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Sample size estimation

The number of cross-sectional study samples in this study was calculated using the following public disclosure:

$$n = \frac{z_\alpha{}^2 * p * (1-p)}{\delta^2}$$

In the formula, the meaning and value of each parameter are as follows:

a)   α is Type I Error, and α is taken as 0.05 in this study；

b)   δ is the allowable error, and δ is taken as 0.3 in this study；

c)   p represents the incidence rate, and the amount of depression was chosen as the variable of interest to estimate the sample size, with a pre-experimental result of depression incidence = 0.3.

After substituting each parameter into the calculation, n=897. Considering certain errors and experimental mistakes, Finally, 1200 questionnaires were distributed.

Table S1. Distribution of Screen Time and Sleep Status among Mental Health Status(Depression, Anxiety, Loneliness)

Characteristics	Depression			Anxiety			Loneliness	
	No(N=604)	Yes(N=466)	P	No(N=902)	Yes(N=168)	P		P
Screen time, h, mean (SD)	7.79 (3.14)	8.83 (3.31)	<0.001	7.98 (3.18)	8.85 (3.40)	0.001	0.0334[a]	0.2755
Sleep status, mean (SD)	4.53 (2.37)	6.97 (2.79)	<0.001	5.13 (2.54)	8.08 (3.02)	<0.001	0.2146[a]	<0.001

a. Spearman's correlation coefficient

b. Screen Time, Sleep Status and Loneliness are continuous variables

c. Depression and Anxiety are binary variables

Table S2. Association of Screen time with Depression, Anxiety, Loneliness, and Sleep status

	Depression, OR (95% CI)	Anxiety, OR (95% CI)	Loneliness, β (95% CI)	Sleep status, β (95% CI)
Crude model				
Screen time	1.107(1.065, 1.151)**	1.084(1.032, 1.139)***	0.032(-0.091, 0.156)	0.153(0.101, 0.205)***
Adjusted model				
Screen time	1.118(1.072,1.166)***	1.079(1.023, 1.138)**	0.107(-0.023, 0.237)	0.117(1.005, 1.095)***

a. *p<0.05, **p<0.01, ***p<0.001

Table S3. Mediating Effect of Sleep Status on the Association Between Screen Time and Mental Health Status(Depression, Anxiety, Loneliness)

	Depression, OR (95% CI)				Anxiety, OR (95% CI)			
	X→Y	X+M→Y	Indirect Effect (95% CI)	Proportion of Mediation (%)	X→Y	X+M→Y	Indirect Effect (95% CI)	Proportion of Mediation (%)
Screen Time	1.118 (1.072,1.166)***	1.095 (1.045, 1.146)***	0.044 (0.022, 0.066) ***	32.89%	1.079 (1.023, 0.138)**	1.034 (0.973, 1.098)	0.046 (0.023, 0.068)***	57.48%
Sleep Status		1.457 (1.373, 1.547)***				1.477 (1.375, 1.587)***		

a. *p<0.05, **p<0.01, ***p<0.001

Table S4. Distribution of Screen Time and Sleep Status among Mental Health Status(Depression, Anxiety, Loneliness)

Characteristics	Depression			Anxiety			Loneliness		
	No(N=604)	Yes(N=466)	P	No(N=902)	Yes(N=168)	P	No(N=463)	Yes(N=607)	P
Screen time, h, mean (SD)	7.79 (3.14)	8.83 (3.31)	<0.001	7.98 (3.18)	8.85 (3.40)	0.001	8.02 (3.21)	8.19 (3.25)	0.41
Sleep status, mean (SD)	4.53 (2.37)	6.97 (2.79)	<0.001	5.13 (2.54)	8.08 (3.02)	<0.001	4.96 (2.59)	6.08 (2.92)	<0.001

a. Screen Time and Sleep Status are continuous variables

b. Depression, Anxiety and Loneliness are binary variables

Table S5. Association of Screen time with Depression, Anxiety, Loneliness, and Sleep status

	Depression, OR (95% CI)	Anxiety, OR (95% CI)	Loneliness, OR (95% CI)	Sleep status, β (95% CI)
Crude model				
Screen time	1.107(1.065, 1.151)**	1.084(1.032, 1.139)***	1.016(0.978,1.055)	0.153(0.101, 0.205)***
Adjusted model				
Screen time	1.118(1.072,1.166)***	1.079(1.023, 1.138)**	1.031(0.989, 1.075)	0.117(1.005, 1.095)***

a. *p<0.05, **p<0.01, ***p<0.001

Table S6. Mediating Effect of Sleep Status on the Association Between Screen Time and Mental Health Status(Depression, Anxiety, Loneliness)

