiveness and autonomy-granting,

predicted reduced problematic social media use among adolescents. Nevertheless, this study and a few others (Boer, 2022; Costantini et al., 2022; Geurts et al., 2022) failed to discern between the roles of fathers' and mothers' parenting behavior on adolescents' SMA.

The present study aims to bridge this gap by examining the unique moderating roles of both fathers' and mothers' general parenting in the connection between Internet-specific parenting practices and adolescent SMA. We hypothesize that both fathers' (Hypothesis 3a) and mothers' (Hypothesis 3b) general parenting behaviors will moderate the respective associations between fathers' and mothers' Internet-specific parenting practices and adolescent SMA. By doing so, we hope to shed light on targeted interventions tailored for both fathers and mothers, helping safeguard their children from SMA.

In summary, this study has three primary aims: (a) to assess the prevalence of SMA among Hong Kong adolescents both before and during the pandemic; (b) to discern the distinct effects of general parenting behaviors and Internet-specific practices by fathers and mothers on adolescents' SMA; and (c) to analyze the moderating roles of general parenting behaviors in the relationship between Internet-specific parental practices and SMA, focusing on the respective impacts of fathers and mothers.

2. Methods

2.1. Participants and procedure

The present study was part of a longitudinal project targeting the wellbeing of Hong Kong junior secondary school students, which involved two waves of data collection. A two-stage cluster sampling was adopted to recruit participants. First, 20 schools were randomly selected from all Hong Kong local secondary schools, taking the representativeness of the sample into account. Second, all students studying in Secondary 1 (Grade 7) in the 20 schools were invited to participated in the study. At wave 1, 1896 students (Mean age = 13.19 ± 0.52 years) were successfully recruited who completed a questionnaire between March and June in 2019, with an average response rate at 70% from each school (Table 1). At wave 2, 12 out of the 20 schools agreed to participate with an average response rate at 71% from each school and 1169 Secondary 2 students (Mean age = 15.16 ± 0.53 years) joined the study from June to September 2020 when schools resumed their face-to-face teaching after the first wave of the outbreak of COVID-19. Among the 1169 wave 2 participants, 291 did not join the first wave of the study, resulting in a final matched dataset of 878 cases (473 girls and 393 boys). At each wave of data collection, students completed a paper-and-pencil questionnaire in an anonymous manner administered by trained research staff in classroom settings. Strict confidentiality was maintained during the data collection, data processing, and questionnaire storage.

Table 1
Participants' background information at Wave 1.

Age (N = 1836)	Mean	SD				
	13.19	0.52				
Gender (N = 1893)	Female	Male				
	911 (48.12%)	982 (52.88%)				
Born in Hong Kong (N = 1836)	Yes	No				
	1634 (99.00%)	202 (11.00%)				
Fathers' educational level (N = 1815)	Illiterate	Primary school	Secondary school	Post-secondary school	Not sure	
	17 (0.94%)	88 (4.85%)	741 (40.83%)	478 (26.34%)	491 (27.05%)	
Mothers' educational level (N = 1812)	Illiterate	Primary school	Secondary school	Post-secondary school	Not sure	
	24 (1.32%)	129 (7.12%)	751 (41.44%)	437 (24.12%)	471 (25.99%)	
Fathers' employment (N = 1824)	Full-time	Part-time	Unemployment	Retirement	Not sure	
	1392 (76.32%)	62 (3.40%)	20 (1.10%)	53 (2.91%)	297 (16.28%)	
Mothers' employment (N = 1819)	Full-time	Part-time	Unemployment	Retirement	Housewife	Not sure
	873 (47.99%)	237 (13.03%)	8 (0.44%)	2 (0.11%)	555 (30.51%)	144 (7.92%)

2.2. Measures

2.2.1. Bergen's social media addiction scale (BSMAS)

Participants' social media addiction was measured by the Chinese version of the Bergen Social Media Addiction Scale (Andreassen et al., 2016; Lin et al., 2017), which assesses six core symptoms of behavioral addiction including salience, tolerance, withdrawal, mood modification, conflict and relapse, based on Griffith's (2005) behavioral addiction model. Participants respond to each item on a five-point rating scale (1 = very rarely; 2 = rarely; 3 = sometimes; 4 = often; 5 = very often) regarding how frequently they have displayed the described behavior in the past one year. Individuals with a total score above 19 are classified as being at high risk for SMA (Bányai et al., 2017). Cronbach's α coefficients of BSMAS based on samples of wave 1 and wave 2 are 0.88 and 0.89, respectively.

2.2.2. Chinese parenting behavioral scale (CPBS)

The validated 20-item Chinese Parenting Behavior Scale (Shek, 1999) was adopted to assess general parenting behavior in terms of parental responsiveness (13 items, e.g., "If I encounter problems, I can count on my father/mother to help me out.") and demandingness (7 items, e.g., "My father/mother keeps pushing me to do my best in whatever I do."). Participants rated each item on a 4-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree) with separate ratings for paternal and maternal behaviors. Higher scores indicate higher levels of positive parenting behavior. The CPBS has demonstrated good reliability and validity in measuring parenting behavior across various Chinese populations (Leung & Shek, 2014). Cronbach's α coefficients were above 0.81 for all subscales (Table 2).

2.2.3. The adapted Parental Mediation Scale

Internet-specific parenting practices were assessed using an adapted 16-item Parental Mediation Scale from an earlier version measuring parenting behaviors related to Internet use (Koning et al., 2018; van den Eijnden et al., 2010). In the present study, we focused on three types of Internet-specific parenting behaviors. First, reactive restrictive mediation, referring to parents' directly intervening their children's social media use behaviors, such as turning off the WiFi to stop child from using the Internet (4 items). Second, rule-setting, meaning that parents' setting rules on when and how long the child can use the Internet (9 items). Third, parental co-use, which means parents participate in their children's technology use such as doing things online with the child (3 items). Students respond to each item on a five-point rating scale (1 = "Never", 2 = "Rarely", 3 = "Sometimes", 4 = "Often", 5 = "Very often") in terms of the frequency of certain behaviors displayed by their parents when they want to be online. Paternal and maternal behaviors were assessed separately. Cronbach's α coefficients for all subscales were above 0.80 (Table 2).

