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Adolescence during a Pandemic: Examining US Adolescents' Time Use and Family and Peer Relationships during COVID-19

Laura Wray-Lake ^{1,*}, Sara Wilf ¹, Jin Yao Kwan ² and Benjamin Oosterhoff ³

¹ Department of Social Welfare, University of California Los Angeles, Los Angeles, CA 90095, USA; sarabwilf@gmail.com

² Graduate School of Social Work, University of Denver, Denver, CO 80208, USA; jinyao.kwan@du.edu

³ Department of Psychology, Montana State University, Bozeman, MT 59717, USA; benjamin.oosterhoff@montana.edu

* Correspondence: wraylake@luskin.ucla.edu

Abstract: Adolescents' time use during COVID-19 offers insight into their lived experiences in unprecedented times. Using a person-centered approach, we describe profiles of time use and examine demographics, parent support, and friend support as predictors of time use. Among 555 U.S. adolescents, we identified three latent profiles across 14 daily activities. Education-Focused youth were more likely to be gender non-binary, Latinx, or Asian, and had higher parental education, higher parent support, and lower friend support. High Media Users were more likely to be female or gender non-binary, LGBTQ-identifying, Latinx, or Asian, and had lower parent and higher friend support. Work-Focused youth were more likely to be older and spent in-person time with friends. Implications include strengthening relational supports, and reconsidering the risks and benefits of different types of time use during this historical moment.

Keywords: pandemic; social media; friendships; parent-adolescent relationships; leisure activities



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1. Introduction

Adolescents' daily lives were abruptly upended during the COVID-19 global pandemic. In mid-March 2020, U.S. adolescents shifted to learning remotely and upended their typical lives and routines. Numerous contexts known to shape adolescent development, such as school- and community-based resources and relationships, drastically changed or became non-existent. Shrinking access to developmental opportunities raises the question of how adolescents chose to spend their time during a period of societal upheaval. Adolescents' gender, race/ethnicity, socioeconomic status (SES), and sexual orientation likely shape experiences of the pandemic [1] and patterns of time use. As adolescents spent more time at home and families experienced economic and psychosocial pandemic stressors, family conflict likely increased [2], and family relationships—whether conflictual or supportive—were likely salient during the pandemic. Peer interactions likely shifted to virtual spaces, which may have altered adolescents' time use.

This study had two specific aims: to examine variability in U.S. adolescents' time use during the 2020 summer of COVID-19, and to explore demographic and relational differences in time use. Using latent profile analysis (LPA) with a non-representative national sample of 555 adolescents, we described patterns of daily activities during the COVID-19 pandemic. We examined variation in patterns by gender, race/ethnicity, SES, sexual orientation, parent support and conflict, and friend support. This study is largely descriptive, and contributes to the literature by offering deeper understanding of the variability in adolescents' experiences during the COVID-19 pandemic, a unique moment in history.

2. Theoretical Framework

This study was informed by several tenets of relational developmental systems (RDS) theory [3,4]. First, RDS prioritizes heterogeneity in development, i.e., that young people have different developmental experiences. Similarly, this study examined heterogeneity in adolescents' time use using a latent profile approach, and further explored heterogeneity through understanding how time use profiles differ by adolescents' demographic backgrounds. Second, RDS theory recognizes the importance of situating development in larger social, political, and historical contexts. Adolescent researchers do not often consider these broader societal contexts, and this study adds to the literature by examining adolescents' time use in the particular sociohistorical moment of a COVID-19 surge in the U.S. in summer 2020. Third, RDS views individuals' interactions with proximal contexts of everyday life as fundamental to development. Family and peers are key proximal contexts in adolescents' lives, and we examined how adolescents' relationships with their family and peers relate to choices about time use during the pandemic.

3. Adolescents' Time Use

Adolescents' time use is important from a research and applied perspective due to well-established links between adolescents' daily activities and health and well-being [5,6]. Adolescents' time in leisure activities provides insight into positive youth development, as certain activities build skills or facilitate learning, and promote health, positive social relationships, and civic engagement [7,8]. Social media use is important to consider, as adolescents are spending larger amounts of time on screens and in virtual spaces [9]. Person-centered methods are ideal for capturing systematic variation in adolescents' activity choices [10]. Adolescents' time use profiles show that they differentially engage in sports or civic activities, sedentary time, media use, work, school, and health behaviors [11–13].

The dramatic societal changes due to COVID-19 merit a new look at adolescents' time use. During the summer, when adolescents' time may be less structured, physical activity decreases and screen time increases [14]. Adolescents' time use during COVID-19 likely departed from how adolescents spent time pre-COVID-19 in key ways. Other major events, such as the Black Lives Matter movement resurgence sparked by the murder of George Floyd by police and the 2020 election, may have compounded adolescents' stressors and shaped daily activities. Examining time use can help us to understand adolescents' daily life experiences during the pandemic and different ways in which adolescents coped with the changes brought on by this crisis. Our study focused on adolescents' time spent in various leisure and social pursuits, spanning media use, civic activity, work, self-improvement, and time with friends and family.

Adolescents have unique developmental experiences based on gender, race/ethnicity, SES, and sexual orientation. People of color and low-income families experienced disproportionate impacts of COVID-19, including higher rates of infection and death, greater involvement in essential work that brings heightened health risks, and greater income loss and labor market precarity [15]. In summer 2020, the dual pandemics of COVID-19 and systemic racism intersected to disproportionately impact adolescents of color and their communities, laying bare race-based structural inequalities in many sectors of society [16]. Under stay-at-home orders, lesbian, gay, bisexual, transgender, queer, and gender non-conforming (LGBTQ) adolescents experienced heightened risk for social isolation and victimization at home [1]. Considering demographic differences in time use can offer knowledge of how marginalized groups of adolescents experienced the COVID-19 pandemic. Below, we briefly review five major domains of leisure time for adolescents—media use, civic engagement, work, self-improvement, and time with family and friends. This broad review helps set the stage for our empirical analysis of adolescents' time use during the COVID-19 pandemic by considering why these aspects of time use are important and contextualizing these activities during the pandemic. We also consider any potential demographic differences in time use to inform our analysis of demographic predictors of adolescents' patterns of time use.

