



Storm Clouds and Silver Linings: Day-to-Day Life in COVID-19 Lockdown and Emotional Health in Adolescent Girls

Jennifer S. Silk ¹ PhD, Lori N. Scott,² PhD, Emily A. Hutchinson,¹ BS, Celine Lu,¹ BS, Stefanie L. Sequeira ¹ MS, Kirsten M. P. McKone,¹ MS, Quyen B. Do,¹ BS and Cecile D. Ladouceur,² PhD

¹Department of Psychology, University of Pittsburgh, USA, and ²Department of Psychiatry, University of Pittsburgh, USA

All correspondence concerning this article should be addressed to Jennifer S. Silk, PhD, Department of Psychology, University of Pittsburgh, 210 S. Bouquet St., Pittsburgh, PA 15260, USA. E-mail: jss4@pitt.edu

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Abstract

Objective We examined risk and protective factors for emotional health problems in adolescent girls during the COVID-19 pandemic. We investigated pre- to early-pandemic changes in symptoms of anxiety and depression, documented daily activities and perceived positive and negative impacts of the pandemic, and linked perceived positive and negative impacts of the pandemic to real-time changes in emotional health. **Methods** The study was a 10-day daily diary study with 93 U.S. adolescent girls (aged 12–17; 68% White non-Hispanic) at temperamental risk for anxiety and depression, conducted in April/May 2020 when all participants were under state-issued stay-at-home orders. Girls provided daily reports of positive and negative affect, depressive and anxious symptoms, activities, and positive and negative impacts resulting from the pandemic. **Results** Girls reported engaging in many activities that may contribute to well-being. Mixed effects analyses revealed positive impacts associated with improved same-day emotional health such as more time for family and relaxation and reduced pressure from school/activities. Negative impacts associated with poorer same-day emotional health included problems with online schooling, lack of space/privacy, lack of a regular schedule, and family conflict. **Conclusion** Findings highlight the importance of providing in-person or quality online schooling, resources and space for learning, promoting daily routines, and spending time with teens while reducing family conflict. The pandemic also appears to have offered many girls a respite from the chronic stress of modern teen life, with time to relax and engage in creative and healthy pursuits showing benefits for daily emotional health, which should be considered following the return to normal life.

Key words: adolescents; anxiety; COVID-19; depression.

Introduction

The COVID-19 pandemic has resulted in unprecedented disruptions to daily life, with the potential to exacerbate a mental health crisis among adolescents (Loades et al., 2020). The years leading up to the pandemic witnessed alarming increases in depression and

anxiety in teens, especially girls (Kalb et al., 2019; Mojtabai et al., 2016). Early evidence suggests that symptoms of anxiety and depression in adolescents around the world increased beyond pre-pandemic levels during the early “lockdown” phase of the pandemic (March–June 2020), particularly among girls

(Breux et al., 2021; Hawes et al., 2021; Lorenzo et al., 2021; Magson et al., 2021), although the long-term course of symptoms is not yet clear (Breux et al., 2021). Gaining a better understanding of risk and protective factors for emotional health problems during this period may help researchers and practitioners identify key prevention and intervention targets for helping adolescent girls cope with acute stress and social isolation, and potentially to promote longer-term emotional health.

The changes to day-to-day life during the COVID-19 lockdown encompassed all of the major domains of adolescent functioning, including peer interactions, academics, family life, and recreation. As such, this early phase of the pandemic set up a “naturalistic experiment,” manipulating key variables implicated in adolescent emotional health, such as social connectedness and stress. This provides researchers with the opportunity to better understand how manipulations of these factors correspond to changes in emotional health, potentially contributing a better mechanistic understanding of the development of emotional health problems such as anxiety and depression in adolescent girls. Yet, all of these changes occurred simultaneously, making it difficult to disentangle how specific changes to daily life were related to emotional functioning. To address this challenge, we utilized a daily diary approach to investigate within-person changes in day-to-day emotional health during lockdown in relation to same-day positive and negative experiences resulting from the COVID-19 pandemic. Understanding the perceived benefits and negative consequences of the pandemic, and how these impacts were linked with emotional health in real time, may help to guide pediatric health practitioners, policymakers, and families through the remainder of the pandemic and inform responses to future crises and stressors.

Several early reports provide a preliminary window into the major concerns experienced by adolescents during this initial phase of the pandemic. Interestingly, these reports suggest that adolescents may have experienced relatively low levels of concern about the virus itself and/or its health and financial impacts, focusing more on problems related to social distancing orders and the resulting changes to daily life (Magson et al., 2021; Scott et al., 2021). The most prominent concern reported by many adolescents across sociodemographic groups was the dramatic reduction in live social interaction with peers (Cost et al., 2021; Magson et al., 2021; Tang et al., 2021). Researchers have theorized that this change would be detrimental to adolescent emotional health, given the critical importance of peer relationships for adolescent social development (Loades et al., 2020; Orben et al., 2020), especially for

girls (Rudolph, 2002). Consistent with these predictions, one study of Australian teens showed that not being able to see friends was the most distressing issue reported by adolescents and that feeling socially connected with peers protected against increases in depressive and anxious symptoms during the first few months of the pandemic (Magson et al., 2021).