Table 2
Descriptive statistics of key variables and Cronbach's α of scales.

Variables	Mean	SD	Cronbach's α	FRES	FDEM	MRES	MDEM	FLOR	FSLB	FAWC	MLOR	MSLB	MAWC
FRES	0.94	0.41	0.87	–									
FDEM	1.25	0.63	0.82	0.584***	–								
MRES	1.17	0.38	0.87	0.511***	0.286***	–							
MDEM	1.52	0.57	0.81	0.250***	0.553***	0.522***	–						
FRUL ^a	2.30	0.96	0.90	–0.095**	–0.132***	–0.126***	–0.168***	–					
FRRM	1.76	0.80	0.89	0.053	0.126***	0.019	0.032	–0.126***	–				
FCOU	2.01	0.81	0.81	0.437***	0.255***	0.235***	0.079*	0.056	0.073*	–			
MRUL ^a	2.12	0.99	0.93	–0.174***	–0.171***	–0.145***	–0.175***	0.665***	–0.109**	0.051	–		
MRRM	2.14	1.03	0.92	–0.033	0.014	0.064	0.171***	–0.030	0.488***	0.009	–0.115***	–	
MCOU	2.11	0.95	0.85	–0.095**	–0.027	–0.149***	–0.025	0.171***	0.056	0.087*	0.251***	0.117***	–
SMA	12.91	4.82	0.88	–0.106**	–0.050	–0.002	–0.021	0.089*	0.143***	0.001	0.116***	0.157***	0.126***

Note: FRES = paternal responsiveness; FDEM = paternal demandingness; MRES = maternal responsiveness; MDEM = maternal demandingness; FRUL = paternal rule-setting; FRRM = paternal reactive restrictive mediation; FCOU = paternal co-use; MRUL = maternal rule-setting; MRRM = maternal reactive restrictive mediation; MCOU = maternal co-use; SMA = social media addiction. Social networking addiction scores were measured at Wave 2; all other variables were measured at Wave 1.

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

^a For FRUL and MRUL, lower scores represent for more rule-setting behaviors.

2.3. Statistical analyses

Prevalence rates of SMA before and after the outbreak of the pandemic were first calculated and compared using paired-samples proportions analysis. To address the second aim, regression analysis was performed, in which SMA at wave 2 served as the dependent variable; age and gender were entered in the first block; paternal and maternal general parenting behaviors at wave 1, and paternal and maternal Internet specific behaviors at wave 1, were entered in the second block. To examine the moderating effects, interactive terms between paternal general parenting behaviors and paternal Internet-specific behaviors, and between maternal general parenting behaviors and maternal Internet-specific behaviors were further entered into the regression model in the second block. Centered variables were used in calculating the interactive terms and in the regression model. Written informed consents were obtained from both the participating students and their parents before the study. The project was approved by the Human Subjects Ethics Sub-Committee (HSESC) of the first author's institution (Reference No.: HSEARS20180326015).

3. Results

3.1. Prevalence of SMA before and after the COVID-19 pandemic

Numbers and percentages of students reported problematic social networking behaviors at different frequencies before and after the pandemic were summarized in Table 3. At both waves, a notable percentage of students indicated experiencing SMA behaviors at least “sometimes” over the past year. Specifically, more than half of students stated that they “spent a lot of time thinking about social media or planning how to use it”; more than one third reported “feeling an urge to use social media more and more” or “using social media so much that it has had a negative impact on their job/studies” either sometimes or more frequently. Based on the criterion set by Bányai et al. (2017), the prevalence rates of SMA before and after the pandemic were 10.7% and 9.7%, respectively.

Paired-samples proportions tests were conducted to compare the percentages of students who responded with “positive” (i.e., sometimes + often + very often) answers to each SMA behavior and the overall prevalence before and after the pandemic. McNemar tests showed that for five out of six SMA behaviors, the percentages of students reported “positive” during the pandemic did not change significantly as compared to pre-pandemic. Similarly, the difference in the prevalence rates of SMA between pre- and post-pandemic was not statistically significant. Hypothesis 1 was rejected.

3.2. Predictive effects of parenting behaviors on adolescents' SMA

The predictive effects of general parenting behaviors and Internet-specific parenting practices measured at Wave 1 on participants' SMA at Wave 2 were examined using multiple regression analyses. As shown in Table 4 (Model 1) ($\Delta R^2 = 0.08, p < 0.001$), after controlling for the effects of gender and age, paternal responsiveness ($\beta = -0.14, p < 0.01$) was negatively associated with adolescents' SMA, while maternal responsiveness was positively associated with adolescents' SMA ($\beta = 0.12, p < 0.05$). Hypothesis 2a was supported. Hypothesis 2b was rejected. Hypothesis 2c and Hypothesis 2d were both rejected. For Internet-specific parenting practices, both paternal ($\beta = 0.14, p < 0.001$) and maternal ($\beta = 0.11, p < 0.05$) reactive restrictive mediations were positively associated with adolescents' SMA. Other parenting behaviors did not show significant predictive effects on adolescents' SMA.

3.3. Moderating effects of general parenting behaviors on the relationship between internet-specific parenting practices and adolescents' SMA

Table 4 (Model 2) ($\Delta R^2 = 0.11, p < 0.001$) further summarized the

Table 3

Numbers and percentages of participants reporting social networking addictive behaviors at different frequencies before and after the pandemic based on the matched dataset.