3.1. Media Use

Adolescents' media use includes watching television, playing video games, and using social media. In 2019, a nationally representative U.S. sample of adolescents reported 7.5 h of screen time daily on average, outside of schoolwork [17]. Negative health consequences of adolescents' high media use include depressive symptoms, poor sleep, low self-esteem, and heightened substance use [18]. Increased social media usage during COVID-19 has been linked to higher adolescent depression [19]. Yet, during COVID-19, social media was, for many, an essential outlet for social connection, information about COVID-19 and other issues, and opportunities to make civic contributions [20]. In some cases, social media use can have positive associations with adolescents' mental health, peer relationships, and civic contributions [21]. Adolescents may participate in media use in distinct ways. Girls, as well as Black and Latinx adolescents, spend more time on social media than their counterparts [22,23], and LGBTQ adolescents may turn to social media for social support [24]. Adolescents from lower-SES backgrounds may have less consistent internet or device access or engage online differently [25].

3.2. Civic Engagement

According to positive youth development (PYD) theory, adolescents' contributions to community and society are indicators of thriving [3]. During COVID-19, adolescents may help neighbors, follow current events, or take online political action related to current sociopolitical issues; national disasters and major events often stimulate adolescents' civic actions. Girls may engage in more helping, whereas boys report more political action in some studies [26]. Adolescents from higher-SES backgrounds tend to participate more in helping and political activities, yet findings are mixed regarding racial and ethnic differences [27]. Summer 2020 brought increased protests of racial injustice in response to police violence against Black bodies, and adolescents of color may have participated in more online political action compared to others. Adolescents of color, non-binary, and LGBTQ backgrounds may participate in political action to cope with and resist marginalization [28].

3.3. Adolescents' Work

Historically, around half of U.S. adolescents spent their summers working paid jobs, although this proportion declined to less than 35% in 2018 due to the economic recession [29]. Employment opportunities also declined during the pandemic; in July 2020, 31.3 million Americans reported lost jobs or reduced work hours due to COVID-19 [30]. While fewer adolescents worked in summer 2020, some adolescents may have worked to reduce economic stress in their families. In non-pandemic times, White and lower-SES adolescents reported more paid work during the school year [31]. During the COVID-19 surge and lockdowns, adolescents' employment heightened risks of contracting COVID-19, yet may have offered opportunities for social interaction with others. Beyond working for pay, adolescents engage in housework and childcare to contribute to the family. Asian and Latinx adolescents report stronger family expectations to help family than White adolescents [32], and girls and Black adolescents spend more time on housework [33].

3.4. Self-Improvement Activities

During the pandemic lockdown, adolescents may have spent time on activities that promote skill development, positive coping, and improved health. Adolescents who spend the summer on educational activities may also be focused on future goals, such as attending college [34]. Adolescents' engagement in educational activities during the COVID-19 pandemic has been linked to lower loneliness [19]. Adolescents with more educated parents may be encouraged to spend time on educational activities [35]. Physical exercise improves adolescents' physical and mental health and cognitive functioning, and boys spend more time on physical activity on average than girls [36]. Arts, music, and religious and spiritual practices may have been outlets to cope with stress and promote wellness during the pandemic [37,38]. Religious practices may vary by race and ethnicity;

for example, Black adolescents tend to report higher church attendance on average than White adolescents [39].

3.5. Time with Family and Friends

Under stay-at-home orders during COVID-19, adolescents may have spent more time with family and less time with friends. Adolescents who spent more time with family during the pandemic had lower depression and loneliness [19,40]. Other adolescents may have spent time with friends virtually to connect during COVID-19. However, adolescents who spent more time virtually with peers during COVID-19 reported higher depression [19]. Leisure time with family and friends may vary by race and ethnicity. One older study found that Chinese immigrant adolescents spent less leisure time with family than Mexican immigrant youths [41]. Relationship quality likely plays an important role in how much time adolescents devoted to family or friends during the pandemic, a topic we turn to in the next section.

3.6. Time Use Profiles during the COVID-19 Pandemic

In summary, the literature demonstrates the importance of adolescents' time use in multiple domains, including social media, civic engagement, work, self-improvement, and time with family and friends. Although there are many other ways that adolescents could choose to spend their time, these key domains hold particular relevance to understanding adolescents' experiences during the summer 2020 COVID-19 surge. Moreover, rather than consider each domain separately, this study examined adolescents' time use holistically. Identifying subgroups of U.S. adolescents that vary in how they spent their time during a COVID-19 lockdown provides important insights into adolescents' different lived experiences during the COVID-19 pandemic.

4. Family and Peer Relationships and Adolescent Time Use

Considering both family and peer contexts aligns with an RDS theoretical perspective [3], and can inform understanding of relational factors that shaped U.S. adolescents' time use during the COVID-19 summer surge of 2020. During adolescence, adolescents increasingly spend more time with friends and less with family [42]. This developmental trend may have flipped during COVID-19, causing adolescents to spend more time with family and less with friends. We seek to determine the implications of family and peer relationships for adolescents' time use, proposing that adolescents' choice of activities to cope with COVID-19 may depend on the degree and type of support from parents and friends. This idea aligns with time-use theories that adolescents choose activities offering positive experiences, and conversely withdraw from contexts offering negative experiences [34]. Our cross-sectional study cannot assess directionality, however, and perhaps adolescents' selection of activities could also change the ways parents and friends support them.

4.1. Family Conflict

COVID-19 is a crisis that families have experienced to varying degrees. Nearly half of U.S. households faced serious financial difficulties, and almost 60% of parents reported childcare challenges during COVID-19 in 2020 [43], which may increase family conflict. Indeed, several reports indicate that family conflict increased in mild and severe forms, particularly in families that experienced other stressors [40,44]. When possible, adolescents may reduce the time spent with family in response to conflict [45]. Higher family conflict and stressors have been associated with adolescents spending more time on housework and chores [33], less time on homework [46], and more time on screens and online [47]. Perhaps family conflict also results from adolescents' time use; for example, adolescents' lack of time on homework, or video game use, may heighten family conflict. Family conflict may drive adolescents to online spaces, where they feel freedom from parents and to openly express themselves [48]. Thus, given that family conflict may have increased during the COVID-19 pandemic, and that family conflict has implications for adolescents' choices of

time use, we examined the role of family conflict in relation to adolescents' time use profiles during the COVID-19 2020 summer surge.

