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Internet-Related Behaviors and Psychological Distress Among Schoolchildren During COVID-19 School Suspension

To the Editor:

The novel coronavirus disease 2019 (COVID-19) infection has rapidly grown worldwide,[1] and many governments have implemented policies to control the infection rate. For example, school suspension, self-quarantine, requirement of citizens to stay at home,[2] travel and border controls, and discouragement of outdoor activities[3] have been used. Although these actions emphasizing the importance of "spatial distancing" are based on the perspective of public health, they may result in health problems other than COVID-19 infection, such as psychological distress and fear.[4] Therefore, the present authors examined the potential predictors for psychological distress among schoolchildren during COVID-19 school suspension.

Using of an ongoing longitudinal project approved by the Hong Kong Polytechnic University's ethics committee (ref: HSEARS20190718001), data from 2 waves of the project (ie, baseline [time 1] and 5 months after baseline [time 2]) were analyzed. The first-wave data (time 1) were collected from October 22, 2019, to November 1, 2019, and the COVID-19 outbreak in mainland China occurred around February 2020. Chinese primary school students ended their autumn semester on January 16, 2020, and had a winter vacation during the Chinese New Year (from January 17 to February 17, 2020). The students were then housebound from February 18, 2020, and received online teaching beginning March 5, 2020 (ie, a policy implemented by the Sichuan Province's education bureau). Online teaching included recorded video clips and homework designed according to the content of the video clip. Teachers sent out the homework using *WeChat*. The second-wave data (time 2) were collected from March 4 to 16, 2020: on average, 130.8 days after the data collection in the first wave (SD = 5.42). In March 2020, mainland Chinese primary schoolchildren were still suspended from school because of the government's COVID-19 policy restrictions.

Data collections were performed with the assistance from teachers of three primary schools in Sichuan province. More specifically, the three primary schools were public schools and located in the suburban area of Qionglai city (population size, 0.65 million; approximately 60 km [37 miles] from downtown Chengdu city), which is a country-level city in the Sichuan province. Regarding the schoolchildren's parents in the three schools, approximately 85% of them had completed high school education, and 5% of them had a college degree or above. The parents' annual income was between 50,000 and 180,000 Renminbi (RMB; 1 USD ≈ 7.05 RMB), with an average of 80,000 RMB.

In the baseline assessment (time 1), teachers first distributed the study information to schoolchildren and their parents. Their willingness to participate in the first wave was verified by written informed consent (signed by the children and one of their parents). For consent in the second wave, the survey was sent to parents' smartphone with the instruction that one of the parents was requested to accompany the children to complete the survey if they agreed to participate. Only those parents and children who agreed to participate in the second wave's survey could continue and complete the scales after providing online informed consent (ie, on the first page prior to the survey). If the parents or children did not hit the "agree" button on the first page, the survey ended directly. Several psychometric scales, together with a background information sheet, were then given to the students to complete in the classroom under the supervision of the schoolteachers. In the assessment during the COVID-19 outbreak (time 2), an online survey using the same psychometric scales and background information sheet as those at time 1 was generated by the researchers. Because schoolteachers were unable to have physical contact with the children in schools, the hyperlink of the online survey was sent to the students by their teachers. The study objectives and participants' rights (eg, withdrawal from the survey at any time without any consequence) were clearly stated on the survey's first page. Eligible schoolchildren fulfilled the following inclusion criteria: having the ability to read and understand written Chinese that enabled them to complete the online survey without difficulties, and their family possessing at least one smartphone with Internet access.

All the self-report measures were assessed using a past-week timeframe. More specifically, schoolchildren's time spent on Internet-related activities, problematic use of Internet-related activities, and psychological distress were asked with the item stem of "in the past week." Participants'

TABLE 1 Characteristics Among Schoolchildren Who Attended Baseline Assessment, Those Who Attended Follow-up Assessment, and Those Who Attended Both Baseline and Follow-up Assessments