Early reports also suggest that academic concerns were heightened early in the pandemic, when many academic milestones were canceled (i.e., college aptitude tests, classes, internships) and most schools rapidly transitioned to an online format without advanced preparation (Magson et al., 2021; Scott et al., 2021). These concerns were especially common among low-income families, with 36% of low-income parents reporting that their child could not complete homework due to lack of access to a computer at home, compared to 4% in high-income and 14% in middle-income families (Vogels et al., 2020). Studies have linked academic concerns and problems with online schooling to increases in depressive symptoms from pre- to early-pandemic levels among teens in the United States (Hawes et al., 2021) and Australia (Magson et al., 2021). Additionally, family conflict resulting from increased amounts of time confined together was reported as a top concern among Dutch adolescents (Janssen et al., 2020), and contributed to increases in symptoms of anxiety and depression from pre- to early-pandemic levels among Australian adolescents (Magson et al., 2021).

In addition to the negative effects of the pandemic, there could be silver linings for some teens, as reflected in reports that a sizable minority of adolescents experienced improvements in emotional health during the lockdown phase of the pandemic. For example, a recent study of Canadian teens revealed that although 40–46% reported feeling more depressed and anxious during the early phase of the pandemic, 20% reported feeling less depressed and 14% less anxious than before the pandemic (Cost et al., 2021). Similarly, in a study of Chinese adolescents, 21% reported being more satisfied with their lives during the early stages of the pandemic (Tang et al., 2021). Additionally, a study in the United States with a majority Hispanic/Latinx sample found that adolescents with elevated levels of mental health problems before the pandemic had a significant reduction in these problems 1 month after school closures brought on by COVID-19 (Penner et al., 2021).

There are several potential reasons why some adolescents might have fared better during this period. First, for youth experiencing peer victimization or other problems with peers, social distancing might provide a welcome respite (Hawes et al., 2021). Second, spending more time with family members

might contribute to teens feeling more supported and closer with family, which could have beneficial effects on emotional health. Indeed, adolescents in China reported benefits from home quarantine such as increased time available to spend with parents and on recreational and personal activities (Tang et al., 2021). A qualitative study of U.S. adolescents in urban high schools also revealed that these teens felt that having more time to spend with family and more free time was beneficial for their mental health (Rogers et al., 2021).

The cancelation of in-person classes and activities could also provide some youth with more leisure time to engage in relaxing or creative endeavors, along with reduced workload and pressure to achieve. This could have positive impacts on well-being, potentially countering negative effects of the modern “achievement culture,” in which pressure to excel is considered a top risk factor for adolescent mental health problems (Luthar et al., 2019; Robert Wood Johnson Foundation, 2018). Youth may also benefit from more time to attend to health and wellness, potentially getting more sleep and exercise or engaging in healthy eating routines and cooking. Aligning with these hypotheses, one study found that some Black teens in the United States adapted positively to COVID-19 changes by becoming more health conscious (Banks, 2021). However, little is known about how youth were actually spending their time during the pandemic, and no studies have empirically investigated whether perceived positive effects of the pandemic are temporally linked with improvements in emotional health.

To address these gaps, the present study used a daily diary approach to delineate risk and protective factors for emotional health in adolescent girls during the COVID-19 pandemic. Our first goal was to replicate previous findings showing an increase in symptoms of anxiety and depression during the early lockdown phase of the COVID-19 pandemic in the present sample of girls at high risk for emotional health problems. Our second goal was to better understand the day-to-day experience of the pandemic by documenting (a) how adolescent girls were spending their time during the lockdown and (b) what changes they perceived as having positive and negative impacts on their day-to-day life. The final goal was to determine which of these perceived negative and positive impacts were linked in real-time to changes in their emotional health, thus representing candidate risk and protective factors for emotional health during crisis. We expected that daily negative impacts related to online schooling, family conflict, and disruption to routines and social activities would emerge and would be linked with worse same-day mood and higher

symptoms of anxiety and depression. We also anticipated potential positive impacts, such as reduced academic pressures, increased time for relaxation, creativity, and wellness, and spending more time with family, that would predict better same-day mood and lower daily symptoms of anxiety and depression. We investigated these questions in a sample of U.S. adolescent girls enriched for risk for both anxiety and depression as a function of shy or fearful temperament (Hayward et al., 1998). Most existing research on adolescent mental health during the pandemic has utilized community samples; focusing on a sample of girls at higher risk for emotional health problems increased the potential for variability in day-to-day emotional functioning, enhancing our ability to detect predictors of this variability. Focusing on a high-risk sample also allowed us to generate insights on risk and protective factors during the pandemic that are applicable to those girls at the highest risk for emotional health problems during and following the crisis.