1. During the past year, you ...	Very rarely	Rarely	Sometimes	Often	Very often	Positive	McNemar test's z
Spend a lot of time thinking about social media or planning how to use it	157 (18.2%)/ 148 (16.9%)	240 (27.9%)/ 244 (27.9%)	329 (38.2%)/344 (39.3%)	108 (12.5%)/ 115 (13.1%)	27 (3.1%)/25 (2.9%)	452 (53.6%)/ 462 (54.8%)	−0.53
Feel an urge to use social media more and more	255 (29.7%)/ 238 (27.2%)	304 (35.3%)/ 340 (38.9%)	212 (24.7%)/237 (27.1%)	70 (8.1%)/43 (4.9%)	19 (2.2%)/16 (1.8%)	291 (34.5%)/ 288 (34.2%)	0.36
Use social media in order to forget about personal problems.	326 (37.9%)/ 290 (33.2%)	272 (31.6%)/ 284 (32.5%)	178 (20.7%)/222 (25.4%)	56 (6.5%)/53 (6.1%)	28 (3.3%)/25 (2.9%)	257 (30.5%)/ 290 (34.4%)	−2.02*
Have tried to cut down on the use of social media without success	365 (42.5%)/ 325 (37.2%)	251 (29.2%)/ 311 (35.6%)	166 (19.3%)/167 (19.1%)	56 (6.5%)/50 (5.7%)	21 (2.4%)/21 (2.4%)	237 (28.1%)/ 232 (27.5%)	0.26
Become restless or troubled if you are prohibited from using social media	406 (47.3%)/ 379 (43.4%)	250 (29.1%)/ 281 (32.1%)	141 (16.4%)/166 (18.9%)	45 (5.2%)/29 (3.3%)	17 (1.9%)/21 (2.4%)	196 (23.3%)/ 205 (24.3%)	−0.77
Use social media so much that it has had a negative impact on your job/studies	312 (36.3%)/ 276 (31.6%)	252 (29.3%)/ 294 (33.6%)	205 (23.8%)/216 (24.7%)	59 (6.9%)/58 (6.6%)	32 (3.7%)/30 (3.4%)	288 (34.2%)/ 291 (34.5%)	−0.42
Social Networking Addiction	94 (10.7%)/85 (9.7%)						0.81

Note: Positive = Sometimes + Often + Very often.

Wave 1 data were shown before the slash; Wave 2 data were after the slash.

* $p < 0.05$.

Table 4

Results of multiple regressions on the predictive effects of general and Internet-specific parenting behaviors at Wave 1 and their interactive effects on participants' social networking addiction at Wave 2.

	Model 1							Model 2					
	B	SE B	β	95% Confidence Interval for B	R ²	ΔR^2		B	SE B	β	95% Confidence Interval for B	R ²	ΔR^2
Block 1					0.02	0.02**	Block 1					0.02	0.02**
Gender	−1.15	0.35	−0.12***	[−1.84, −0.46]			Gender	−1.15	0.35	−0.12**	[−1.84, −0.46]		
Age	0.51	0.35	0.05	[−0.18, 1.20]			Age	0.51	0.35	0.05	[−0.18, 1.20]		
Block 2					0.10	0.08***	Block 2					0.12	0.11***
FRES	−1.70	0.65	−0.14**	[−2.98, −0.41]			FRES	−1.97	0.67	−0.17**	[−3.29, −0.66]		
FDEM	0.16	0.43	0.02	[−0.68, 1.00]			FDEM	0.09	0.44	0.01	[−0.78, 0.95]		
MRES	1.59	0.66	0.12*	[0.30, 2.88]			MRES	1.49	0.67	0.12*	[0.18, 2.80]		
MDEM	−0.85	0.46	−0.10	[−1.75, 0.05]			MDEM	−0.83	0.47	−0.10	[−1.74, 0.10]		
FRUL	0.32	0.24	0.06	[−0.16, 0.79]			FRUL	0.23	0.27	0.05	[−0.30, 0.76]		
FRRM	0.85	0.26	0.14***	[0.35, 1.36]			FRRM	0.81	0.27	0.13**	[0.27, 1.34]		
FCOU	−0.06	0.25	−0.01	[−0.54, 0.42]			FCOU	0.10	0.26	0.02	[−0.41, 0.60]		
MRUL	0.34	0.24	0.07	[−0.14, 0.82]			MRUL	0.44	0.26	0.09	[−0.08, 0.95]		
MRRM	0.51	0.20	0.11*	[0.12, 0.90]			MRRM	0.51	0.21	0.11*	[0.10, 0.91]		
MCOU	0.34	0.22	0.07	[−0.10, 0.78]			MCOU	0.39	0.23	0.08	[−1.74, 0.90]		
							FRES*FRUL	−0.50	0.55	−0.05	[−1.59, 0.59]		
							MRES*MRUL	−0.41	0.55	−0.04	[−1.49, 0.67]		
							FRES*FRRM	0.54	0.67	0.04	[−0.77, 1.86]		
							MRES*MRRM	0.93	0.55	0.08	[−0.15, 1.20]		
							FRES*FCOU	−1.33	0.61	−0.11*	[−2.53, −0.12]		
							MRES*MCOU	−0.01/-0.09	0.60	−0.01	[−1.26, 1.08]		
							FDEM*FRUL	−0.04	0.41	−0.01	[−0.84, 0.76]		
							MDEM*MRUL	0.96	0.41	0.13*	[0.16, 1.76]		
							FDEM*FRRM	0.08	0.47	0.01	[−0.84, 1.00]		
							MDEM*MRRM	−0.46	0.37	−0.06	[−1.18, 0.27]		
							FDEM*FCOU	0.20	0.41	0.02	[−0.61, 1.00]		
							MDEM*MCOU	−0.21	0.41	−0.02	[−1.01, 0.58]		

Note. All independent variables were centered.

Gender: 0 = female, 1 = male.