4.2. Continuity vs. Compensatory Models for Parent and Peer Influence

In this, two models help to illuminate the interplay between parents and peers in adolescents' lives [49,50]. According to continuity models, which are rooted in attachment theory, peer relationships are an extension of the kinds of relationships adolescents develop with parents. Supporting this idea, adolescents who have secure, supportive relationships with parents are more likely to have supportive friendships [51]. Compensatory models, in contrast, posit that adolescents seek from friends what they cannot get from parents. Supporting this idea, adolescents who feel low support or high conflict with parents may turn to peers for more support [52]. Additionally, when adolescents have less supportive parents, supportive relationships with friends can serve as a protective factor against depression and anxiety [53]. Compensatory processes may emerge, in particular, when considering social media use. Whereas family support predicted less social media use during the COVID-19 pandemic, adolescents may have spent more time online to receive support from friends [19]. For adolescents who go online to nurture existing friendships, social media usage is related to higher perceived social support and self-esteem [54]. Conflicts with parents during COVID-19 may drive adolescents to spend more time with friends online to find peer support. We investigated parent-child relationships and friendships in relation to adolescents' time use, recognizing that parent and friend support may have similar or divergent relationships with time use profiles.

5. Current Study

This study examined how US adolescents spent their time in summer 2020 during the COVID-19 pandemic. Specifically, the study assessed adolescents' time use during a typical day during a week in August, a time when COVID-19 cases had reached then-record highs, and the majority of states had advisories or mandates in place to restrict social contact with others [55]. Our first aim was to describe adolescents' time use during this unique point in time. We used latent profile analysis (LPA) to identify time use patterns across 14 activities that span the categories of social media, civic engagement, work, self-improvement, and time with family and friends. Person-centered approaches such as LPA are useful tools for studying time use [5]. Beyond expecting that some adolescents increased time using media [19], we had no hypotheses about what time use profiles would emerge. COVID-19 times call for an exploratory, person-centered approach to highlight the complex ways adolescents are spending time and contribute knowledge on the pandemic's impact on adolescent development. A second aim was to explore differences in time use profiles by gender, race/ethnicity, parent education (a marker of SES), and sexual orientation, as adolescents may have faced different realities and adapted to the pandemic in different ways. We had no a priori hypotheses for this exploratory aim. A third aim was to examine the role of parent and peer relationships in relation to time use profiles. We did not have specific hypotheses, but acknowledged that findings may suggest compensatory processes due to tension between heightened time with family and challenges to seeing friends during the COVID-19 pandemic. In-person time with friends was also used to predict time use profiles to gain additional insight into youths' peer dynamics.

6. Method

6.1. Participants

Participants were 555 U.S. adolescents between the ages of 12 and 21 ($M = 16.28$, $SD = 1.29$). Our age range is compatible with contemporary definitions of adolescence that span age 10 to 24, which has expanded in response to science of biological and social growth that extends through the mid-20s [56]. The sample was primarily 12th (29.4%), 11th (23.8%), and 10th graders (18.2%), with fewer 9th graders (7.39%), some participants who were entering college in the fall (17.9%), and a few who were not enrolled in school (1.7%). Only

13 participants were older than 18; one was in 11th grade, and the rest were in college. The sample included more females (49.6%) than males (39.7%), with 7.9% identifying as non-binary. The sample was non-Hispanic White (47.2%), Latinx (19.6%), Asian (17.5%), Black (7.2%), American Indian/Alaska Native (5.0%), and other race and ethnicities (2.9%). Most adolescents' parents had a college degree (56.1% of mothers; 54.3% of fathers). Adolescents identified as straight/heterosexual (47.2%), lesbian/gay/bisexual/queer (27.0%), and unsure/questioning or multiply identifying (25.8%).

The study was advertised to teenagers on Instagram and participants self-selected to complete a 10 min survey. Data were collected from 5–28 August 2020, and the study received institutional review board approval. Participants were entered into a drawing for a \$50 Amazon gift card.

6.2. Measures

Time Use. Adolescents were asked to think about a typical day in the past week and indicate which of 14 activities they engaged in. For activities they reported engaging in, they were asked about time spent on the activity in hours (from 0 to 5+ h) and minutes (from 0 to 50, in intervals of 10 min). Activities included work (work for pay; doing chores, childcare or other family work); media use (using social media, watching shows or movies, playing video games); social interactions (time with family; interacting with friends online or via phone/text); self-improvement (educational activities; working out or exercising; engaging in religious, spiritual, or meditation activities; creating art or music); and civic engagement (helping others; taking online political action; watching or reading the news). Activities are similar to other time-use measures [34]. We utilized a stylized approach to measuring time use rather than comprehensive time diaries [6] to reduce participants' response burden, compared to other methods, particularly during a pandemic. Items were recoded to reflect the number of hours adolescents spent on the activity.

Parent-adolescent conflict. Past month parent-adolescent conflict consisted of three items ($\omega = 0.87$; λ s range = 0.83 to 0.86; e.g., “had a serious argument or fight” [57]. Responses spanned a six-point scale: not at all (1), once or twice (2), about once a week (3), several times a week (4), every day (5), and multiple times a day (6).

Parent and friend support. Past month parent support (three items, e.g., “how often have your parents shown they care about you”) and positive social exchange with parents (three items, e.g., “how often have you done an activity together to help get your mind off of things”) came from the Inventory of Socially Supportive Behaviors [58]. The same items assessed past month friends' support and positive social exchange. The same six-point response scale was used as described above. Support and positive social exchange were highly correlated and inseparable for parents ($r = 1.00$) and friends ($r = 0.89$); thus, parent and friend support were modeled as two single latent constructs. For parsimony, three parcels were created by averaging support and exchange items [59]; factor loadings and omega coefficients indicated construct validity and internal reliability for parent (λ s range = 0.73 to 0.86; $\omega = 0.83$) and friend support (λ s range = 0.80 to 0.89; $\omega = 0.84$).

In-person time with friends. Time spent with friends in-person came from a single item: “In the past month, how often have you spent time with friends in person?” Again, the same six-point response scale was used. This variable was used to predict time use profiles rather than as an indicator as it was not measured in hours.

Demographic covariates. Gender was dummy coded into male, female, and non-binary. Race/ethnicity was dummy coded into White, Asian, Latinx, and other. Due to small samples, Black, American Indian, and other races had to be coded into an ‘other race’ category, and results were not interpreted. Sexual orientation was coded as LGBQ (lesbian, gay, bisexual, and queer or questioning) and straight. We averaged mothers' and fathers' education (where applicable), assessed on a three-point scale—high school or less (1), some college (2), and college graduate or more (3)—and coded “don't know” as missing.