Methods

Participants and Procedures

Participants were 93 girls aged 12–17 ($M = 15.06$, $SD = 1.21$; see Table I for additional demographic information) recruited from a longitudinal study on the development of internalizing disorders in a U.S. Midwestern city. Approximately two-thirds of the sample (63%) were previously identified as at-risk for internalizing disorders based on shy and/or fearful temperament as determined by the Early Adolescent Temperament Questionnaire-Revised (EATQ-R; Ellis & Rothbart, 2001). Girls were excluded from the larger study if they met criteria for current or past anxiety (except specific phobia), depressive, psychotic, or autism spectrum disorder at the beginning of the study. Girls reported on depressive symptoms using the Mood and Feelings Questionnaire (MFQ; Angold et al., 1995) and anxiety symptoms using the Screen for Childhood Anxiety Related Disorders (SCARED; Birmaher et al., 1997) at baseline and every 6 months across the 3 years of the larger study. The MFQ and SCARED have been shown to be reliable and valid tools for assessing severity of anxiety and depression in children and adolescents (Angold et al., 1995; Birmaher et al., 1997).

All participants in the larger study who consented to be contacted about future studies ($N = 113$) were invited to participate in a COVID-19 follow-up assessment in April/May 2020, which ranged from 16 to 52 months (median = 32 months) from the baseline assessment and was approximately 1 month after the first COVID-19 case was identified in the local area. During this period, the families in our state had

Table I. Participant Demographic and Clinical Characteristics

Variables	M (SD) or Count (%)
Demographic variables	
Age	15.06 (1.21)
Race	
White, non-Hispanic	64 (68.8%)
Black, non-Hispanic	16 (17.2%)
Asian	2 (2.2%)
Biracial	8 (8.6%)
Black/African American and American Indian	1 (1.1%)
White and Black/African American and American Indian	1 (1.1%)
Approximate family total income	\$107,859.15 (\$60,554.41)
Current SCARED	18.20 (12.66)
Pre-pandemic average SCARED	14.44 (9.14)
Current MFQ	12.53 (9.05)
Pre-pandemic average MFQ	9.20 (6.73)
COVID-19 health and financial impacts	
Know anyone who tested positive	21 (22.6%)
Self-quarantined due to exposure	6 (6.5%)
Parental job or income loss	7 (7.5%)
Halted activities since the pandemic	
In-person contact with family inside the home	6 (6.5%)
In-person contact with family who live outside the home	63 (67.7%)
In-person contact with friends indoors	73 (78.5%)
In-person contact with friends outdoors	63 (67.7%)
Family travel	87 (93.5%)
Family activities in outdoor spaces (e.g., beaches, parks)	57 (61.3%)
Family activities in public spaces (e.g., museums, theaters)	82 (88.2%)
Going to restaurants or stores	53 (57.0%)
Indoor exercise and/or recreational sports	51 (54.8%)
In-person events in the community	78 (83.9%)
In-person religious services	68 (73.1%)

Note. MFQ = Mood and Feelings Questionnaire; SCARED = Screen for Childhood Anxiety Related Disorders. Participants' parents reported on race and income information at the start of the larger longitudinal study.

been ordered not to leave the home except for essential life-sustaining purposes and to practice “social distancing” measures limiting social interactions outside of the household. All school buildings were closed, with instructional activities suspended or continuing online-only. Participants who had moved outside of the study’s metropolitan region ($n=2$) were required to be under similar stay-at-home orders to be included. Data collection were completed just before the death of George Floyd and the subsequent Black Lives Matter protests in the summer of 2020, so findings were not influenced by the effects of these sociopolitical movements on adolescents’ emotional health.

Participants provided online consent/assent in accordance with the university’s Human Research Protection Office and completed the MFQ, SCARED, and a 24-item version of the COVID-19 Adolescent Symptom & Psychological Experience Questionnaire (CASPE; Ladouceur, 2020). The short version of the CASPE was developed for the present study to obtain descriptive information about adolescents’ experiences related to the COVID-19 pandemic over the past 2 weeks. Girls subsequently completed a daily diary survey for 10 consecutive

days. An online link to the survey was texted and emailed to participants at 7 p.m. each evening. Participants completed an average of 88% of daily diaries.