	Depression, OR (95% CI)				Anxiety, OR (95% CI)			
	X→Y	X+M→Y	Indirect Effect (95% CI)	Proportion of Mediation (%)	X→Y	X+M→Y	Indirect Effect (95% CI)	Proportion of Mediation (%)
Screen Time	1.118 (1.072,1.166)***	1.095 (1.045, 1.146)***	0.044 (0.022, 0.066) ***	32.89%	1.079 (1.023, 0.138)**	1.034 (0.973, 1.098)	0.046 (0.023, 0.068)***	57.48%
Sleep Status		1.457 (1.373, 1.547)***				1.477 (1.375, 1.587)***		

a. *p<0.05, **p<0.01, ***p<0.001

Table S7. Distribution of Screen Time and Sleep Status among Mental Health Status(Depression, Anxiety, Loneliness)

Characteristics	Depression			Anxiety			Loneliness		
	No(N=604)	Yes(N=466)	P	No(N=902)	Yes(N=168)	P	No(N=463)	Yes(N=607)	P
Screen time, h, mean (SD)	7.79 (3.14)	8.83 (3.31)	<0.001	7.98 (3.18)	8.85 (3.40)	0.001	8.02 (3.21)	8.19 (3.25)	0.41
Sleep status, n(%)									
Good(N=398)	349(47.4%)	49 (14.7%)	<0.001	375(41.6%)	23(13.7%)	<0.001	216(46.7%)	182(30.0%)	<0.001
Bad(N=672)	388(52.6%)	284 (85.3%)		527(58.4%)	145 (86.3%)		247(53.3%)	425(70.0%)	

a.   Screen Time is continuous variable

b.   Depression, Anxiety, Loneliness and Sleep Status are binary variables

Table S8. Association of Screen time with Depression, Anxiety, Loneliness, and Sleep status

	Depression, OR (95% CI)	Anxiety, OR (95% CI)	Loneliness, OR (95% CI)	Sleep status, OR (95% CI)
Crude model				
Screen time	1.107(1.065, 1.151)**	1.084(1.032, 1.139)***	1.016(0.978,1.055)	1.069(1.027, 1.112)**
Adjusted model				
Screen time	1.118(1.072,1.166)***	1.079(1.023, 1.138)**	1.031(0.989, 1.075)	1.049(1.005, 1.095)*

a.   *p<0.05, **p<0.01, ***p<0.001

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Table S9. Mediating Effect of Sleep Status on the Association Between Screen Time and Mental Health Status(Depression, Anxiety, Loneliness)

	Depression, OR (95% CI)				Anxiety, OR (95% CI)			
	X→Y	X+M→Y	Indirect Effect (95% CI)	Proportion of Mediation (%)	X→Y	X+M→Y	Indirect Effect (95% CI)	Proportion of Mediation (%)
Screen Time	1.118 (1.072,1.166)***	1.115 (1.066, 1.166)***	0.017 (0.016, 0.033) *	13.73%	1.079 (1.023, 0.138)**	1.067 (1.010, 1.128)*	0.016 (0.001, 0.031)*	19.68%
Sleep Status		5.044 (3.746, 6.793)***				4.449 (2.781,7.117)***		

a. *p<0.05, **p<0.01, ***p<0.001

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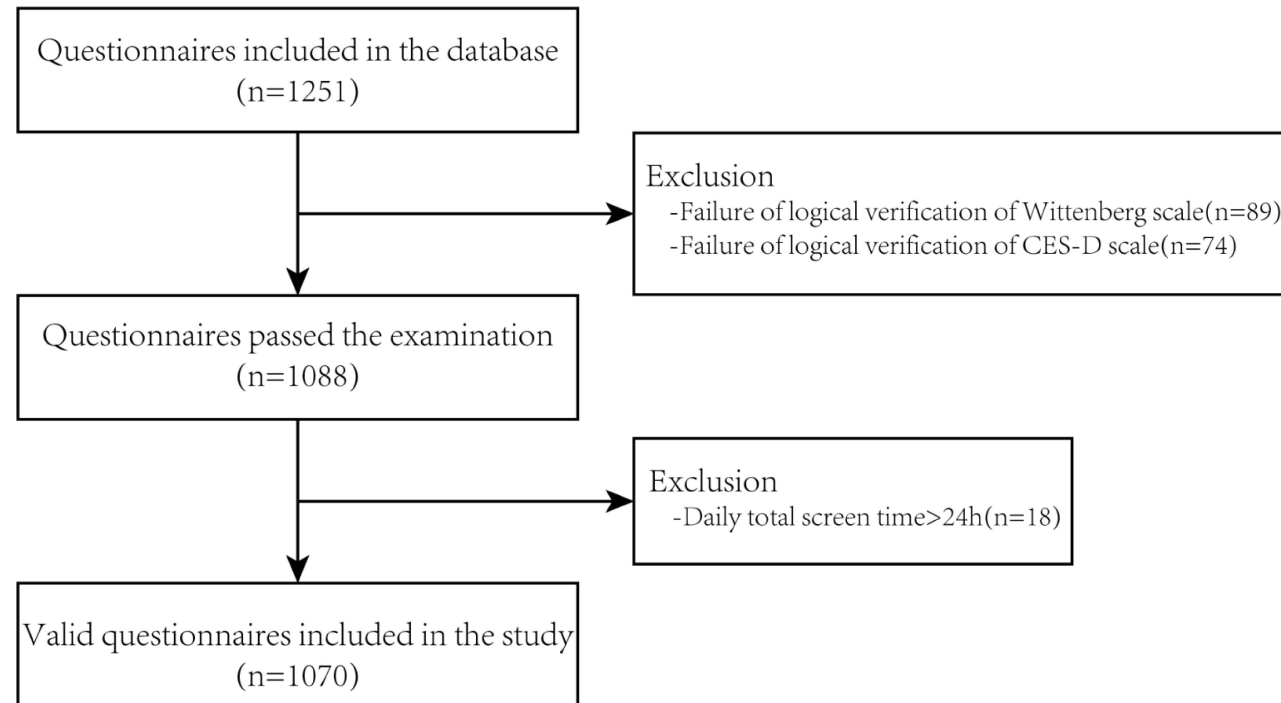
Figure S1. Flow chart of questionnaire screening.