	Cross-sectional data		Longitudinal data[a]
	Baseline (n = 1,108)	Follow-up (n = 2,026)	Baseline and follow-up (n = 543)
Participation rate[b]	0.26	0.48	0.13
Age, y, mean (SD)	10.65 (0.90)	10.71 (1.07)	10.88 (0.72)
Grade, n (%)			
First	0	0	0
Second	0	46 (2)	0
Third	0	175 (9)	0
Fourth	351 (31)	553 (27)	164 (30)
Fifth	398 (35)	832 (41)	321 (59)
Sixth	359 (32)	420 (21)	58 (11)
Ethnicity, n (%)			
Han	1,098 (99)	1,999 (99)	535 (99)
Other	10 (1)	27 (1)	8 (1)
Sex, n (%)			
Male	545 (49)	1,015 (50)	265 (49)
Female	558 (51)	1,011(50)	273 (51)
Currently ill, n (%)			
Yes	301 (27)	32 (2)	145 (27)$^{\text{Baseline}}$; 9 (2)$^{\text{Follow-up}}$
No	793 (72)	1,994 (98)	384 (71)$^{\text{Baseline}}$; 534 (98)$^{\text{Follow-up}}$
Perceived academic performance; mean (SD)[c]	1.57 (0.79)	1.56 (0.77)	1.58 (0.79)$^{\text{Baseline}}$; 1.64 (0.78)$^{\text{Follow-up}}$

Note: [a]*Longitudinal data were for participants who completed both baseline and follow-up assessments.*
[b]*Participation rate was calculated using the denominator of the total number of students in the 3 primary schools: that is, 1,108/4,260 for baseline, 2,026/4,260 for follow-up, and 543/4,260 for those who attended both baseline and follow-up assessments.*
[c]*Perceived academic performance was assessed using an item (How do you perceive your academic performance?) with a 5-point Likert scale (1 = very good; 5 = very poor).*

demographics and characteristics were collected, including their date of birth, grade, ethnicity, sex, health condition (using an dichotomous item "In the past week, were you ill [eg, having diarrhea or catching a cold]?"), perceived academic performance (using the question "How do you perceive your academic performance in the past week?" with a 5-point Likert scale [1 = very good; 5 = very poor]), and (using open-ended questions) time spent on gaming ("In the past week, how much time did you spent gaming per day?"), social media use ("In the past week, how much time did you spent on social media per day?"), and smartphone ("In the past week, how much time did you spent on smartphone per day?"). In addition, the Smartphone Application–Based Addiction Scale (SABAS),[5-7] Bergen Social Media Addiction Scale (BSMAS),[5-7] and Internet Gaming Disorder Scale–Short Form (IGDS-SF9)[5-7] were used to understand the problematic Internet-related behaviors among the schoolchildren. The Depression, Anxiety, Stress Scale–21 (DASS-21)[8] was used to evaluate the psychological distress of the schoolchildren. The SABAS contains six items answered on a six-point Likert scale; the BSMAS contains six items with a five-point Likert scale; the IGDS-SF9 contains nine items with a five-point Likert scale; and the DASS-21 contains 21 items with a four-point Likert scale. Higher scores in the SABAS, BSMAS, IGDS-SF9, and DASS-21 indicate greater problematic smartphone-application use, problematic social media use, problematic gaming, and psychological distress, respectively.

Descriptive statistics were first used to report means and 95% confidence intervals to understand the time spent engaging in Internet-related behavior, problematic Internet-related behavior use, and psychological distress for the participants. Paired *t* tests were then carried out to compare the differences in time spent engaging in Internet-related behavior, problematic Internet-related behavior use, and psychological distress between baseline and follow-up assessments. Three regression models were constructed to understand the factors associated with psychological distress during the COVID-19 outbreak period. The first regression model predicted the outcome of baseline psychological distress by age, sex, and baseline information on current illness status, perceived academic performance, time spent on Internet-related behaviors (time spent on smartphone, social media use, and gaming) and problematic Internet-related behaviors (problematic smartphone-application use, problematic social media use, and problematic gaming). The second regression model predicted the outcome of follow-up psychological distress by age, sex, and follow-up information on current illness status, perceived academic performance, time spent on Internet-related behaviors, and problematic Internet-related behaviors. The third regression model predicted the outcome of psychological distress at follow-up by age, sex, and both baseline and follow-up information on current illness status, perceived academic performance, time spent on Internet-related behaviors, and problematic Internet-related behaviors.