6.3. Analytic Plan

We conducted LPA on 14 time-use indicators, which were continuous variables measured in hours. We evaluated model fit from 1–4 class solutions. Bayesian Information Criterion (BIC), Akaike’s Information Criterion (AIC), Lo–Mendell–Rubin likelihood ratio test (LMR-LRT), bootstrap likelihood ratio test (BLRT), analytic utility of class sizes, and entropy were used to evaluate model fit. Low BIC and AIC and high LMR-LRT/BLRT values indicate better fit [60]. A significant p -value for the BLMR-LRT/BLRT indicated that the current class solution fit best. Solutions with a class smaller than 5% of the sample were not considered viable. Once class enumeration was established, latent profiles were classified into discrete, mutually exclusive groups. Hard classification enabled the use of latent variable predictors and full information maximum likelihood (FIML) to handle missing data. Multinomial logistic regression was used to examine predictors of time use profile membership. Demographics and in-person contact with friends were manifest variables, and parent-adolescent conflict and parent and friend support were latent variables. We used a three-form planned missing design for items contributing to latent variables; each participant randomly completed 2/3 of each item set. Planned missing designs reduce participant burden, and planned missing data are missing completely at random (MCAR). Item non-response was highest for parent education (<4.5%) and generally low for other variables (<1.0%).

7. Results

7.1. Descriptive Statistics and Bivariate Correlations

Table 1 displays means, standard deviations, and correlations among study variables. Adolescents spent the most time on social media ($M = 2.41$ h), watching shows or movies ($M = 2.23$), and messaging friends ($M = 2.22$). They spent the least amount of time engaging in online political action ($M = 0.36$ h), helping others ($M = 0.41$), and watching or reading news ($M = 0.56$). Parent support was positively related, and parent conflict negatively related, to family time and several self-improvement activities, and negatively correlated with media and social media use, online political action, and creating art or music. Parent-adolescent conflict was positively correlated with media and social media use, helping others, online political action, and creating art or music. Friend support was positively correlated with interacting with friends online or via phone/text, social media use, and helping others.

Table 1. Descriptive statistics and bivariate correlations.

	M (SD)	Parent Support	Parent Conflict	Friend Support	In-Person Time with Friends
Family and Peer Relationships					
Parent support	2.71 (1.22)	-			
Parent conflict	2.57 (1.21)	−0.28 ***	-		
Friend support	2.84 (1.17)	0.26 ***	0.06	-	
In-person time with friends	2.34 (1.13)	0.14 *	−0.02	0.30 ***	-
Demographic Factors					
Female ^a	0.51 (0.50)	0.05 *	0.03	0.01	−0.00
Non–binary ^a	0.08 (0.27)	−0.05 ***	0.04 **	0.01	−0.00
Latinx ^b	0.20 (0.40)	−0.02	−0.00	−0.01	−0.06 **
Asian ^b	0.17 (0.38)	−0.03	0.00	0.01	−0.03
Other race/ethnicity ^b	0.13 (0.33)	0.02	0.01	0.01	−0.02
Parents’ education	2.39 (0.71)	0.06	−0.03	−0.02	0.12 ***
LGBQ	0.53 (0.50)	−0.07 **	0.07 **	0.01	−0.03
Time Use					
Educational activities	1.40 (1.82)	0.20 *	−0.08	0.13	−0.03
Playing video games	1.51 (1.70)	−0.17 *	0.03	−0.06	−0.27 **
Watching shows or movies	2.23 (1.59)	−0.16 *	0.27 ***	0.06	−0.14
Watching or reading the news	0.56 (0.87)	0.03	0.07	0.01	−0.05

Table 1. Cont.

	M (SD)	Parent Support	Parent Conflict	Friend Support	In-Person Time with Friends
Time with family	2.05 (1.82)	0.63 ***	−0.24 **	−0.02	0.09
Virtual interactions with friends	2.22 (1.75)	−0.26 **	0.22 **	0.60 ***	0.03
Social media time	2.41 (1.67)	−0.28 ***	0.23 **	0.28 ***	−0.14
Working out or exercising	0.59 (0.84)	0.11 **	−0.09 *	0.01	0.06
Working for pay	1.05 (1.93)	0.03	−0.11	0.07	0.40 ***
Doing chores and family work	0.86 (1.08)	0.01	0.13 *	0.08	−0.14 **
Religious, spiritual, or meditation	0.18 (0.48)	0.09 ***	−0.06 **	0.04	0.08 **
Helping others	0.41 (0.87)	0.10 *	0.12 **	0.12 **	0.11 **
Engaging in online political action	0.36 (0.79)	−0.09 *	0.19 ***	0.05	−0.04
Creating art or music	0.71 (1.15)	−0.12 *	0.13 *	0.10	−0.06

Notes: Parent support, parent conflict, and friend support were estimated as latent variables, but here, their manifest means (averaged across items) are reported. M = mean, SD = standard deviation. ^a Reference = male. ^b Reference = white. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

7.2. Latent Profiles of Adolescent Time Use during COVID-19

Table 2 presents model fit and comparisons for 1–4 class solutions. We selected a three-class solution as best-fitting. Lower BIC and AIC and LMR-LRT/BLRT comparisons confirmed that the three-class solution fit better than the two-class solution. The four-class solution showed lower BIC and AIC and improved fit based on LMR-LRT/BLRT comparisons; yet two classes were very small ($n = 22$, $n = 16$). Thus, the three-class model was selected due to fit and utility, with acceptable entropy (0.89).

Table 2. Fit indices for LPA.

Number of Classes	Fit Statistics					
	AIC	BIC	ABIC	LMR-LRT (p-Value)	BLRT (p-Value)	Entropy
1	25,080.091	25,200.971	25,112.087			
2	23,931.164	24,116.802	23,980.301	1166.615 (<0.001)	1178.927 (<0.001)	1.00
3	23,640.004	23,890.400	23,706.282	317.806 (<0.001)	321.16 (<0.001)	0.89
4	23,055.275	23,370.428	23,138.693	417.38 (0.0168)	421.785 (<0.001)	0.99

Notes: AIC: Akaike's Information Criterion; BIC: Bayesian Information Criterion; ABIC: Sample size-adjusted BIC; LMR-LRT: Lo-Mendell-Rubin likelihood ratio test; BLRT: Bootstrap likelihood ratio test.