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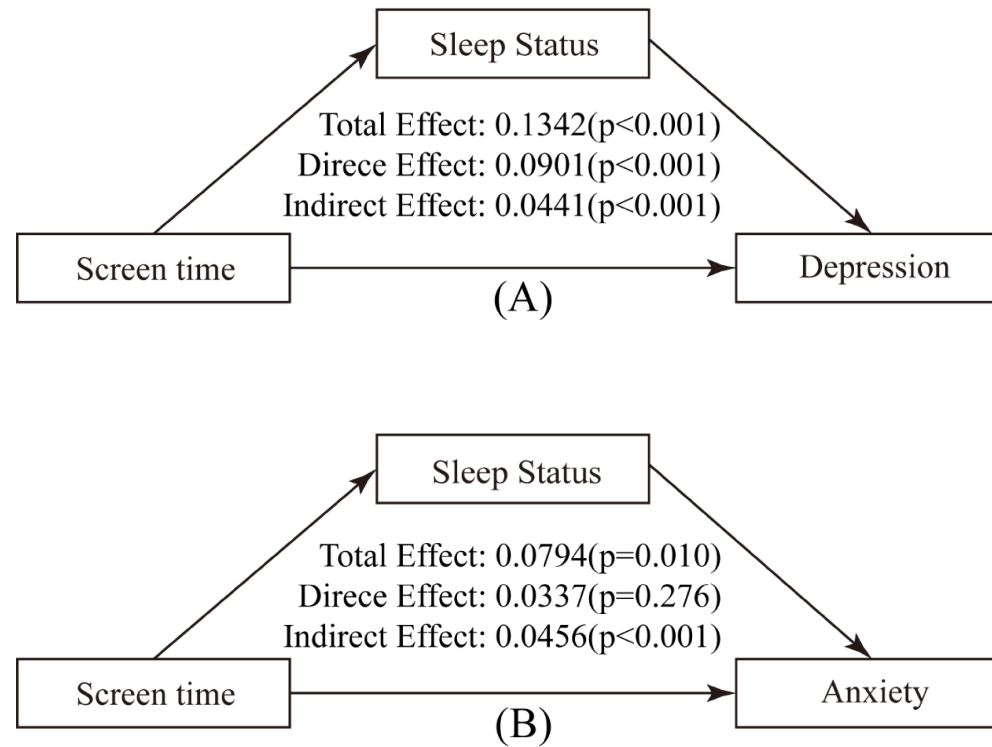
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Figure S2. The intermediary model. (A) Screen time + sleep status → depression. (B) Screen time + sleep status → anxiety.