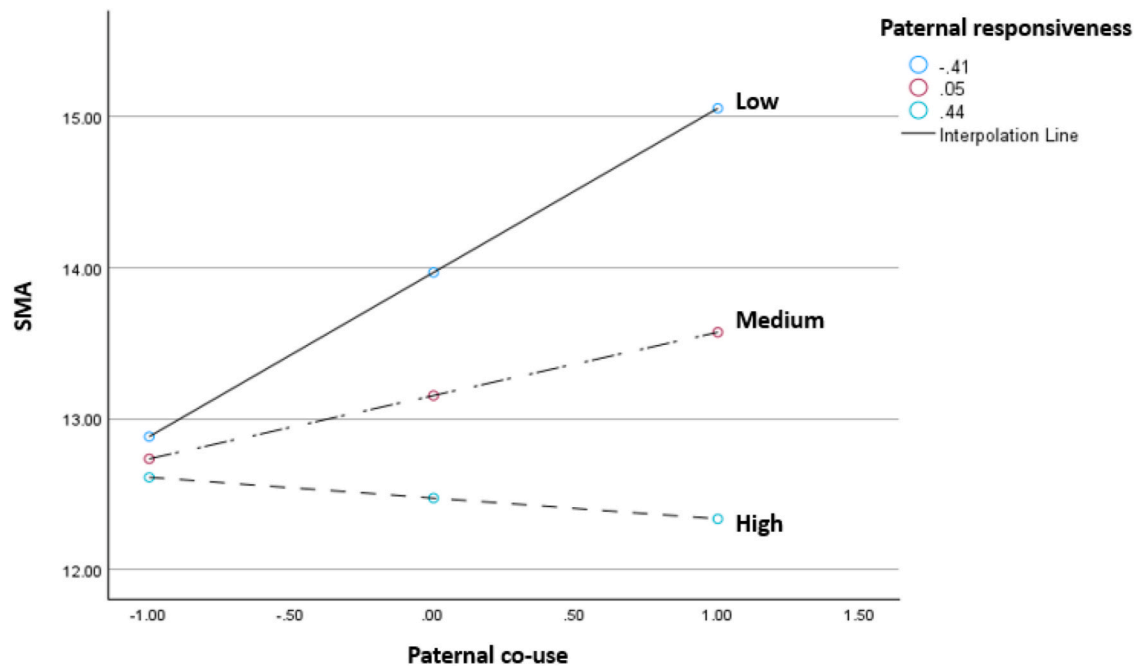
DV = participants' scores on the BSMAS at Wave 2.

IV were all measured at Wave 1; FRES = paternal responsiveness; FDEM = paternal demandingness; MRES = maternal responsiveness; MDEM = maternal demandingness; FRUL = paternal rule-setting; FRRM = paternal reactive restrictive mediation; FCOU = paternal co-use; MRUL = maternal rule-setting; MRRM = maternal reactive restrictive mediation; MCOU = maternal co-use.

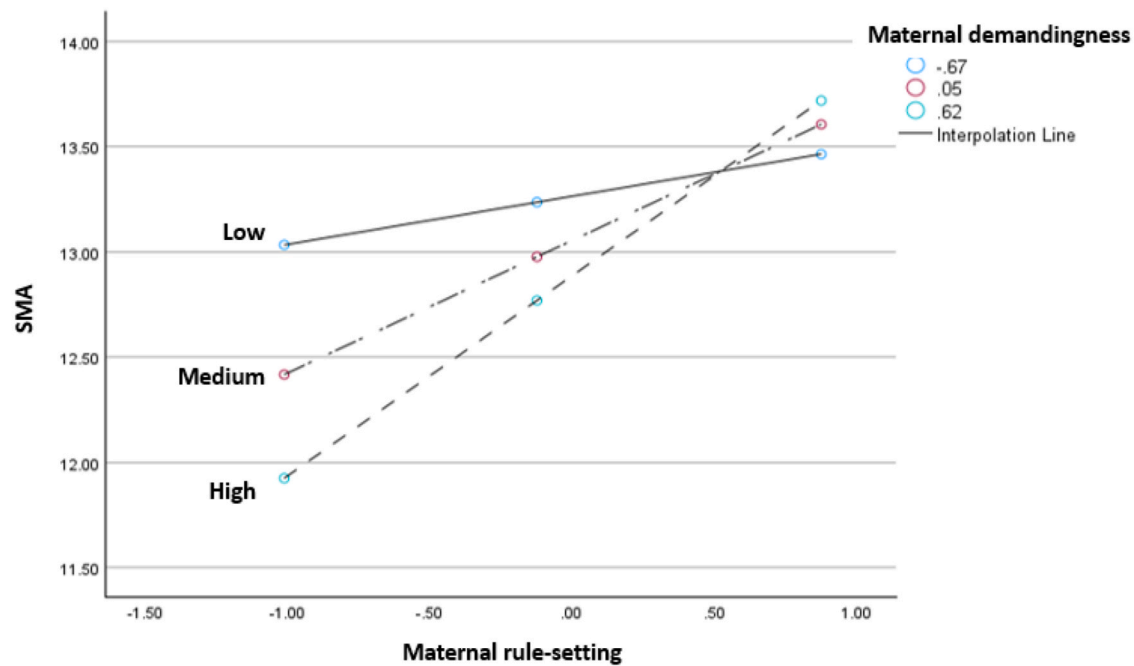
* $p < .05$, ** $p < .01$, *** $p < .001$.

moderating effects of general parenting behaviors on the relationship between Internet specific parenting practices and adolescents' SMA. The effects of two interactive terms were significant, indicating that paternal responsiveness moderates the effects of paternal co-use on adolescents' SMA ($b = -1.45$, $se = 0.47$, $t = -3.06$, $p < 0.01$), and that maternal demandingness moderates the predictive effects of maternal rule-setting on adolescents' SMA ($b = 0.56$, $se = 0.28$, $t = 2.04$, $p < 0.05$). Both Hypothesis 3a and 3b were partly supported.

To interpret the significant interactive effects, simple slope analyses were performed using SPSS's PROCESS macro (Hayes, 2022) and the results were visually shown in Fig. 1. First, fathers' co-use behaviors predicted higher SMA scores among adolescents only when fathers showed lower levels of responsiveness ($b = 1.09$, $se = 0.32$, $t = 3.38$, $p < 0.001$); when fathers' responsiveness was high, the relationship between fathers' co-use and adolescents' SMA became non-significant ($b = -0.14$, $se = 0.26$, $t = -0.54$, $p = 0.60$). Second, mothers' rule setting



a. Paternal responsiveness moderates the relationship between paternal co-use and SMA.



b. Maternal demandingness moderates the relationship between maternal rule-setting and SMA

(Note: for maternal rule-setting, lower scores mean higher levels of rule-setting).

Fig. 1. Moderation effects of general parenting behaviors on the relationship between Internet-specific parenting behaviors and SMA. 1a. Paternal responsiveness moderates the relationship between paternal co-use and SMA. 1b. Maternal demandingness moderates the relationship between maternal rule-setting and SMA (Note: for maternal rule-setting, lower scores mean higher levels of rule-setting).

behaviors was negatively related to adolescents' SMA ($b = 0.95$, $se = 0.27$, $t = 3.49$, $p < 0.001$) only when mothers showed higher levels of demandingness, while the relationship became non-significant ($b = 0.23$, $se = 0.23$, $t = 1.00$, $p = 0.32$) when mothers' demandingness was low.