Figure 1 presents the average time for each activity by latent profile, and Table 3 displays the means. Class 1 ($n = 267$; 48.2% of sample) was Education-Focused, and spent more time on educational activities in a typical day than others ($M = 1.83$ h). Education-Focused adolescents spent less time interacting with friends online or via phone/text ($M = 1.38$) and on social media ($M = 1.37$). Class 2 ($n = 166$, 30.0% of sample), Media Users, spent more time interacting with friends online or via phone/text ($M = 3.54$), on social media ($M = 4.16$), watching shows or movies ($M = 2.89$), playing video games ($M = 1.92$), on online political action ($M = 0.74$), and watching or reading news ($M = 0.75$) than others. Media Users spent more time creating music or art ($M = 0.99$), and slightly more time on chores, childcare, or family work ($M = 1.20$). Class 3 ($n = 121$, 21.8% of sample), Workers, reported more time working for pay ($M = 4.61$) than others. Time spent with family, helping others, exercising, and on religious/spiritual practices did not distinguish between classes.

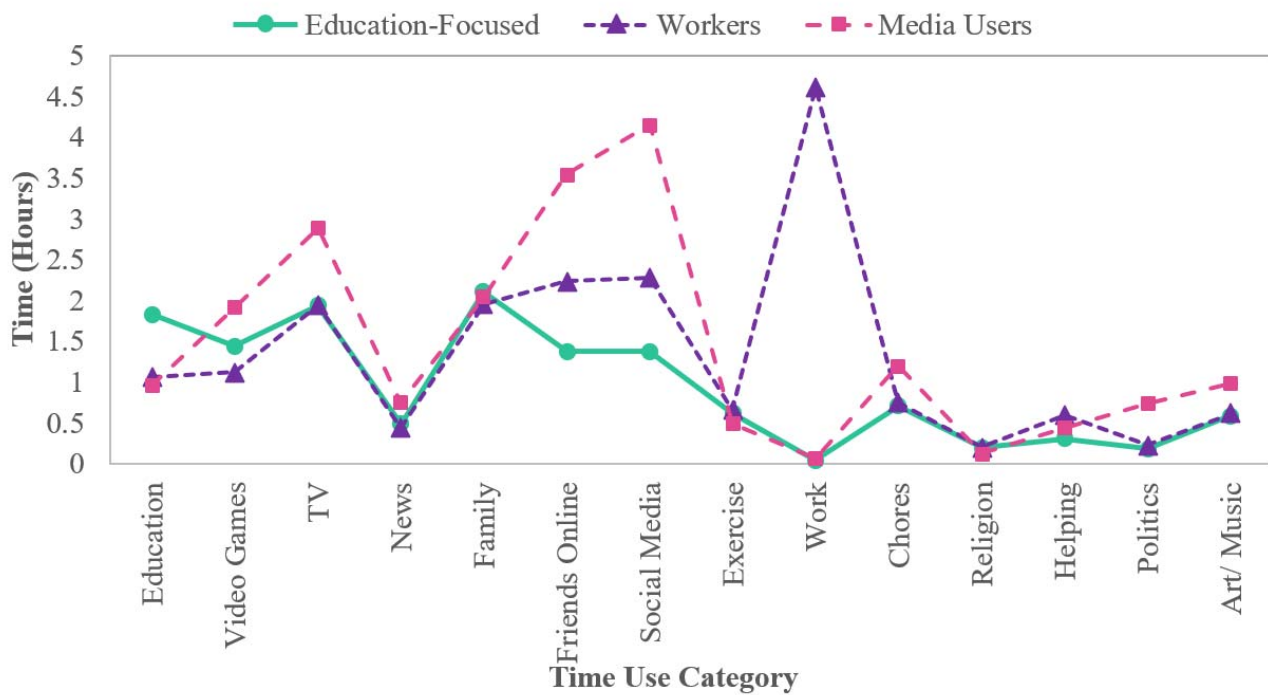


Figure 1. Profiles of adolescent time use. Note. Point estimates represent average hours adolescents reported for each time use category by class.

Table 3. Adolescent time use: Means for each latent class.

Time Use Indicator	Education-Focused		Media-Focused		Workers	
	Mean	SE	Mean	SE	Mean	SE
Educational activities	1.83	0.13	0.96	0.13	1.06	0.15
Playing video games	1.44	0.11	1.92	0.16	1.12	0.14
Watching shows or movies	1.94	0.10	2.89	0.14	1.94	0.14
Watching or reading the news	0.49	0.05	0.75	0.10	0.45	0.06
Time with family	2.11	0.12	2.04	0.17	1.95	0.16
Virtual interactions with friends	1.38	0.10	3.54	0.17	2.23	0.16
Social media time	1.37	0.09	4.16	0.12	2.28	0.14
Working out or exercising	0.62	0.06	0.49	0.07	0.66	0.08
Working for pay	0.04	0.02	0.07	0.03	4.61	0.06
Doing chores and family work	0.70	0.06	1.20	0.11	0.76	0.10
Religious, spiritual, or meditation	0.20	0.04	0.12	0.03	0.20	0.04
Helping others	0.30	0.04	0.44	0.08	0.60	0.09
Engaging in online political action	0.18	0.03	0.74	0.10	0.23	0.04
Creating art or music	0.59	0.07	0.99	0.12	0.61	0.10

Note. Means are reported from the final latent profile analysis model. Means correspond to number of hours spent on the activity in a typical week that month. SE = standard error.

7.3. Demographic and Relational Differences in Latent Profiles

In this study, two multinomial logistic regressions examined parent support, friend support, parent–adolescent conflict, in-person contact with friends, and demographics as predictors of profiles (see Table 4). The Workers class was the reference group in the first model, and the Education-Focused class was the reference group in the second model to compare all three groups.

Table 4. Multinomial logistic regression model predicting class membership.