(Screen Time, Sleep Status and Loneliness are continuous variables, Depression and Anxiety are binary variables)
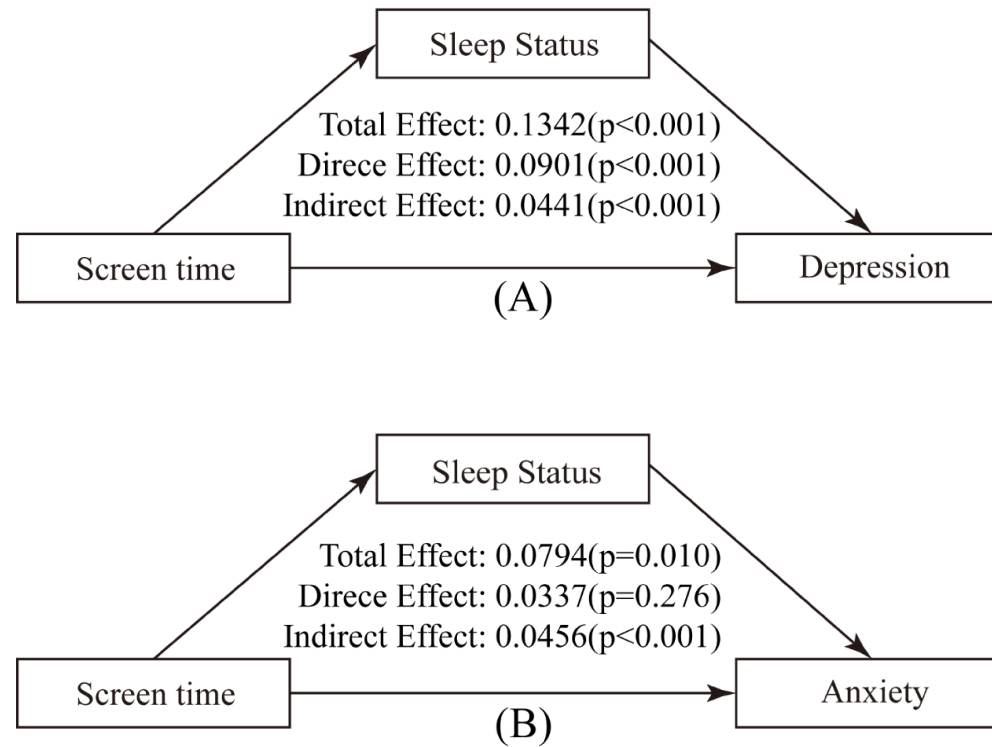
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Figure S3. The intermediary model. (A) Screen time + sleep status → depression. (B) Screen time + sleep status → anxiety.

(Screen Time and Sleep Status are continuous variables, Depression, Anxiety and Loneliness are binary variables)

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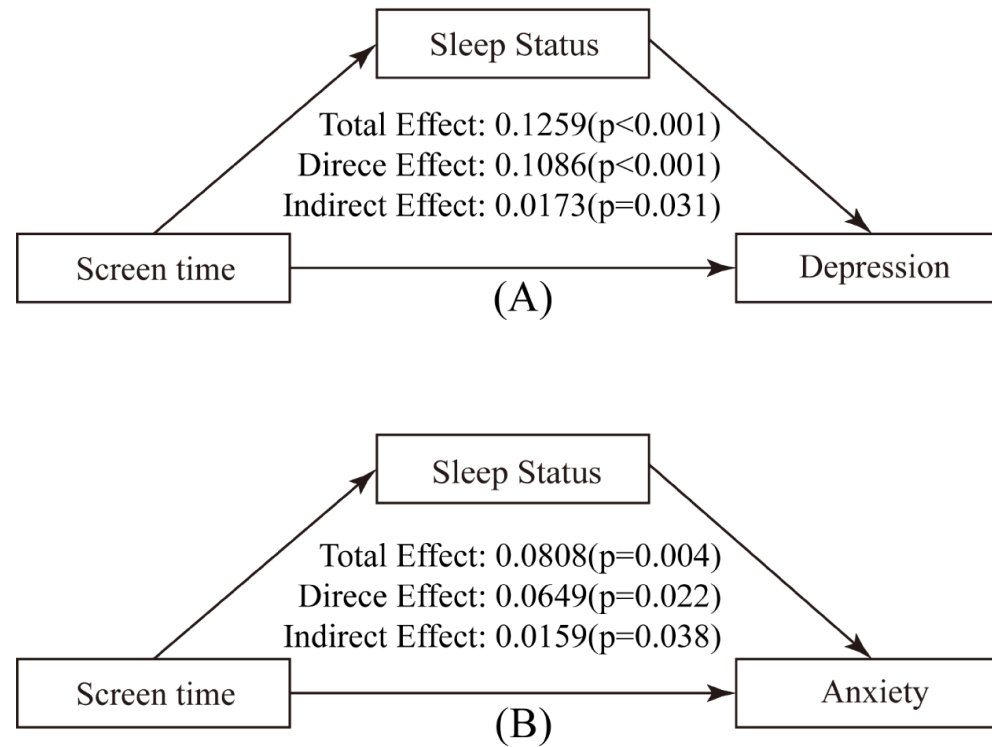
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Figure S4. The intermediary model. (A) Screen time + sleep status → depression. (B) Screen time + sleep status → anxiety.

(Screen Time is continuous variable, Depression, Anxiety, Loneliness and Sleep Status are binary variables)