4. Discussion

This study is one of the first that examined the effects of parenting behaviors by fathers and mothers respectively on adolescents' social media addiction (SMA). Using a two-wave longitudinal design, this study revealed that the prevalence of SMA during the pandemic remained relatively stable compared to pre-pandemic levels. Paternal and maternal general parenting behaviors had distinct effects on Hong Kong adolescents' SMA. In terms of Internet-specific parenting practices, both fathers' and mothers' reactive restrictive mediation predicted a higher incidence of SMA in their children. Additionally, we found that the impacts of Internet-specific parental practices on adolescents' SMA was moderated by general parenting behaviors. This study provides important evidence for a deeper understanding and clarification of the relationship between parenting behaviors and social media addiction among youth.

The finding that adolescent SMA prevalence did not significantly increase during the pandemic contradicts our initial hypothesis, however, it aligns with a recent study by [Geurts et al. \(2023\)](#) based on youth in the Netherlands. One possible explanation is that, during the pandemic, the Internet and social media became indispensable tools for daily functions. As a result, although social media was used more frequently, adolescents' online behaviors might have remained controlled, purposeful, and beneficial for both their personal lives and studies, not crossing into the territory of SMA. In addition, due to lockdown and social distancing policies, family members had more opportunities to spend time together in the same space. The direct supervision by parents could have reduced teenagers' time on the Internet and social media outside of online classes and learning. However, it is worth noting that even though the overall incidence of SMA did not increase significantly, there were more students claiming to "use social media to forget about personal problems" sometimes, often, or very often. This suggests that adolescents' mental and emotional well-being deteriorated during the pandemic ([Temple et al., 2022](#)). Relying on social media as a coping mechanism has been observed ([Maftei et al., 2023](#)). Researchers should recognize this trend, ensuring that timely emotional support is available for young people and challenging the perception that social media serves as an effective solution to their problems.

In this study, we distinguished between the impacts of paternal and maternal general parenting behaviors on adolescents' SMA. In line with previous findings based on samples from western cultures ([Lukavská et al., 2022](#); [Trumello et al., 2021](#)), we found that fathers' responsiveness played a protective role against SMA. Past research indicates that paternal responsiveness is often associated with playfulness, challenge, and encouragement of risk-taking ([Robinson et al., 2021](#)). Highly responsive fathers tend to invest more time in playing with their children such as engaging in outdoor activities and sports ([Ashbourne et al., 2011](#)), which may subsequently decrease a child's dependence on the Internet or social media.

Surprisingly, a mother's responsiveness was found to be associated with an increase in her child's SMA behaviors. Given the traditional role of mothers in primarily providing care and emotional security, highly responsive mothers are often attuned and supportive to their children's needs and demands ([Bornstein & Tamis-LeMonda, 1989](#)). During the pandemic, when face-to-face interactions became scarce, these mothers might have noticed their children's unmet socialization needs. As a response, they might have encouraged or allowed their children to use social media more intensively to maintain social connection. This, however unintentional, could pave the way to potential SMA behaviors.

Moreover, high parental responsiveness has been linked with overparenting ([Locke et al., 2012](#)), which can be described as excessive involvement in a child's life. Such an intrusiveness might drive adolescents to seek privacy and autonomy on social media platforms. Studies have shown a positive correlation between intrusive parenting and children's online gaming addiction in Korea ([Mun & Lee, 2023](#)). Another possibility is that mothers may become more responsive to their children's needs when upon observing their children's social media addictive behaviors and the subsequent negative consequences, such as decreased academic performance and poor mental health. This hypothesis necessitates examination in future studies that collect longitudinal data on both parenting behaviors and children's social media addiction.

Furthermore, it is crucial to recognize the multifaceted nature of parenting behaviors and the potential differences in how adolescents perceive maternal and paternal responsiveness. The construct of parental responsiveness may include different behaviors from mothers and fathers, and identical behaviors demonstrated by mothers versus fathers could be interpreted differently by their children, thereby exerting varying impacts on their behavior. Future research should consider these potential gender differences (maternal vs. paternal) in conceptualizing and measuring parental behaviors. Further exploration of the relationships among parental responsiveness, perceived overparenting, and adolescents' social media addiction is warranted, especially in Asian cultures, utilizing a longitudinal design.

Regarding Internet-specific parenting behaviors, both paternal and maternal reactive restrictive mediation were found to predict an increase in adolescents' SMA behaviors a year later. Specifically, the stricter parents were in limiting their teenagers' Internet use, the more SMA behaviors these adolescents demonstrated. This seemingly counterintuitive finding is consistent with several existing studies ([Koning et al., 2018](#)). For instance, in a recent four-wave study, [Geurts et al. \(2023\)](#) identified a positive relationship between parental reactive restrictions on children's Internet use and their higher scores for problematic social media use in Netherlands. These researchers posited that parents might impose such restrictions because they had already observed addictive tendencies in their children, even before signs of SMA emerged. Yet, these restrictive actions do not effectively deter the onset of SMA. In another study, [Liu \(2020\)](#) noted that maternal restrictive mediation positively predicted children's Internet addiction through perceived invasion and the ensuing defensive responses among Taiwanese adolescents. These findings suggest that reactive restrictive mediation might exacerbate adolescents' SMA, rather than serve as a preventive strategy.

Another pivotal finding from this study pertains to the moderating effects of general parenting behaviors on the relationship between Internet-specific parenting practices and adolescent SMA. Specifically, paternal responsiveness and maternal demandingness influenced the outcomes of paternal co-use of the Internet and maternal rule-setting on adolescent SMA, respectively. When fathers exhibited low responsiveness, their shared use of the Internet with their children was associated with a heightened prevalence of adolescent SMA. However, this relationship was not significant for highly responsive fathers. For mothers, the act of setting rules on Internet use only proved effective in mitigating SMA among their teenagers when combined with a distinct level of demandingness. In essence, when a mother consistently monitors her children's activities, enforces regular and contingent disciplines, and anticipates mature and responsible actions from her children ([Baumrind, 1991](#)), her rule-setting regarding social media use becomes a useful strategy against adolescent SMA. These findings emphasize that an enduring parenting style significantly influences the effectiveness of specific parental practices on child behavior. Merely setting boundaries and rules regarding adolescent social media use by mothers might be insufficient unless these mothers maintain a high level of demandingness throughout their children's lives. Given the previously observed inconsistencies in the relationship between Internet-specific parenting

behaviors and adolescents' problematic Internet and social media use (Chandrima et al., 2020; Koning et al., 2018; Liu, Wu, Sun, Bai, & Duan, 2023), our research offers novel and valuable insights that merit replication studies in various cultural contexts.