Participants' characteristics for schoolchildren who completed the baseline survey, those who completed the follow-up survey, and those who completed both the baseline and follow-up surveys are presented in Table 1. More specifically, the participation rates were 26% for baseline

TABLE 2 Time Spent Engaging in Internet-Related Behavior, Problematic Internet-Related Behavior Use, and Psychological Distress in Cross-Sectional Data (n = 1,108 for Baseline and n = 2,026 for Follow-up) and Longitudinal Data Between Time 1 (Baseline Assessment) and Time 2 (Assessment During COVID-19 Outbreak; n = 543)

	Cross-sectional data		Longitudinal data			
	Baseline mean (95% CI)	Follow-up mean (95% CI)	Time 1 mean (95% CI)	Time 2 mean (95% CI)	*t*	*p*
Smartphone use[a]	1.09 (0.99, 1.19)	2.17 (2.08, 2.26)	0.85 (0.71, 0.99)	1.99 (1.78, 2.20)	9.24	<.001
Social media use[a]	0.39 (0.34, 0.44)	1.06 (0.99, 1.13)	0.32 (0.22, 0.42)	1.08 (0.92, 1.23)	8.14	<.001
Gaming[a]	0.73 (0.65, 0.81)	0.84 (0.77, 0.90)	0.70 (0.53, 0.87)	0.89 (0.72, 1.06)	1.62	.11
SABAS	1.87 (1.81, 1.93)	2.06 (2.02, 2.10)	1.80 (1.72, 1.88)	1.85 (1.77, 1.93)	1.09	.28
BSMAS	1.60 (1.56, 1.64)	1.51 (1.48, 1.54)	1.58 (1.53, 1.63)	1.42 (1.37, 1.47)	4.88	<.001
IGDS-SF9	1.48 (1.45, 1.51)	1.42 (1.39, 1.45)	1.44 (1.39, 1.49)	1.33 (1.29, 1.37)	4.02	<.001
DASS-21	0.49 (0.46, 0.51)	1.20 (1.19, 1.21)	0.49 (0.44, 0.53)	1.22 (1.19, 1.25)	33.28	<.001

Note: BSMAS = Bergen Social Media Addiction Scale; DASS-21 = Depression, Anxiety, Stress Scale–21; IGDS-SF9 = Internet Gaming Disorder Scale–Short Form; SABAS = Smartphone Application–Based Addiction Scale.
[a]*Presented using daily hours spent on smartphone use, social media use, and gaming.*

assessment, 48% for follow-up assessment, and 13% for baseline and follow-up assessments. The participation rate was higher in the follow-up assessment than in the baseline assessment because additional schoolchildren were invited to participate in the follow-up assessment. The sex distributions of the present samples were not significantly different from those of the entire sample of schoolchildren in the three schools ($\chi^2[1] = 0.49$ and $p = .48$ for baseline; $\chi^2[1] = 0.25$ and $p = .62$ for follow-up). The present samples were significantly older than the entire schoolchildren sample (mean age, 10.0 years [entire schoolchildren] vs 10.65 years [present baseline data] and 10.71 years [present follow-up data]; $t = 12.96$ and $p < .001$ for baseline; $t = 29.87$ and $p < .001$ for follow-up). Therefore, the present samples represented more senior primary schoolchildren. Moreover, Individualized Education Program Plans (IEPs) were implemented in the three schools (0.81%, 0.22%, and 0.38%, respectively). During the school suspension period, schoolteachers visited the homes of schoolchildren who required IEPs to provide additional support according to the Education Bureau's guidance.

The schoolchildren reported more time engaging in smartphone use and social media use. They further reported lower levels of problematic social media use and problematic gaming at follow-up assessment than at baseline assessment. However, the psychological distress was greater for the schoolchildren at follow-up assessment than at baseline assessment (Table 2). Table S1, available online, additionally shows that problematic Internet-related behaviors were significant predictors for psychological distress at both baseline (standardized coefficient [β] = 0.093 for problematic smartphone-application use; 0.081 for problematic social media use; and 0.437 for problematic gaming; n = 1,108) and follow-up assessments ($\beta = 0.181$ for problematic smartphone-application use; 0.152 for problematic social media use; 0.232 for problematic gaming; n = 2,026). Follow-up illness status (reference group being healthy status; $\beta = 0.071$) and perceived academic performance ($\beta = 0.099$) were significant predictors for distress in the follow-up. Moreover, the regression on data from schoolchildren who completed both baseline and follow-up assessments (n = 543) showed that problematic smartphone-application use at follow-up ($\beta = 0.304$) and problematic gaming at follow-up ($\beta = 0.308$) significantly predicted psychological distress at follow-up.

The higher association found between illness status and psychological distress during the COVID-19 outbreak period than before the COVID-19 outbreak may be explained by the fear of COVID-19 transmission and mortality rates.[1,4] The associations between psychological distress and different types of problematic Internet-related behaviors found in the present study concur with prior research.[5,6,9,10] Special attention should be paid to the greater associations between problematic smartphone-application use, problematic social media use, and psychological distress during the COVID-19 outbreak than before. Therefore, parents of primary school children are encouraged to understand and to monitor their children's smartphone and social media use during the COVID-19 outbreak. Subsequently, their children's psychological distress may not become as elevated during this period.