	Model 1 ^c						Model 2 ^d		
	Education-Focused vs. Workers			Media Users vs. Workers			Media Users vs. Education-Focused		
	B	SE	OR (95% CI)	B	SE	OR (95% CI)	B	SE	OR (95% CI)
Demographics									
Female ^a	−0.41	0.25	0.67 (0.44–1.01)	0.28	0.28	1.33 (0.83–2.10)	0.69	0.24	1.99 ** (1.34–2.95)
Non-binary ^a	1.25	0.64	3.49 * (1.23–9.91)	1.55	0.66	4.71 * (1.60–13.84)	0.30	0.39	1.35 (0.71–2.56)
Latinx ^b	0.82	0.38	2.26 * (1.22–4.20)	1.10	0.41	3.02 ** (1.55–5.88)	0.29	0.30	1.33 (0.81–2.19)
Asian ^b	1.06	0.35	2.90 ** (1.63–5.16)	0.82	0.40	2.26 * (1.17–4.38)	−0.25	0.32	0.78 (0.46–1.33)
Other race/ethnicity ^b	0.73	0.41	2.08 (1.06–4.06)	0.64	0.44	1.89 (0.92–3.89)	−0.09	0.34	0.91 (0.52–1.59)
Parents' education	0.37	0.19	1.45 * (1.07–1.97)	0.22	0.20	1.24 (0.90–1.72)	−0.16	0.17	0.86 (0.65–1.13)
LGBQ	−0.16	0.25	0.86 (0.57–1.29)	0.53	0.28	1.70 (1.08–2.69)	0.69	0.23	1.99 ** (1.36–2.92)
Age	−0.49	0.10	0.61 *** (0.52–0.72)	−0.59	0.11	0.55 *** (0.46–0.67)	−0.10	0.09	0.91 (0.78–1.05)
Relationships									
Parent support	0.43	0.17	1.54 ** (1.18–2.02)	−0.12	0.19	0.89 (0.65–1.21)	−0.55	0.16	0.58 ** (0.44–0.75)
Parent conflict	0.19	0.16	1.21 (0.93–1.57)	0.31	0.16	1.36 (1.05–1.77)	0.12	0.12	1.13 (0.92–1.38)
Friend support	−0.31	0.16	0.74 * (0.56–0.96)	0.30	0.17	1.35 (1.01–1.79)	0.60	0.14	1.83 *** (1.45–2.31)
In-person time w/friends	−0.24	0.11	0.78 * (0.66–0.94)	−0.39	0.13	0.68 ** (0.55–0.84)	−0.15	0.11	0.87 (0.72–1.04)

Notes: OR = Odds ratios, >1 = higher odds, <1 = lower odds. ^a Reference = male. ^b Reference = white. ^c Reference = Workers. ^d Reference = Education – Focused. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Regarding demographic differences in adolescents' time use profiles, Education-Focused adolescents and Media Users were more likely to be gender non-binary (OR = 3.49 [1.23–9.91], OR = 4.71 [1.60–13.84]), Latinx (OR = 2.26 [1.22–4.20], OR = 3.02 [1.55–5.88]), and/or Asian (OR = 2.90 [1.63–5.16], OR = 2.26 [1.17–4.38]), compared to Workers. Education-Focused and Media User groups were also less likely to be older in age compared to Workers (OR = 0.61 [0.52–0.72], OR = 0.55 [0.46–0.67], respectively). Additionally, Education-Focused adolescents had higher parental education (OR = 1.45 [1.07–1.97]) than Workers. Media Users were more likely to be female (OR = 1.99 [1.34–2.95]) and/or LGBQ-identifying (OR = 1.99 [1.36–2.92]) compared to Education-Focused adolescents.

Figure 2 displays raincloud plots for parent support, parent conflict, friend support, and in-person time with friends by latent profile. Education-Focused adolescents had higher parent support compared to Workers (OR = 1.54 [1.18–2.02]). Media Users had lower parent support (OR = 0.58 [0.44–0.75]) than Education-Focused adolescents. Media Users and Workers did not differ on parent support. Parent conflict significantly did not differ by profiles at $p < 0.05$.

For friend support, Education-Focused adolescents reported lower friend support than Workers (OR = 0.74 [0.56–0.96]). Media Users had higher friend support than Education-Focused adolescents (OR = 1.83 [1.45–2.31]). Media Users and Workers did not differ on friend support. Compared to Workers, Education-Focused adolescents (OR = 0.78 [0.66–0.94]) and Media Users (OR = 0.68 [0.55–0.84]) spent less time in-person with friends.