5. Conclusions

The current findings provide several implications. Theoretically, the discovery that reactive restrictive mediation can exacerbate SMA calls into question our current understanding of the effectiveness of parental mediation. Theories that focus on Internet-specific parental practices may need reconsideration, recognizing that not all mediation strategies, even those well-intended, yield beneficial outcomes. Furthermore, the distinct impacts of paternal and maternal behaviors on adolescent SMA underscore the multifaceted nature of parent-child interactions. Specific parental practices do not function in isolation but can be influenced by general parenting behaviors. This emphasizes the necessity for more complex theoretical models that capture the interplay of diverse parenting behaviors within parent-child dynamics.

From a practical standpoint, parents and educators should take note of the finding that reactive restrictive mediation might be counterproductive in preventing SMA, refraining from such strategies. Educational institutions and professionals can develop training sessions and workshops aiming at enhancing paternal responsiveness. Meanwhile, fathers should be encouraged to be more involved in their children's lives, understanding their online experiences and providing a space for open discussions about social media. Moreover, practitioners could advise mothers on effectively combining demandingness with specific Internet or social media rules. While setting boundaries is important, the method for instituting and upholding these limits is equally critical. Rules ought to be applied with clarity, consistency, and empathy. Lastly, although mothers should be responsive to their children's needs, they must carefully avoid becoming over-protective or intrusive, as such tendencies might inadvertently drive adolescents to seek privacy and autonomy on social media platforms.

Methodologically, this two-wave longitudinal study, which utilized schools randomly selected from all secondary schools in Hong Kong, addresses potential limitations found in previous research that used small and unrepresentative samples or employed a cross-sectional design. The findings contribute to clarifying the underlying mechanisms of the relationship between parenting behaviors and adolescent SMA.

Certain limitations of the study must be acknowledged. First, the number of participants decreased significantly at Wave 2 due to the withdrawal of eight schools during the pandemic, which affected the representativeness of the matched data sample. Moreover, it is recommended that future replication studies be conducted in diverse cultural contexts beyond Hong Kong to enhance generalizability. Second, we collected data only once during the pandemic, at a time when the initial wave was temporarily abating. It remains unclear whether the prevalence of SMA changed as the pandemic endured. Third, although we obtained statistically significant results linking parental behaviors to adolescent SMA, the effect sizes were relatively modest. This suggests that other pivotal factors, including both individual and at peer-level influences such as the purposes of social media usage, might play a role in the development of SMA or possibly moderate the relationship between parental behaviors and adolescent SMA. These factors warrant further exploration. Fourth, findings of this study were exclusively drawn from adolescent self-reports. Future investigations should collect data from diverse sources, such as parental reports on their general parenting behaviors, Internet-specific parenting practices, and children's SMA, as well as objective measures of adolescent social media use. Fifth, detailed data on the psychometric properties of the measures used were not reported, although these scales have been previously validated in Chinese adolescent populations with good psychometric properties (Lin et al., 2017; Shek, 1999; Yu & Shek, 2021). The

reliability and validity of each instrument should be re-examined in subsequent research. Lastly, this study focused on general SMA. Future research may yield more nuanced insights by examining the specific social media platforms such as Facebook, Twitter, or TikTok.

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Ethics approval statement

Written informed consents were obtained from both the participating students and their parents before the study. The project was approved by the Human Subjects Ethics Sub-Committee (HSESC) of The Hong Kong Polytechnic University (Reference No.: HSEARS20220412003).

CRediT authorship contribution statement

Lu Yu: Writing – review & editing, Writing – original draft, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Xiaohua Zhou:** Writing – review & editing, Writing – original draft, Data curation.

Declaration of competing interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Data availability

Data will be made available on request.

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References

- Abbasi, I. S. (2019). Social media addiction in romantic relationships: Does user's age influence vulnerability to social media infidelity? *Personality and Individual Differences*, 139, 277–280. <https://doi.org/10.1016/j.paid.2018.10.038>
- Akdağ, B., Önder, A., Gül, M. E., Yorulmaz, Ş.Ç., Çoban, Ö. G., & Adanır, A. S. (2023). Online behavioral addictions among adolescents before and after the Covid-19 pandemic. *Curēus (Palo Alto, CA)*, 15(8), Article e43231. <https://doi.org/10.7759/curēus.43231>. –e43231.
- Andreassen, C. S. (2015). Online social network site addiction: A comprehensive review. *Current Addiction Reports*, 2(2), 175–184. <https://doi.org/10.1007/s40429-015-0056-9>
- Andreassen, C. S., Billieux, J., Griffiths, M. D., Kuss, D. J., Demetrovics, Z., Mazzoni, E., & Pallesen, S. (2016). The relationship between addictive use of social media and video games and symptoms of psychiatric disorder: A large-scale cross-sectional study. *Psychology of Addictive Behaviors*, 30(2), 252–262. <https://doi.org/10.1037/adb0000160>
- Andreassen, C. S., & Pallesen, S. (2014). Social network site addiction - an overview. *Current Pharmaceutical Design*, 20(25), 4053–4061. <https://doi.org/10.2174/13816128113199990616>
- Bányai, F., Zsila, A., Király, O., Maraz, A., Elekes, Z., Griffiths, M. D., Andreassen, C. S., & Demetrovics, Z. (2017). Problematic social media use: Results from a large-scale nationally representative adolescent sample. *PLoS One*, 12(1), Article e0169839. <https://doi.org/10.1371/journal.pone.0169839>
- Baumrind, D. (1991). Influence of parenting style on adolescent competence and substance use. *The Journal of Early Adolescence*, 11(1), 56–95. <https://doi.org/10.1177/0272431691111004>