Daily Diary Items

Participants rated their mood each day on a 0–100 sliding scale, along five negative emotions (sad, worried, stressed, mad, lonely) and five positive emotions (happy, joyful, interested, excited, hopeful), which were averaged to create indices of daily negative affect (NA, $\omega_{\text{within-person}} = .66$, $\omega_{\text{between-person}} = .93$) and positive affect (PA, $\omega_{\text{within-person}} = .77$, $\omega_{\text{between-person}} = .92$). Participants also reported on daily depressive symptoms using six items from the Patient Health Questionnaire-9 (PHQ-9) (Allgaier et al., 2012) assessing anhedonia, sad mood, fatigue, guilt, trouble concentrating, and psychomotor agitation/retardation ($\omega_{\text{within-person}} = .68$, $\omega_{\text{between-person}} = .90$). Anxious symptoms were assessed using the General Anxiety Disorder-7 (GAD-7) items (Spitzer et al., 2006), which probe worry, nervousness, fear, restlessness, and irritability ($\omega_{\text{within-person}} = .73$, $\omega_{\text{between-person}} = .95$). The GAD-7 has been validated for use with adolescents (Mossman et al., 2017). The response scale for the

Table II. Activities Endorsed During the 10-Day Daily Diary Period

Activity	Percentage of days (SD)	Percentage of participants who endorsed the activity at least once
TV/Netflix/YouTube or other screen-based entertainment	76.4% (25.7%)	98.90%
Texting/communicating with friends	76.4% (27.2%)	96.80%
Social media	76.1% (29.4%)	94.60%
Family time	68.1% (29.4%)	95.70%
Listening to music	59.5% (30.4%)	96.80%
Creative hobbies (e.g., art projects, making music)	36.5% (35.0%)	73.10%
Chores	35.4% (31.3%)	80.60%
Video games	29.8% (37.4%)	51.60%
Reading/writing	24.6% (29.7%)	61.30%
Cooking/baking	21.6% (24.8%)	65.60%
Childcare	4.8% (14.4%)	14.00%
		Median (range)
Physical activity		15–30 min (none–more than 5 hr)
Schoolwork (online classes and homework)		30 min–2 hr (none–more than 10 hr)
		Mean (SD)
Sleep duration		8.73 hr (1.18)

GAD-7 and PHQ-9 were adapted for daily diary by asking participants to rate the extent to which they experienced each depressive or anxious symptom that day on a 0–100 sliding scale. Participants also reported what activities they engaged in that day using a checklist (Table II). Negative impacts were assessed with the item: “What issues, worries, or changes resulting from the COVID-19 outbreak have been a problem for you today?,” followed by a list of 17 potential negative impacts including problems related to school, social life, health, and finances (Table II). Positive impacts were assessed with the item: “What changes resulting from social distancing measures have had a positive impact on you today?,” followed by a list of 12 potential positive impacts related to stress reduction, free time, family, and well-being (Table III).

Analytic Plan

Changes in depressive and anxious symptoms from prior to the pandemic were assessed using paired samples *t*-tests comparing MFQ and SCARED scores during the pandemic with the average of girls’ scores across all available previous assessment points ($M = 4.80$ assessments). Descriptive data on day-to-day activities and impacts were calculated as percentages of days on which each activity or impact was reported across participants, and percentage of participants who reported each activity and impact across the 10 days. To examine within-person and between-person effects of daily positive and negative impacts on emotional health during the pandemic, we conducted multilevel fixed effects models using Bayesian estimation with default (i.e., non-informative) priors in Mplus v8.4 (Muthén & Muthén, 2017), with four dependent variables (daily PA, NA, anxious symptoms, depressive symptoms) estimated simultaneously to reduce the number of tests run (see Table IV).

Models controlled for risk status and weekday versus weekend effects. Bayes estimation has several benefits over maximum likelihood methods in multilevel models, including the ability to obtain standardized point estimates for fixed effects at the within- and between-person levels, improved performance with non-normal data and small samples, more stable parameter estimates, and improved convergence (Ozechowski, 2014). Separate models were run for positive and negative impacts, which were automatically decomposed into within- and between-person variance using latent mean centering. Within-person effects can be interpreted as within-person changes on a daily basis relative to one’s own average levels, and between-person effects are interpreted as associations averaged across time relative to the sample means.

Results

Changes in Symptoms From Pre-Pandemic to Lockdown

Paired samples *t*-tests indicated that on average, girls experienced an increase in both anxious ($t = 3.55$, $p < .001$, Cohen’s $d = 0.37$) and depressive symptoms ($t = 4.28$, $p < .001$, Cohen’s $d = 0.44$) during the pandemic, although high between-person variability was noted in symptom scores (see Table I).