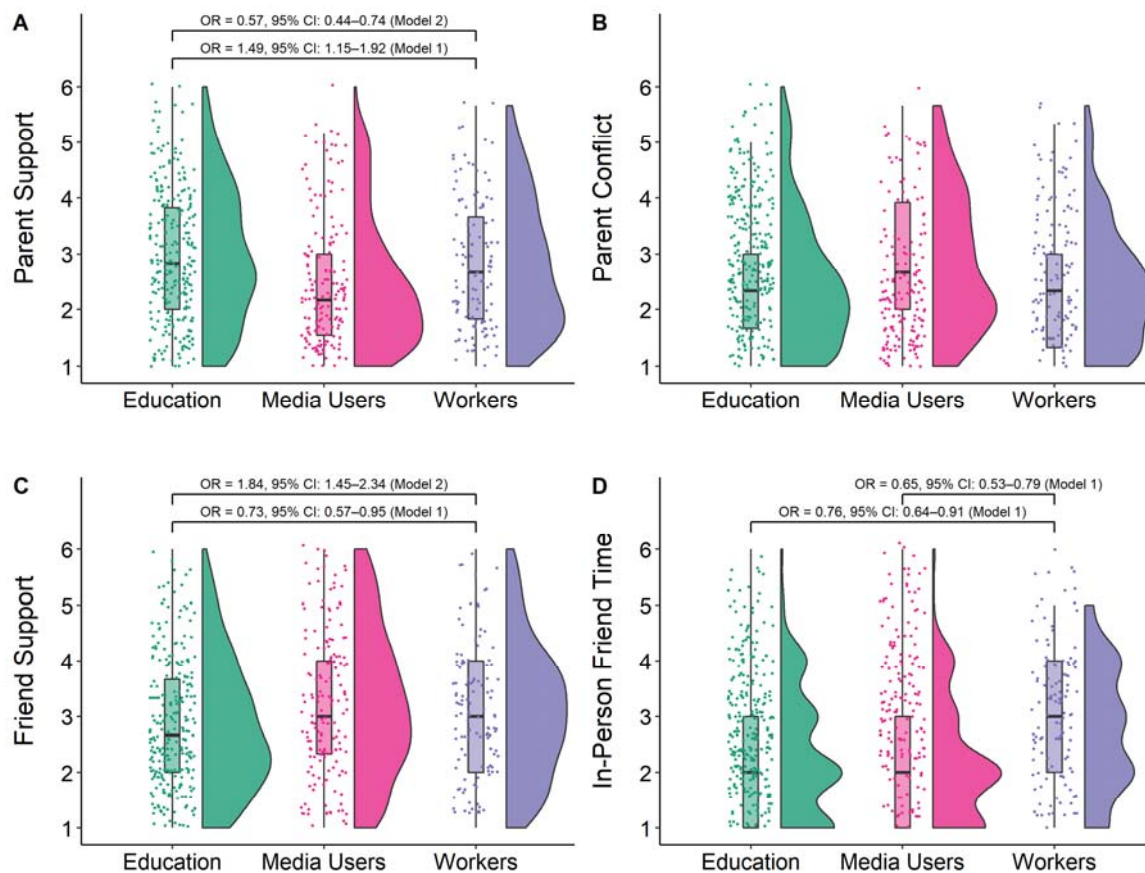


Figure 2. (A): Parent support by time use profile. (B): Parent conflict by time use profile. (C): Friend support by time use profile. (D): In-person friend time by time use profile.

8. Discussion

Our study identified three distinct typologies of adolescents' time use during the COVID-19 pandemic. Education-focused, media use, and work-focused profiles indicated that adolescents differ in daily life experiences during this unique crisis point in history. At a time when typical developmental opportunities through work, extracurricular, and leisure activities were limited or cancelled, time-use profiles show that adolescents found different ways to adapt to these challenging circumstances. Adolescents' choice of activities differed by gender, age, race and ethnicity, and sexual orientation, as well as levels of parent and friend support. In line with a RDS theoretical perspective, this study illustrates heterogeneity in adolescents' experiences and the importance of examining adolescent development in relation to relational contexts and in particular historical moments. By examining associations between adolescents' time use, demographic background, and relational contexts, we found that each profile exhibits strengths and vulnerabilities, which has implications for theories of family and peer support and for adolescents and families during times of crisis.

8.1. Education-Focused Adolescents

Adolescents classified as education-focused spent over twice as much time on educational activities as other adolescents, and moderate amounts of time across other activities. These adolescents were more likely to be gender non-binary, Latinx, or Asian (relative to white), and have parents with more formal education. The findings with gender and race and ethnicity were not necessarily anticipated based on extant literature. Prior work has shown that gender and racial/ethnic minority groups vary widely in their academic engagement, based on experiences of marginalization as well as school and family support,

and they have also experienced the COVID-19 pandemic differently [61,62]. In our study, we found that these particular minoritized groups were more focused on education than other adolescents in the sample during an intense moment in the COVID-19 pandemic. Perhaps they were particularly committed to self-improvement and motivated to learn during this time period, and were using educational activities as a productive way to cope or fill time during the pandemic.

Education-focused adolescents also reported higher parent support and lower friend support. Their higher family support may be due to adolescents changing their behaviors in response to parents' input or rule-setting [63]. In addition, parents and adolescents in these families may have been following recommendations from educators to avoid the "summer melt" and maintain academic engagement [64]. Indeed, more educated parents tend to have higher educational expectations for children, which is linked to children's greater academic engagement [35,65]. Another possibility is that parent support may encourage adolescents to seek various stimulating activities daily, including education. This explanation aligns with our findings that adolescents in the education-focused group were moderately engaged in a number of different activities. Past research shows that adolescents with lower parent support were uninvolved in extracurricular, work, and leisure activities, whereas adolescents with more parental support were more engaged across activities [66]. Alternatively, adolescents who focus on education may please their parents, who in turn offer them more support. Overall, these adolescents seemed to be engaging in a balance of activities and finding strength in supportive parent relationships.

However, education-focused adolescents reported lower friend support, which suggests some vulnerability in their lived experiences during the pandemic, as friendships are important for self-confidence, identity development, and well-being [67]. Education-focused adolescents' reporting of high parent support and low friend support align with a compensatory model of parent and peer relationships [49,50]. Adolescents with supportive parents may have chosen not to nurture friendships, or may have been restricted from spending larger quantities of time online, which for many was the primary or sole mode of connecting with friends to avoid COVID-19 risk during this point of the pandemic. An alternative compensatory explanation is that education-focused adolescents may have been getting the support they needed from parents, making them less apt to nurture friendships. These ideas should be tested using longitudinal models to determine whether low social media use and high parent support predict declines in friend support during the COVID-19 pandemic.

8.2. High Media Users

Adolescents classified as media users spent considerable time watching shows and movies, playing video games, and using social media. Although national estimates prior to the pandemic suggested high levels of screen time for U.S. adolescents [17], adolescents' media use appeared to be on the rise during COVID-19 [19]. Notably, a portion of adolescents' media time focused on relationship-seeking via texting with peers and civic engagement via news watching or online political action. These adolescents spent more time creating art or music than others, and online spaces are often contexts for such creative expressions [68]. Thus, these adolescents were engaged in a combination of passive viewing and active participation in social and civic life.

Media users were more likely to be female and/or LGBTQ-identifying than the education-focused group, and were also more likely to be gender non-binary, and Latinx or Asian (relative to white), compared to working adolescents. The race/ethnicity findings highlight important heterogeneity within racial/ethnic groups, as Latinx and Asian adolescents were also likely to be found in the education-focused group. The finding that high media users were more likely to be non-binary and/or LGBTQ-identifying, in particular, may offer insight into why media users reported lower parent support and higher friend support. Past studies found lower parent support and acceptance and greater parent avoidance, neglect, and abuse of sexual and gender minority adolescents [69]. These patterns may

have been exacerbated during the COVID-19 pandemic of 2020, when many adolescents lived with families who may not have been supportive of their sexual orientation or gender non-conformity [1]. For adolescents who feel marginalized, social media provides avenues for building community and social connections [24]. Indeed, media users in our study reported higher friend support. Thus, although education and health professionals warn against health risks of screen time [70], media use during the height of a COVID-19 surge may have also provided important spaces for friendship, support-seeking, and coping for sexual minority adolescents and others [20]. Again, the pattern of low parent support and high friend support for this group suggest compensatory processes at play. Low family support may be driving adolescents online to seek greater support from friends. Alternatively, high media use and virtual time with friends may decrease opportunities for supportive exchanges with parents.

