Supplemental Materials

to accompany

Social experiences and youth psychopathology during the COVID-19 pandemic: A longitudinal study

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Supplemental Materials

Supplemental Methods

Participants
When comparing participants from the parent studies who completed the COVID study (N=224) to those who did not (N=93), we found no differences in pre-pandemic internalizing or externalizing symptoms (β=0.051, p=.369 and β=-0.005, p=.925, respectively), nor income-to-needs ratios (β=-0.001, p=0.989).

SDQ Respondent Information

SDQ Informant Information

	Wave 1	Wave 2
Internalizing Symptoms		
Youth report used	46%	47%
Parent report used	42%	42%
Equivalent scores	12%	11%
Externalizing Symptoms		
Youth report used	44%	41%
Parent report used	44%	49%
Equivalent scores	12%	11%

SDQ Informant from Wave 1 to Wave 2

Internalizing Symptoms	
Child-child	29%
Child-parent	23%
Parent-child	14%
Parent-parent	14%
Equivalent scores	11%
Externalizing Symptoms	
Child-child	23%
Child-parent	28%
Parent-child	16%
Parent-parent	12%
Equivalent scores	11%

For internalizing symptoms, parent and child report were highly correlated at wave 1 and wave 2 of the pandemic (r=0.43, p<.001, r=0.61, p<.001, respectively). Similarly, parent and child report of externalizing symptoms were also highly correlated at wave 1 and 2 of the pandemic (r=0.60, p<.001, r=0.47, p<.001, respectively).

Supplemental Analyses

Secondary Analyses

As a secondary analysis, we examined *absolute levels socialization* and *parental support* during Wave 1 of the pandemic. As described in the main text, participants completed a novel survey and were asked to report the frequency and duration with which they socialized with friends in-person (M=6.945, SD=6.081, *range*: 1-30) and by digital means (i.e., phone call, text, messaging apps, and other platforms; M=12.192, SD=8.872, *range*: 1-36) during the initial stay-at-home orders of the pandemic.

Parental support was assessed using a validated measure of six items (Harter, 1985) that probed relationship quality and perceived emotional support from parents (M=3.285, SD=0.539, *range*: 1.33-4.00). Items included whether participants had parents who "understand them," "want to hear about their problems," "care about my feelings," "treat them like they really matter," "like them the way they are," and "act like what they do is important" scored on a 1-4 Likert scale from "Strongly disagree" to "Strongly agree." Items were summed and had moderately high reliability (*alpha*=0.80).

All analyses followed the same statistical approach as in the main text, examining socialization or parental support as both predictors of psychopathology and moderators of the relationship between pandemic-related stress and psychopathology. We again examined age-related differences to these models to test whether associations differed across age. Summary statistics and plots for these secondary models can be found in Table S3 and Figure S1.

Absolute Levels of Socialization during the Pandemic

We examined how in-person and digital socialization during the initial stay-at-home orders were associated with psychopathology, while controlling for pre-pandemic symptoms. Lower levels of in-person socialization during this time were associated with greater concurrent internalizing (β=-0.160, p=.012) but not externalizing (β=-0.005, p=.934) symptoms. Levels of in-person socialization were not prospectively associated with internalizing symptoms six months later (β=-0.137, p=.061). Meanwhile, lower levels of digital socialization during the pandemic were not significantly related to concurrent internalizing symptoms (β=-0.131, p=.065) or externalizing symptoms at either time-point (ps=.340-.888), but prospectively predicted greater internalizing symptoms six months later, after the initial stay-at-home orders were lifted (β=-0.193, p=.017). There were no age-related differences in the association between socialization and psychopathology (ps>.155). When examining levels of socialization as a moderator, we did not find a significant effect of absolute levels of socialization (in-person or digital) on the relationship between pandemic-related stress and psychopathology (ps>.090), nor any moderating effects by age (ps>.061).