- Boer, J. D. (2022). Adolescents' social media disorder in relation to Sensory processing Sensitivity. In *Examining the role of positive parenting (Master's thesis)*. Utrecht University.
- Bornstein, M. H., & Tamis-LeMonda, C. S. (1989). Maternal responsiveness and cognitive development in children. *New Directions for Child and Adolescent Development*, 1989 (43), 49–61. <https://doi.org/10.1002/cd.23219894306>
- Chandrima, R. M., Kircaburun, K., Kabir, H., Riaz, B. K., Kuss, D. J., Griffiths, M. D., & Mamun, M. A. (2020). Adolescent problematic internet use and parental mediation: A Bangladeshi structured interview study. *Addictive Behaviors Reports*, 12, 100288. <https://doi.org/10.1016/j.abrep.2020.100288>, 100288.
- Chang, F. C., Chiu, C. H., Miao, N. F., Chen, P. H., Lee, C. M., Chiang, J. T., & Pan, Y. C. (2015). The relationship between parental mediation and Internet addiction among adolescents, and the association with cyberbullying and depression. *Comprehensive Psychiatry*, 57, 21–28. <https://doi.org/10.1016/j.comppsy.2014.11.013>
- Cheng, C., & Lau, Y. C. (2022). Social media addiction during COVID-19-mandated physical distancing: Relatedness needs as motives. *International Journal of Environmental Research and Public Health*, 19(8), 4621. <https://doi.org/10.3390/ijerph19084621>
- Cheng, C., Lau, Y. C., Chan, L., & Luk, J. W. (2021). Prevalence of social media addiction across 32 nations: Meta-analysis with subgroup analysis of classification schemes and cultural values. *Addictive Behaviors*, 117, Article 106845. <https://doi.org/10.1016/j.addbeh.2021.106845>
- Chng, G. S., Li, D., Liao, A. K., & Khoo, A. (2015). Moderating effects of the family environment for parental mediation and pathological internet use in youths. *Cyberpsychology, Behavior, and Social Networking*, 18(1), 30–36. <https://doi.org/10.1089/cyber.2014.0368>
- Chou, C., & Lee, Y. H. (2017). The moderating effects of internet parenting styles on the relationship between Internet parenting behavior, Internet expectancy, and Internet addiction tendency. *The Asia-Pacific Education Researcher*, 26, 137–146. <https://doi.org/10.1007/s40299-017-0334-5>
- Costantini, A., Semeraro, C., Musso, P., Cassibba, R., & Coppola, G. (2022). The role of parenting, dysregulation and self-esteem in adolescents' problematic social network site use: A test of parallel and serial mediation models in a healthy community sample. *International Journal of Environmental Research and Public Health*, 19(20), Article 13154. <https://doi.org/10.3390/ijerph192013154>
- Darling, N., & Steinberg, L. (1993). Parenting style as context: An integrative model. *Psychological Bulletin*, 113, 487–496.
- Drouin, M., McDaniel, B. T., Pater, J., & Toscos, T. (2020). How parents and their children used social media and technology at the beginning of the COVID-19 pandemic and associations with anxiety. *Cyberpsychology, Behavior, and Social Networking*, 23(11), 727–736. <https://doi.org/10.1089/cyber.2020.0284>
- Đuricová, L., & Políach, V. (2023). Social media use in the context of parental acceptance among Slovak adolescents. In *International Psychological Applications Conference and Trends (INPACT) 2023*. Lisbon, Portugal.
- Geurts, S. M., Koning, I. M., Van den Eijnden, R. J., & Vossen, H. G. (2023). Predicting adolescents' problematic social media use from profiles of internet-specific parenting practices and general parenting dimensions. *Journal of Youth and Adolescence*, 52(9), 1829–1843. <https://doi.org/10.1007/s10964-023-01816-4>
- Geurts, S. M., Koning, I. M., Vossen, H. G., & van den Eijnden, R. J. (2022). Rules, role models or overall climate at home? Relative associations of different family aspects with adolescents' problematic social media use. *Comprehensive Psychiatry*, 116, Article 152318. <https://doi.org/10.1016/j.comppsy.2022.152318>
- Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: A regression-based Approach* (3rd ed.). The Guilford Press.
- Huang, C. (2022). A meta-analysis of the problematic social media use and mental health. *International Journal of Social Psychiatry*, 68(1), 12–33. <https://doi.org/10.1177/0020764020978434>
- Huang, X., Zhang, H., Li, M., Wang, J., Zhang, Y., & Tao, R. (2010). Mental health, personality, and parental rearing styles of adolescents with Internet addiction disorder. *Cyberpsychology, Behavior and Social Networking*, 13(4), 401–406. <https://doi.org/10.1089/cyber.2009.0222>
- Kalmus, V., Blinka, L., & Olafsson, K. (2015). Does it matter what mama says: Evaluating the role of parental mediation in European adolescents' excessive Internet use. *Children & Society*, 29, 122–133. <https://doi.org/10.1111/chso.12020>
- Koning, I. M., Peeters, M., Finkenauer, C., & Van Den Eijnden, R. J. (2018). Bidirectional effects of Internet-specific parenting practices and compulsive social media and Internet game use. *Journal of Behavioral Addictions*, 7(3), 624–632. <https://doi.org/10.1556/2006.7.2018.68>
- Kuss, D. J., & Griffiths, M. D. (2017). Social networking sites and addiction: Ten lessons learned. *International Journal of Environmental Research and Public Health*, 14(3), 311. <https://doi.org/10.3390/ijerph14030311>
- Leung, J. T., & Shek, D. T. (2014). Parent-adolescent discrepancies in perceived parenting characteristics and adolescent developmental outcomes in poor Chinese families. *Journal of Child and Family Studies*, 23, 200–213.
- Lin, C. Y., Broström, A., Nilsen, P., Griffiths, M. D., & Pakpour, A. H. (2017). Psychometric validation of the Persian bergen social media addiction scale using classic test theory and rasch models. *Journal of Behavioral Addictions*, 6(4), 620–629.
- Liu, Y.-L. (2020). Maternal mediation as an act of privacy invasion: The association with Internet addiction. *Computers in Human Behavior*, 112. <https://doi.org/10.1016/j.chb.2020.106474>