8.3. Working Adolescents

Around 20% of our sample spent time working for pay during the COVID-19 summer of 2020. These adolescents were older on average than the other two groups, were more likely to be white than adolescents in other groups, and had parents with less formal education compared to education-focused adolescents. These findings align with the demographics of adolescents who were part-time workers prior to the pandemic [31]. Working adolescents spent more time in-person with friends than other adolescents, and had higher friend support than education-focused adolescents. We presume these adolescents were primarily engaged in part-time work outside the home, which is common for adolescents in non-pandemic times [29], but during the COVID-19 surge, part-time work significantly heightened adolescents' risks of contracting and spreading the coronavirus. Although the prevalence of COVID-19 cases and associated risks varied across the U.S., August 2020 had then-peak numbers of cases across all 50 states [71]. Adolescents may have worked to mitigate their family's economic stressors during the pandemic. Older adolescents are not only more legally able to hold a job, but also may take on more financial responsibility to support their family and themselves. This pattern may be particularly evident among adolescents from low-income families; we found that working adolescents had parents with less education, on average, but other measures of socioeconomic status could have demonstrated this pattern more robustly. Our findings highlight the potentially challenging trade-offs for working adolescents, who may experience heightened stress due to increased possible virus exposure, while also using work to meet economic or social needs.

8.4. Limitations

Study findings should be interpreted in the context of certain limitations. The study design was cross-sectional, and causal or temporal claims cannot be made. Longitudinal studies are needed to examine the temporal sequencing between time use, family relationships, and peer relationships during the COVID-19 pandemic. Although the sample varied in race/ethnicity, gender, and sexual orientation, participants were recruited using social media, which may have led to selection bias. We may have oversampled adolescents who spend time on platforms such as Instagram and missed experiences of adolescents who are not on social media. For the education-focused group, we cannot discern what types of educational activities adolescents were engaged in, and it is possible that some had begun their fall school year by the time of data collection; this is unlikely, as the majority of data were collected in the first week of the data collection period. We did not include measures of political orientation or views about COVID-19, and thus cannot discern whether adolescents in the working group held more skepticism about the virus, leading them to spend more time outside of their homes. Our measures did not assess substance use, which is commonly studied in other time-use research [72]. We did not comprehensively assess time use, and thus, may be missing other ways that adolescents are coping with the pandemic. Other national events beyond COVID-19—such as the Black Lives Matter movement and 2020 election—could have shaped these results. Future

research would benefit from examining the complex intersection between period effects to further understand their influence on adolescent development.

8.5. Implications for Theory and Research

Our study demonstrates that adolescents have been adapting to the COVID-19 pandemic in ways that map onto their demographic and relational contexts. Studying time use offers insight into adolescents' lived experiences and has implications for adolescents' health and well-being [5]. Adolescents' time use should be continually reassessed, as changing dynamics during health crises or other major events may shift adolescents' social, leisure, and enrichment opportunities, and change what time use choices mean for health and well-being. Looking across the demographic differences in time-use profiles, we see that adolescents from sexual, gender, and racial/ethnic minority groups were less likely to be engaging in work outside of the home. Perhaps these adolescents were more focused on coping styles that offered protection from COVID-19, particularly given the multifaceted, disproportionate impacts of the COVID-19 pandemic on sexual, gender, and racial/ethnic minority groups [73,74], and the increased salience of systemic racism during summer 2020 [16]. More research on Black adolescents and other adolescents of color's experiences of the dual pandemics of COVID-19 and systemic racism is urgently needed.

Adolescents' support from parents and friends has implications for how adolescents spend their time during a national health crisis. Our results support a pattern of compensatory processes between family and peer relationships in demonstrating opposing roles of parent and friend support for the media use and education-focused groups. Many adolescents during the pandemic faced very tangible trade-offs between parent and friends' support, especially at a time when adolescents lack access to many contexts through which adolescents naturally interact with peers and spend time away from parents. This health crisis, with its dramatic social implications, may be creating or exacerbating competing dynamics between peers and parents for adolescents to navigate. The pandemic's effects on relational dynamics and adolescents' time use may be long-lasting through establishing new patterns of support giving or seeking or new habits of time use. Levels of parent and friend support during the pandemic may also cascade to academic functioning, health, and well-being over time.

Surprisingly, we did not find associations between parent–adolescent conflict and time-use profiles. Parent conflict was bivariately related to hours spent in various activities, and seemed to be a valid and reliable measure. Perhaps parent conflict and support, despite their modest negative correlation, predicted overlapping variance in time use profiles. Future research might examine mediation, moderation, or cross-lagged models to further explore processes by which parent conflict and support relate to adolescents' time use during COVID-19 and beyond.

8.6. Implications for Practice and Policy

Parents are undoubtedly seeking insight into healthy ways for adolescents to spend time during the COVID-19 pandemic. Each time use profile we identified suggests different risks to health or well-being, which is unfortunate, but fitting for lived experiences during a global health crisis. Education-focused adolescents reported low friend support, high media users had low family support, and working adolescents may have been at greater risk for contracting the virus. Yet, each group showcased strengths: education-focused adolescents pursued learning and felt supported by parents, high media users experienced support from friends and were more engaged in civic contributions and creative arts, and working adolescents enjoyed in-person contact with friends. Parents and others should engage adolescents in open conversations about their challenges during the pandemic, which may identify ways to strengthen relational supports and mitigate risks for different groups of adolescents, both now and for future challenges that arise. We also underscore the conclusion from other research that parents must find ways to show love and support for their LGBTQ children [75].

Our findings raise the need to consider where and how adolescents receive social support, which can inform debates regarding adverse or advantageous effects of screen time [69]. Screen time may offer some advantages to adolescents, especially when face-to-face interactions are limited. Results emphasize the need to further understand how adolescents are using online media, rather than focusing only on quantity of time use [76,77]. Health policymakers, medical practitioners, and others may want to consider more flexible or nuanced recommendations about media use for adolescents during the pandemic. Policies should ensure workplaces are safe for adolescents, and proper precautions followed to minimize risks for teens and workers of all ages. Schools—whether in-person or remote—should consider how to meet adolescents’ needs for support and connection, and integrate services for health and well-being into core practices. Communities should devote attention and resources to rebuilding or reimagining opportunities for adolescents’ time use during and post-pandemic that prioritize safety, social connection, and well-being.

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