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REFERENCES

1. World Health Organization. Coronavirus disease (COVID-2019): situation report−72. Available at: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200401-sitrep-72-covid-19.pdf?sfvrsn=3dd8971b_2. Accessed April 2, 2020.
2. Safer at home order for control of COVID-19. California Health and Safety Code §120295; Los Angeles County Code §11.02.080; March 19, 2020. Available at: http://publichealth.lacounty.gov/media/Coronavirus/COVID-19_SaferAtHome_HealthOfficerOrder_20200319_Signed.pdf. Accessed March 30, 2020.
3. Alvarez E. COVID-19 concerns lead to unusual bans in Dallas County. Available at: https://www.wfaa.com/article/news/health/coronavirus/covid-19-concerns-lead-to-unusual-bans-in-dallas-county/287-a8a50a42-7e86-4094-82a4-6ca5aeb80e5e. 2020. Accessed March 30, 2020.
4. Ahorsu DK, Lin C-Y, Imani V, *et al*. Fear of COVID-19 Scale: development and initial validation. Int J Ment Health Addict. 2020. Epub ahead of print. Available at:; https://doi.org/10.1007/s11469-020-00270-8.
5. Chen I-H, Strong C, Lin Y-C, *et al*. Time invariance of three ultra-brief Internet-related instruments: Smartphone Application−Based Addiction Scale (SABAS), Bergen Social Media Addiction Scale (BSMAS), and the nine-item Internet Gaming Disorder Scale− Short Form (IGDS-SF9) (Study Part B). Addict Behav. 2020;101:105960.
6. Leung H, Pakpour AH, Strong C, *et al*. Measurement invariance across young adults from Hong Kong and Taiwan among three Internet-related addiction scales: Bergen Social Media Addiction Scale (BSMAS), Smartphone Application−Based Addiction Scale (SABAS), and Internet Gaming Disorder Scale−Short Form (IGDS-SF9) (Study Part A). Addict Behav. 2020;101:105969.
7. Yam C-W, Pakpour AH, Griffiths MD, *et al*. Psychometric testing of three Chinese online-related addictive behavior instruments among Hong Kong university students. Psychiatr Q. 2019;90:117-128.
8. Wang K, Shi H-S, Geng F-L, *et al*. Cross-cultural validation of the Depression Anxiety Stress Scale–21 in China. Psychol Assess. 2016;28:e88-e100.
9. Chen I-H, Pakpour AH, Leung H, *et al*. Comparing generalized and specific problematic smartphone/Internet use: longitudinal relationships between smartphone application−based addiction and social media addiction and psychological distress. J Behav Addict. In press.
10. Wong HY, Mo HY, Potenza MN, *et al*. Relationships between severity of Internet gaming disorder, severity of problematic social media use, sleep quality and psychological distress. Int J Environ Res Public Health. 2020;17:1879.

Child Maltreatment Recurrence Points to Urgent Need to Improve Systems for Identification and Prevention

To the Editor:

There is considerable evidence that child maltreatment is associated with significant short- and long-term negative outcomes.[1] Protecting children from maltreatment should be a clear priority, and there is substantial opportunity for making improvements in child protective services (CPS) to better serve those they are tasked with protecting. Making progress in this effort requires a closer inspection of the processes in place to identify children in danger of being harmed and of the potential effectiveness of the current system. The article by Kim and Drake[2] published in the *Journal* examined CPS records to create US estimates for child maltreatment onset and recurrence for children from birth to age 11 years. More than one-third of children are estimated to have a screened-in report for investigation or assessment by CPS, and after an initial report is made regarding a child, the probability of a subsequent report is nearly 1 in 2. This alarming rate of maltreatment recurrence points to potential areas for improvement.

Given the high cost to each child whose maltreatment continues without effective intervention, the findings of recurrent reports made for children already brought to the attention of authorities is concerning. Most children remain in their homes even following substantiated maltreatment, and data presented by Kim and Drake[2] point to an unmet need to ensure the safety of children with CPS involvement. Strained budgets often limit the access to and availability of tailored mental health services, and training for mental health professionals working with families connected to CPS may not always be evidence-based.