Day-to-Day Activities During Lockdown

Activities during the pandemic are shown in Table II, which reveals that on the majority of days girls were spending time with family (68%), engaging in screen-based entertainment (76%), listening to music (60%), using social media (76%), and text messaging (76%). Girls were also engaging in creative hobbies on many days (37%), reading or writing (25%), doing household chores (35%), and cooking (22%). Girls reported

Table III. Mean Percentage of Negative and Positive Impact Items Endorsed Out of Total Diaries Completed for Each Participant and Percentage of Participants Who Endorsed Items Across all Diaries

		% days reported (SD)	% (n) of participants who endorsed item
Negative impacts	Not seeing friends in person	57% (33)	93.5% (87)
	Not being able to go to school	48% (34)	81.7% (76)
	Not enough to do while stuck at home	44% (32)	88.2% (82)
	Worried about my academic future (i.e., falling behind, AP classes, college admissions)	30% (33)	64.5% (60)
	Not being able to go to stores, the gym, or other places	28% (33)	64.5% (60)
	Difficulties with online schooling (i.e., trouble learning or concentrating)	24% (27)	64.5% (60)
	Increased fighting or irritation with family members	22% (28)	55.9% (52)
	Increased stress or disorientation from not having a schedule	21% (29)	51.6% (48)
	Not enough privacy or space in my house	21% (31)	49.5% (46)
	Increased responsibility around the house (i.e., cleaning, caring for siblings)	19% (26)	49.5% (46)
	Worried about the effects of the virus on the world	19% (28)	48.4% (45)
	An event or activity I was looking forward to was canceled	14% (22)	53.8% (50)
	Worried about catching the virus or someone I love catching the virus	10% (20)	35.5% (33)
	Worried about my family's finances or employment	06% (13)	24.7% (23)
	Do not have access to things that I need (i.e. food, products)	05% (14)	17.2% (16)
	Positive impacts	Worried about my finances or employment	04% (13)
I or someone I love already has the virus		02% (11)	8.6% (8)
More time to relax		70% (28)	95.7% (89)
Getting to watch more TV/movies		53% (33)	90.3% (84)
Getting more sleep		53% (34)	87.1% (81)
Spend more time with family		52% (34)	89.2% (83)
Getting more recreational time on the phone/computer (texting, social media)		51% (36)	86.0% (80)
Getting to do things I do not usually have time for (i.e. art, music, writing, cooking)		48% (33)	83.9% (78)
Reduced amount of schoolwork or no schoolwork		44% (34)	79.6% (74)
More time to exercise or go outside		42% (35)	76.3% (71)
Less stress/pressure from school and activities		38% (33)	78.5% (73)
Spending more time with my pet(s)		37% (38)	63.4% (59)
Feeling like I have more control in creating my own schedule		24% (30)	66.7% (62)
Not having to have unwanted interactions with other kids at school		19% (28)	48.4% (45)

Note. AP = advanced placement.

getting a median of 15–30 min of exercise per day, a mean of 8.73 hr of sleep, and spending a relatively small amount of time engaged in online classes or homework (median = 30 min to 2 hr).

Perceived Positive and Negative Impacts

Daily positive and negative impacts are reported in Table III. The negative impacts reported on the highest number of days were not being able to see friends in person (57%), not having enough to do (44%), not being able to go to school (48%) and other places (28%), being worried about my

academic future (30%), difficulties with online schooling (24%), not enough privacy/space (21%), and increased fighting or irritation with family members (22%). Positive impacts reported on the highest number of days included more time to relax (70%), spending more time with family (52%), more recreational time for creative pursuits (48%) and screen time (television/movies 53%, computer/phone 51%), more sleep (53%), more time for exercise/going outside (42%), reduced amount of schoolwork (44%), and less academic/extracurricular pressure (38%).

Table IV. Within-Person Effects from Multilevel Models Predicting Daily Emotional Health from Daily Positive and Negative Impacts