- Liu, J., Wu, L., Sun, X., Bai, X., & Duan, C. (2023). Active parental mediation and adolescent problematic internet use: The mediating role of parent-child relationships and hiding online behavior. *Behavioral Sciences*, 13(8), 679. <https://doi.org/10.3390/bs13080679>
- Livingstone, S., & Helsper, E. J. (2008). Parental mediation of children's internet use. *Journal of Broadcasting & Electronic Media*, 52(4), 581–599. <https://doi.org/10.1080/08838150802437396>
- Locke, J. Y., Campbell, M. A., & Kavanagh, D. (2012). Can a parent do too much for their child? An examination by parenting professionals of the concept of overparenting. *Journal of Psychologists and Counsellors in Schools*, 22(2), 249–265. <https://doi.org/10.1017/jgc.2012.29>
- Lukavská, K., Hrabec, O., Lukavský, J., Demetrovics, Z., & Király, O. (2022). The associations of adolescent problematic internet use with parenting: A meta-analysis. *Addictive Behaviors*, Article 107423. <https://doi.org/10.1556/2006.2020.00068>
- Maftai, A., Merlici, I. A., & Dănilă, O. (2023). Social media use as a coping mechanism during the COVID-19 pandemic: A multidimensional perspective on adolescents' well-being. *Frontiers in Public Health*, 10, Article 1062688. <https://doi.org/10.3389/fpubh.2022.1062688>
- Masaeli, N., & Farhadi, H. (2021). Prevalence of internet-based addictive behaviors during COVID-19 pandemic: A systematic review. *Journal of Addictive Diseases*, 39 (4), 468–488.
- Mun, I. B., & Lee, S. (2023). The influence of parents' depression on children's online gaming addiction: Testing the mediating effects of intrusive parenting and social motivation on children's online gaming behavior. *Current Psychology: Research and Reviews*, 42(6), 4991–5000. <https://doi.org/10.1007/s12144-021-01854-w>
- Nathanson, A. I. (1999). Identifying and explaining the relationship between parental mediation and children's aggression. *Communication Research*, 26(2), 124–143.
- Ng, S. H., & Lai, J. C. (2011). Bicultural self, multiple social identities, and dual patriotism among ethnic Chinese in Hong Kong. *Journal of Cross-Cultural Psychology*, 42(1), 89–103.
- Nilsson, A., Rosendahl, I., & Jayaram-Lindström, N. (2022). Gaming and social media use among adolescents in the midst of the COVID-19 pandemic. *Nordisk Alkohol- & Narkotikatidskrift: NAT*, 39(4), 347–361. <https://doi.org/10.1177/14550725221074997>
- Robinson, E. L., Stegeorge, J., & Freeman, E. E. (2021). A systematic review of father-child play interactions and the impacts on child development. *Children*, 8(5), 389. <https://doi.org/10.3390/children8050389>
- Shek, D. T. L. (1999). Assessment of global parenting style and specific parenting behavior in a Chinese context. *Psychologia: An International Journal of Psychology in the Orient*, 42, 69–79.
- Shek, D. T. L., Dou, D., & Zhu, X. (2022). Prevalence and correlates of mental health of university students in Hong Kong: What happened one year after the occurrence of COVID-19? *Frontiers in Public Health*, 10, 857147. <https://doi.org/10.3389/fpubh.2022.857147>, 857147.
- Sun, Y., & Zhang, Y. (2021). A review of theories and models applied in studies of social media addiction and implications for future research. *Addictive Behaviors*, 114, Article 106699.
- Temple, J. R., Bauml, E., Wood, L., Guillot-Wright, S., Torres, E., & Thiel, M. (2022). The impact of the COVID-19 pandemic on adolescent mental health and substance use. *Journal of Adolescent Health*, 71(3), 277–284.
- Trumello, C., Vismara, L., Sechi, C., Ricciardi, P., Marino, V., & Babore, A. (2021). Internet addiction: The role of parental care and mental health in adolescence. *International Journal of Environmental Research and Public Health*, 18(24), Article 12876. <https://doi.org/10.3390/ijerph182412876>
- Van den Eijnden, R. J., Spijkerman, R., Vermulst, A. A., van Rooij, T. J., & Engels, R. C. (2010). Compulsive Internet use among adolescents: Bidirectional parent-child relationships. *Journal of Abnormal Child Psychology*, 38, 77–89. <https://doi.org/10.1007/s10802-009-9347-8>
- Wang, Q., Pomerantz, E. M., & Chen, H. (2007). The role of parents' control in early adolescents' psychological functioning: A longitudinal investigation in the United States and China. *Child Development*, 78(5), 1592–1610.
- Wei, X. Y., Ren, L., Jiang, H. B., Liu, C., Wang, H. X., Geng, J. Y., ... Lei, L. (2023). Does adolescents' social anxiety trigger problematic smartphone use, or vice versa? A comparison between problematic and unproblematic smartphone users. *Computers in Human Behavior*, 140, Article 107602.
- Yu, L., & Du, M. (2022). Social networking use, mental health, and quality of life of Hong Kong adolescents during the COVID-19 pandemic. *Frontiers in Public Health*, 10, Article 1040169. <https://doi.org/10.3389/fpubh.2022.1040169>
- Yu, L., & Luo, T. (2021). Social networking addiction among Hong Kong university students: Its health consequences and relationships with parenting behaviors. *Frontiers in Public Health*, 8, Article 555990.
- Yu, L., & Shek, D. T. L. (2021). Positive youth development attributes and parenting as protective factors against adolescent social networking addiction in Hong Kong. *Frontiers in Pediatrics*, 9, 649232. <https://doi.org/10.3389/fped.2021.649232>, 649232.
- Zhao, N., & Zhou, G. (2021). COVID-19 stress and addictive social media use (SMU): Mediating role of active use and social media flow. *Frontiers in Psychiatry*, 12, Article 635546. <https://doi.org/10.3389/fpsy.2021.635546>
- Zhu, X., Deng, C., & Bai, W. (2023). Parental control and adolescent internet addiction: The moderating effect of parent-child relationships. *Frontiers in Public Health*, 11, 1190534. <https://doi.org/10.3389/fpubh.2023.1190534>, 1190534.