Parental Support during the Pandemic

We also examined perceived support from parents during the pandemic and initial stay-at-home order period. Lower levels of parent support were concurrently and prospectively associated with greater internalizing symptoms (β=-0.304, p<.001 and β=-0.344, p<.001, respectively). Additionally, lower parent support was concurrently and prospectively associated with greater externalizing symptoms (β=-0.245, p<.001 and β=-0.263, p<.001, respectively). Children reported greater support from parents than adolescents (β=-0.252, p<.001). No other

age interactions were found (*p*s>.334). Parental support did not interact with pandemic-related stressors to predict psychopathology (*p*s>.282), nor did we find a moderating effect by age (*p*s>.209).

Supplemental Figures

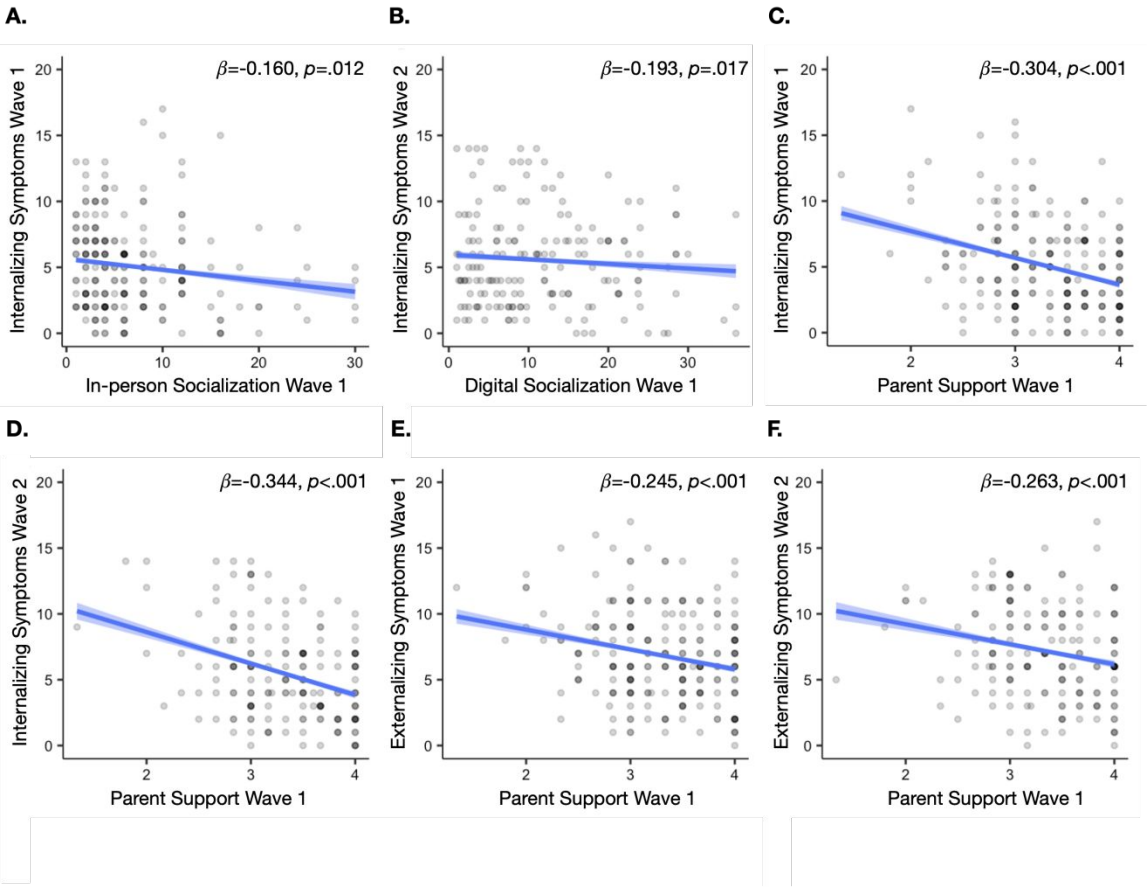

Figure S1. Associations between absolute levels of in-person and digital socialization and parental support with psychopathology. Less in-person and digital socialization during the pandemic was associated with worsened internalizing symptoms at Wave 1 and Wave 2, respectively (A, B). Lower levels of parental support during the pandemic were associated with worsened internalizing and externalizing symptoms at Wave 1 and Wave 2 (C-F) Shaded region indicates SE.