Model	Predictors	Dependent variable				
		PA	NA	Anxiety	Depression	
Negative impacts	An event or activity I was looking forward to was canceled	.08 (.03)*	-.01 (.03)	.01 (.04)	-.01 (.03)	
	Not being able to go to school	.04 (.04)	-.06 (.04)	.00 (.04)	-.01 (.04)	
	Worried about my academic future (i.e., falling behind, AP classes, college admissions)	-.06 (.04)	.01 (.04)	-.01 (.04)	-.04 (.04)	
	Worried about my finances or employment	.04 (.04)	-.04 (.04)	-.01 (.04)	.02 (.04)	
	Worried about my family's finances or employment	.01 (.03)	.06 (.04)	.05 (.04)	.04 (.04)	
	Difficulties with online schooling (i.e., trouble learning or concentrating)	.02 (.04)	.12 (.04)*	.10 (.04)*	.12 (.04)*	
	Not enough to do while stuck at home	.02 (.04)	-.03 (.04)	.02 (.04)	.00 (.04)	
	Not seeing friends in person	-.11 (.04)*	.00 (.04)	-.03 (.04)	.03 (.04)	
	Increased fighting or irritation with family members	-.06 (.04)	.12 (.04)*	.05 (.04)	.06 (.04)	
	Do not have access to things that I need (i.e., food, products)	-.08 (.04)*	.00 (.04)	-.05 (.04)	-.04 (.04)	
	Not enough privacy or space in my house	-.01 (.04)	.11 (.04)*	.07 (.04)	.09 (.04)*	
	Worrying about catching the virus or someone I love catching the virus	-.01 (.04)	-.03 (.04)	.06 (.04)	.02 (.04)	
	I or someone I love already has the virus	.06 (.04)	.00 (.04)	-.03 (.04)	-.04 (.04)	
	Worried about the effects of the virus on the world	.05 (.04)	-.02 (.04)	.01 (.04)	-.05 (.04)	
	Not being able to go to stores, the gym, or other places (text box for where)	.05 (.04)	.00 (.04)	-.03 (.04)	-.04 (.04)	
	Increased stress or disorientation from not having a schedule	-.05 (.04)*	.08 (.04)*	.10 (.04)*	.13 (.04)*	
	Increased responsibility around the house (i.e., cleaning, caring for siblings)	.08 (.04)*	.05 (.04)	-.01 (.04)	.03 (.03)	
	Positive impacts	Reduced amount of schoolwork or no schoolwork	.05 (.04)	.00 (.04)	-.02 (.04)	-.01 (.04)
		Less stress/pressure from school and activities	-.01 (.04)	-.08 (.04)*	-.03 (.04)	-.07 (.04)
		More time to relax	-.02 (.04)	-.19 (.04)*	-.14 (.04)*	-.09 (.04)*
Getting to do things I do not usually have time for (i.e., art, music, writing, cooking)		.06 (.04)	-.02 (.04)	.00 (.04)	-.05 (.04)	
Getting more recreational time on the phone/computer (texting, social media)		.01 (.04)	.00 (.04)	.06 (.05)	.08 (.05)	
Getting to watch more TV/movies		-.05 (.04)	.08 (.04)	.02 (.05)	.04 (.04)	
More time to exercise or go outside		.06 (.04)	-.05 (.04)	-.07 (.04)	-.11 (.04)*	
Getting more sleep		-.00 (.04)	.07 (.04)	-.05 (.04)	-.01 (.04)	
Spend more time with family		.14 (.04)*	-.09 (.05)*	-.04 (.05)	-.02 (.04)	
Spend more time with my pet(s)		-.03 (.05)	-.01 (.05)	.04 (.04)	-.04 (.04)	
Not having to have unwanted interactions with other kids at school	-.04 (.04)	.08 (.04)*	.07 (.04)	.01 (.04)		
Feeling like I have more control in creating my own schedule	.03 (.04)	-.11 (.04)*	-.04 (.04)	-.02 (.04)		

Note. AP = advanced placement; NA = negative affect; PA = positive affect. All estimates are standardized; standard deviations are in parentheses.

* $p < .05$ based on 95% credibility intervals that do not include zero (exact p -values for two-tailed significance tests are not available with Bayes estimation in Mplus).

Positive and Negative Impacts and Daily Emotional Health

Negative Impacts

At the between-person level, girls who reported family conflict on more days also reported higher depressive

symptoms across the 10 days (standardized est. = .39, SD = 0.16, $p = <.05$), with no other significant between-person effects. At the within-person level, daily problems with online schooling were associated with same-day increases (relative to one's average

levels) in NA, depressive, and anxious symptoms. Disorientation due to not having a regular schedule was also associated with same-day increases in depressive and anxious symptoms as well as decreases in PA and increases in NA, while lack of space/privacy was associated with same-day increases in both NA and depressive symptoms. Girls also reported more NA on days when they experienced more family conflict relative to their average levels of family conflict. PA was lower on days when girls reported having increased responsibility around the house, lacked access to things that they needed, or were unable to see their friends. Unexpectedly, PA was higher on days when an event or activity was canceled.

Positive Impacts

At the between-person level, girls who more frequently reported having time to spend with family as a positive impact also reported more PA on average across the 10 days (standardized est. = .31, SD = 0.14, $p = <.05$), with no other significant between-person effects. At the within-person level, more time to spend with family was also associated with same-day increases in PA and decreases in NA. Having more time to relax was associated with lower same-day levels of NA, depressive, and anxious symptoms. Lower levels of NA were also reported on days when girls reported feeling less stress or pressure from school and activities, having more control over their schedule, and not having to have unwanted interactions with other kids at school. Finally, lower levels of depressive symptoms were reported on days when girls reported having more time to exercise or go outside.