Further, interventions for parents aimed to reduce re-perpetration of maltreatment typically focus on providing behavioral techniques to replace or reduce physical discipline, rather than directly target the most common type of child maltreatment (ie, neglect).[2,3] Given the links between neglect and poverty, such interventions may necessitate an

TABLE S1 Multiple Regression Models Predicting Psychological Distress (Assessed Using DASS-21) in Cross-Sectional Data and Predicting Psychological Distress at Follow-up in Longitudinal Data

	Nonstand. coeff. (95% CI)	SE	Stand. coeff.	R^2 (Adj. R^2)	*F* (df)
Cross-sectional baseline data (n = 1,108)				0.30 (0.29)	47.06 (10, 1,083)**
Sex (ref: male)	0.020 (−0.030, 0.070)	0.025	0.023		
Age	−0.016 (−0.042, 0.010)	0.013	−0.034		
Illness status (ref: healthy status)	0.033 (−0.022, 0.088)	0.028	0.033		
Perceived academic status	0.030 (−0.003, 0.062)	0.017	0.049		
Time spent on smartphone use	−0.008 (−0.028, 0.013)	0.011	−0.027		
Time spent on social media use	−0.030 (−0.064, 0.005)	0.018	−0.053		
Time spent gaming	0.016 (−0.006, 0.038)	0.011	0.051		
SABAS	0.046 (0.007, 0.085)	0.020	0.093*		
BSMAS	0.060 (0.010, 0.110)	0.026	0.081*		
IGDS-SF9	0.351 (0.287, 0.414)	0.033	0.437**		
Cross-sectional follow-up data (n = 2,026)				0.27 (0.27)	75.60 (10, 2,015)**
Sex (ref: male)	0.017 (−0.008, 0.041)	0.013	0.026		
Age	0.002 (−0.009, 0.013)	0.006	0.006		
Illness status (ref: healthy status)	0.183 (0.087, 0.279)	0.049	0.071**		
Perceived academic status	0.042 (0.026,0.057)	0.008	0.099**		
Time spent on smartphone use	0.001 (−0.005, 0.006)	0.003	0.007		
Time spent on social media use	−0.004 (−0.010, 0.003)	0.003	−0.025		
Time spent gaming	0.001 (−0.006, 0.007)	0.003	0.004		
SABAS	0.056 (0.039, 0.074)	0.009	0.181**		
BSMAS	0.077 (0.051, 0.103)	0.013	0.152**		
IGDS-SF9	0.127 (0.096, 0.158)	0.016	0.232**		
Longitudinal data (n = 543)				0.37 (0.34)	16.87 (18, 510)**
Sex (ref: male)	0.022 (−0.023, 0.067)	0.023	0.037		
Age	0.023 (−0.004, 0.050)	0.014	0.063		
Baseline sick status (ref: healthy status)	0.049 (0.000, 0.097)	0.025	0.072		
Follow-up sick status (ref: healthy status)	0.147 (−0.014, 0.308)	0.082	0.065		
Baseline perceived academic performance	−0.020 (−0.051, 0.011)	0.016	−0.051		
Follow-up perceived academic performance	0.028 (−0.003, 0.059)	0.016	0.071		
Baseline time spent on smartphone use	0.015 (−0.007, 0.036)	0.011	0.066		
Follow-up time spent on smartphone use	0.004 (−0.007, 0.016)	0.006	0.037		
Baseline time spent on social media use	−0.009 (−0.045, 0.028)	0.019	−0.020		
Follow-up time spent on social media use	−0.012 (−0.028, 0.003)	0.008	−0.074		
Baseline time spent gaming	−0.006 (−0.027, 0.015)	0.011	−0.025		
Follow-up time spent gaming	−0.005 (−0.017, 0.007)	0.006	−0.032		
Baseline SABAS	−0.002 (−0.039, 0.034)	0.019	−0.007		
Follow-up SABAS	0.097 (0.062, 0.133)	0.018	0.304**		
Baseline BSMAS	0.017 (−0.027, 0.062)	0.022	0.035		
Follow-up BSMAS	0.150 (0.101, 0.199)	0.025	0.308**		
Baseline IGDS-SF9	−0.019 (−0.081, 0.043)	0.032	−0.034		
Follow-up IGDS-SF9	0.035 (−0.031, 0.101)	0.033	0.059		

Note: *Adj. = adjusted; BSMAS = Bergen Social Media Addiction Scale; CI = confidence interval; DASS-21 = Depression, Anxiety, Stress Scale–21; IGDS-SF9 = Internet Gaming Disorder Scale–Short Form; Nonstand. Coeff. = nonstandardized coefficient; ref = referent; SABAS = Smartphone Application–Based Addiction Scale; SE = standard error; Stand. coeff. = standardized coefficient.*
**p < .05; **p < . 01.*