Supplemental Tables

Table S1. Stressor composite score and comprising items

Stressor	Items *Each dichotomized and summed*	Reporter
Health stressors	Participant contracted COVID-19	Child
	Parent, sibling, or another relative contracted COVID-19	Child/Parent
	Partner or close friend contracted COVID-19	Child
	Knew someone who died from COVID-19	Child
	Parent continued work as an essential worker (e.g., healthcare, grocer) during the pandemic	Parent
Financial stressors	Parent was laid off or had other significant loss of employment	Parent
	Family experienced food insecurity; assessed using a validated measure[4,5]	Parent
	Family was evicted or otherwise forced to leave their home due to financial hardship	Parent
	Family experienced significant financial loss (e.g., due to loss of job/business, stock market losses)	Parent
Social stressors	Having a difficult relationship with a parent or other household member that worsened during the pandemic	Child
	Experiencing racism, prejudice, or discrimination related to the pandemic	Child
Other stressors	Crowding in the home (total number of people / home square footage)[6]	Parent
	Experienced difficulty getting schoolwork done at home	Child
	Environment where schoolwork is done is noisy	Child

Table S2. Pandemic stressors by domain and psychopathology

	Internalizing		Externalizing	
Stressor Domains	*β*	*p-value*	*β*	*p-value*
Health	**0.160**	**0.011**	0.120	0.055
Financial	0.010	0.120	0.036	0.572
Social	**0.253**	**< 0.001**	**0.206**	**< 0.001**
School	**0.177**	**0.005**	**0.297**	**< 0.001**
Crowding	0.003	0.640	-0.011	0.856

Note: all models examined symptoms at Wave 1 (April and May 2020) and controlled for pre-pandemic symptoms. *β* = standardized coefficient; **Bold** denotes significant effect.

Table S3. Summary statistics for models with absolute levels of socialization and parental support

Social behavior and psychopathology	*Wave 1*				*Wave 2*			
	Internalizing		Externalizing		Internalizing		Externalizing	
Social behaviors	*β*	*p-value*	*β*	*p-value*	*β*	*p-value*	*β*	*p-value*
In-person socialization (absolute level)	**-0.160**	**0.012**	-0.005	0.934	-0.137	0.061	-0.018	0.798
Digital socialization (absolute level)	-0.131	0.065	0.010	0.888	**-0.193**	**0.017**	0.076	0.340
Parent support	**-0.304**	**< 0.001**	**-0.245**	**< 0.001**	**-0.344**	**< 0.001**	**-0.263**	**< 0.001**
Social behaviors by Age								
In-person socialization (absolute level)	0.123	0.179	0.055	0.549	0.004	0.973	-0.058	0.579
Digital socialization (absolute level)	-0.073	0.515	-0.139	0.212	-0.050	0.686	-0.174	0.155
Parent support	0.196	0.650	-0.017	0.969	0.516	0.334	0.402	0.454
Social moderation of stress-related psychopathology	*Wave 1*				*Wave 2*			
	Internalizing		*Externalizing*		*Internalizing*		*Externalizing*	
Social behaviors	*β*	*p-value*	*β*	*p-value*	*β*	*p-value*	*β*	*p-value*
In-person socialization (absolute level)	-0.005	0.969	-0.126	0.310	0.002	0.987	0.032	0.814
Digital socialization (absolute level)	0.222	0.090	-0.143	0.284	-0.071	0.650	-0.049	0.747
Parent support	-0.243	0.493	-0.384	0.282	-0.049	0.909	0.367	0.391
Social behaviors by Age								
In-person socialization (absolute level)	0.329	0.061	0.108	0.552	0.264	0.198	0.335	0.086
Digital socialization (absolute level)	0.020	0.920	0.324	0.112	-0.066	0.803	0.335	0.158
Parent support	0.168	0.792	-0.825	0.209	0.318	0.728	-0.937	0.296

Note: all models examining symptoms as outcomes controlled for pre-pandemic symptoms. *Wave 1* refers to the assessment conducted at the start of the pandemic between April and May 2020, *Wave 2* refers to the assessment conducted six months later between November 2020 and January 2021; *β* = standardized coefficient; **Bold** denotes significant effect.