Discussion

The COVID-19 pandemic provides an unprecedented window into potential mechanistic processes in the development of emotional disorders in adolescent girls during times of acute stress and social disruption. Consistent with other recent reports (Breux et al., 2021; Hawes et al., 2021; Lorenzo et al., 2021; Magson et al., 2021), the girls in our study showed an increase in anxious and depressive symptoms during the lockdown months of the spring of 2020. Yet, also consistent with recent reports, there was significant variability in emotional functioning during the pandemic and girls perceived the changes brought about by the pandemic to have had both positive and negative effects on their lives (Cost et al., 2021; Tang et al., 2021). This study is the first that we are aware of to report on these impacts at the day-to-day level, revealing potential risk and protective factors for daily emotional health. Findings point to the critical potential of family relationships to promote or tax emotional health during this time of stress and reveal online

schooling and related space and privacy concerns as a major stressor on emotional health. In contrast, increased free time and reduced pressures emerged as key factors in improved emotional health during the pandemic. These results may help to inform decisions for the remainder of the pandemic—and any future crises—and provide insights into how to attenuate the current mental health crisis among teens when life returns to “normal.”

This was also the first investigation that we are aware of to investigate how adolescents spent their time during the lockdown phase of the pandemic. It was notable that adolescent girls reported spending time in activities that they typically do not have time for (Wight et al., 2009). These included creative and artistic pursuits, spending time with the family, helping out with cooking and chores, exercising most days, and sleeping nearly 9 hr a night on average, which is within the 8- to 10-hr range recommended for adolescents by the American Academy of Pediatrics (Paruthi et al., 2016). These activities are known to contribute to adolescents’ physical and emotional well-being (Patton et al., 2016; Robert Wood Johnson Foundation, 2018). In contrast, adolescents were spending less than 2 hr per day engaged in schoolwork (including online class time and homework), which is markedly less than during the normal school year (Wight et al., 2009). This finding is likely attributable to challenges experienced by schools in implementing online schooling during the initial phase of the pandemic. Developmentalists and clinicians have expressed concerns that today’s adolescents are receiving insufficient sleep (Zhang et al., 2017) and are overextended, with excessive pressure to excel in numerous academic and extracurricular activities (Luthar et al., 2019; Robert Wood Johnson Foundation, 2018). These findings show that when overscheduling was suddenly put on hold due to the pandemic, adolescents engaged in activities and self-care routines that are healthy for them.

Importantly, girls perceived notable positive effects of having more time to relax, which was endorsed at least once by 96% of girls, and was associated with reductions in daily NA, anxiety, and depressive symptoms. Feeling less pressure from school and activities and having more control over one’s schedule were also associated with lower same-day NA. Having more time to exercise and go outside were associated with lower same-day symptoms of depression, consistent with a study of Chinese adolescents that reported a link between average physical activity and depressive symptoms (Chen et al., 2020). Moreover, physical activity is a form of behavioral activation that can help break the “vicious” cycle of depression detailed by cognitive-behavioral models of anxiety (Beck, 2011). Depression is often associated with low energy and

low motivation, contributing to low activity levels. Low activity levels can then lead to negative thoughts, such as thoughts that one is lazy and ineffective, reinforcing the depression. Increases in physical activity may break this cycle and contribute to lower depressive symptoms through effects on one's thoughts (e.g., challenging lazy and ineffective beliefs) and physiology (e.g., changes in neurotransmitters that can increase arousal).

These results also suggest that finding ways to reduce school and achievement-related pressures and offer adolescent girls more agency and flexibility in managing their time is likely beneficial for their emotional health. The pandemic resulted in a dramatic and sudden reduction in academic and extracurricular demands on teens that appears to have been a silver lining for many adolescent girls. Interestingly, 65% of girls still worried about their academic future, consistent with the academic stress theme identified in Rogers et al.'s (2021) qualitative interviews of U.S. students during the pandemic. Educators and parents should explore ways to maintain time for girls to relax, go outside, and reduce school- and activity-related stress following the pandemic. It is also important to acknowledge that the experience of "free time" during the pandemic may differ dramatically for girls from lower socioeconomic status families not well-represented in our study. These youth may have been working or taking care of other family members to help manage financial and health stressors brought about by the pandemic and may not have experienced the reductions in pressure and increases in leisure time reported here. Future research is needed to better understand how these differences might affect mental health disparities during the pandemic.

Despite the benefits of free time, the absence of an organized schedule was also a contributor to anxiety for many girls, pointing to the value of parents helping teens to establish a regular routine. Problems with online schooling, such as technological issues and difficulty learning in the online format, as well as problems finding sufficiently private space, were associated with relatively higher same-day NA and depressive symptoms, with online learning problems also associated with increases in same-day anxious symptoms. These findings converge with both qualitative and quantitative studies in the United States and Australia highlighting online schooling as a major concern for adolescents in lockdown that was associated with increases in depressive symptoms from pre-pandemic levels (Hawes et al., 2021; Magson et al., 2021; Scott et al., 2021). It is important to note that these problems are likely to disproportionately impact families with fewer resources (Ravens-Sieberer et al., 2021), which could contribute to disparities in mental health. These findings highlight the critical need for

funding and support to facilitate the safe return to in-person school for students who still remain remote and the need for better resources to implement online schooling more successfully in the future. Results also call into question current discussions among many school districts about utilizing remote schooling more regularly in the future, such as replacing snow days with online learning. Additionally, families may wish to consider these negative effects of school closure on adolescent girls' mental health in considering whether or not to vaccinate their children, as at the time of this writing only 30% of eligible American teens were vaccinated (Centers for Disease Control and Prevention, 2021), leading to the possibility of ongoing school closures in the current academic year.

Consistent with the primacy of peer relationships during adolescence and other recent reports (Cost et al., 2021; Magson et al., 2021; Tang et al., 2021), not getting to see friends in person was the most commonly reported negative daily impact. This concern was associated with lower daily PA but was not systematically associated with NA or symptoms of psychopathology, perhaps because youth found alternative ways to stay connected with their peers through digital technologies. In contrast, family relationships had a more pronounced association with emotional health at both the within- and between-person levels, highlighting the critical role of the family context during times of stress. In the only between-person effects to emerge in the study, girls who reported fighting or irritation with family members on more days had more depressive symptoms on average, and girls who reported that they enjoyed spending more time with family had higher PA on average across the 10-day diary period. Similarly, at the within-person level, increases in daily family fights or irritation were temporally associated with increases in same-day NA, whereas spending more time with family was associated with increases in same-day PA. These findings are consistent with work in Dutch and Australian teens on the importance of family relationships during the pandemic (Janssen et al., 2020; Magson et al., 2021) and suggest that despite the focus on peer relationships during adolescence, the quality of family relationships remains critical for adolescent emotional health. Family relationships may be especially important during the pandemic, when most families are spending more time together than ever before. It should be noted, however, that there are likely bidirectional relationships, such that families may be more negative toward adolescents when they display higher NA and lower PA.

Finally, there was a reduction in NA on days when girls reported feeling more relief from not having unwanted interactions with other youth at school. This is consistent with Hawes et al.'s (2021) finding

that U.S. teens who reported high levels of home confinement experienced decreases in social anxiety compared to pre-pandemic scores. As the majority of girls in this sample were at risk for social anxiety based on shy/fearful temperament, it is likely that many were experiencing short-term relief from the temporary removal of social stressors. However, these girls may be at risk for increases in anxiety during the return to school. It will be important to disentangle both the short-term and long-term effects of social avoidance on anxiety during and after the pandemic.

Several limitations of the present study are important to note. First, as the study was conducted early in the pandemic when rates of virus transmission in the local area were relatively low, negative impacts primarily focused on disruptions in daily life associated with social distancing rather than the effects of the illness itself. This is, however, consistent with a study from the Netherlands in which parents tended to report concerns specific to the virus while teens did not (Janssen et al., 2020), as well as qualitative research indicating that virus-specific concerns were less commonly nominated by U.S. teens in lockdown compared to concerns about daily life (Scott et al., 2021). It is also important to note that there were few socioeconomically disadvantaged families in this study and financial impacts related to the pandemic were limited, prohibiting our ability to evaluate the influence of financial stressors during the pandemic. The sample also included girls at high risk for anxiety and depression, thus findings may not generalize to lower-risk girls. We were not able to compare findings with boys given that the larger study included girls only (based on their heightened risk for anxiety and depression), but it would be important for future research to examine whether similar risk and protective factors for emotional health during COVID-19 appear to be operating in boys. Additionally, the majority of participants were White, and findings may not generalize to more diverse populations who may have experienced more adverse impacts on health or finances. Finally, as we did not have comparable pre-pandemic data on daily stressors and positive impacts, it is not possible from the present data to disentangle the extent to which the factors linked to daily emotional health identified here are unique to the pandemic context or would be similarly related to daily emotional health in the context of other stressors or “normal life.”

Despite these limitations, the study took advantage of a naturalistic experiment created by the COVID-19 pandemic to reveal how dramatic changes in adolescents’ day-to-day lives covaried in time with their emotional health. We utilized ecologically valid daily diary methods to examine near-term predictors of day-to-day changes in mood and symptoms. Findings suggest that policymakers, families, and communities

should prioritize providing in-person or quality online schooling, facilitating technological resources and space for learning, promoting daily routines, and spending time with their teens while striving to reduce conflict. Pediatricians may also find it useful to convey the significant mental health impacts of school disruption noted here to families as an important factor to consider in making decisions regarding whether or not to vaccinate adolescents. Findings also highlight the importance of developing strategies to promote better long-term emotional health in adolescent girls by carving out ways for them to maintain unstructured time and family time, as well as by reducing pressure related to academic and extracurricular achievement. Although the COVID-19 pandemic has had devastating consequences for many families across the world, it also appears to have offered many adolescent girls a respite from the chronic stress associated with modern teen life. It is critical that researchers, educators, families, health practitioners, and policymakers consider lessons learned from this experience that may help to attenuate the adolescent mental health crisis in the future.

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Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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