Table S4. Social experiences scores and comprising items

Social Factor	Items	Scoring	Cronbach's alpha (std.)
In-person socialization	How often do you see your friends in person throughout the week (1 item)?	*Items multiplied*	N/A
	How much time per day do you spend socializing with non-household members?		
Digital socialization	How often do you speak to your friends via phone call / text / social media (4 items)?	*Items averaged then multiplied*	pre: 0.82; post: 0.73
	How much time per day do you spend socializing with non-household members?		
Social isolation	How connected do you feel to your peers? (reverse)	*Items z-scored and averaged*	0.57
	How much do you miss your peers?		
	How lonely do you feel?		
Peer social support	I have a close friend I can tell problems to	*Sum score*	0.84
	I have a close friend who really understands me		
	I have a close friend who I can talk to about things that bother me		
	I don't have a close friend who I like to spend time with (reverse)		
	I don't have a close friend who really listens to what I say (reverse)		
	I don't have a close friend who cares about my feelings (reverse)		

Table S5. Descriptive statistics of variables

	Mean	*SD*	*Range*
Stressors			
Pandemic-related stress	2.203	1.631	0 - 8
Social factors			
Change in in-person socialization	-8.640	8.628	-34 - 20
Change in digital socialization	-0.281	6.985	-25.50 - 24
Peer isolation	3.439	0.747	1.08 - 5
Peer support	3.227	0.649	1 - 4
Psychopathology			
Pre-pandemic internalizing symptoms (CBCL)	54.491	9.895	33-80
Pre-pandemic externalizing symptoms (CBCL)	52.049	8.601	33-80
Internalizing symptoms (SDQ)	5.116	3.454	0-17
Externalizing symptoms (SDQ)	6.866	3.468	0-17
Internalizing symptoms at follow-up (SDQ)	5.514	3.599	0-14
Externalizing symptoms at follow-up (SDQ)	7.203	3.612	0-17

Note: SD = standard deviation; CBCL = Child behavioral checklist; SDQ = Strengths and difficulties questionnaire.

Table S6. Zero-order correlations between social factors

Table S6. Zero-order correlations between social factors of interest

Social Factors	1.	2.	3.	4.
1. Change in in-person socialization	-	0.437 ***	-0.149 *	0.016
2. Change in digital socialization	0.437 ***	-	-0.116	0.087
3. Peer isolation	-0.149 *	-0.116	-	-0.055
4. Peer support	0.016	0.087	-0.055	-

Note: Values represent pearson r values. All social factors measured during the pandemic
* $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$.

Table S7. FDR corrected p-values for all significant findings

Social behavior and psychopathology	*Wave 1*		*Wave 2*	
	Internalizing	Externalizing	Internalizing	Externalizing
Social behaviors	*p-value (FDR corr)*	*p-value (FDR corr)*	*p-value (FDR corr)*	*p-value (FDR corr)*
Change in in-person socialization	-	-	-	-
Change in digital socialization	-	-	-	-
Social isolation	**< 0.001**	**< 0.001**	**0.002**	**0.010**
Peer support	**< 0.001**	0.358	**0.014**	0.579
Social behaviors by Age				
Change in in-person socialization	-	-	-	-
Change in digital socialization	-	-	-	-
Social isolation	-	-	-	-
Peer support	0.073	0.104	-	-

Social moderation of stress-related psychopathology	*Wave 1*		*Wave 2*	
	Internalizing	Externalizing	Internalizing	Externalizing
Social behaviors	*p-value (FDR corr)*	*p-value (FDR corr)*	*p-value (FDR corr)*	*p-value (FDR corr)*
Change in in-person socialization	-	-	-	-
Change in digital socialization	-	-	0.068	0.180
Social isolation	**< 0.001**	**0.016**	-	-
Peer support	-	-	-	-
Social behaviors by Age				
Change in in-person socialization	**0.006**	0.680	-	-
Change in digital socialization	-	-	-	-
Social isolation	-	-	-	-
Peer support	-	-	-	-

Note: all models examining symptoms as outcomes controlled for pre-pandemic symptoms. *Wave 1* refers to the assessment conducted at the start of the pandemic between April and May 2020, Wave 2 refers to the assessment conducted six months later between November 2020 and January 2021; β = standardized coefficient; **Bold** denotes significant effect.