A Life Course Framework for Understanding Digital Technology Use in the Transition to Adulthood

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Abstract

Rapid increases in young people's time spent using digital technology ("screen time") in the mobile internet era have led to anxiety about long-term effects. This mixed-method US study examines childhood experiences and contextual factors that shape screen time in the transition to adulthood. We recursively analyzed 56 qualitative interviews with young adults in a large metropolitan area in 2016-2018 and prospective longitudinal nationally representative survey data (PSID-CDS-2007 and PSID-TAS-2017) to articulate a conceptual framework of life course influences on young adults' time spent using digital technologies. Inductive qualitative analyses built an initial framework, which was assessed with quantitative data, then further refined with qualitative analyses. Young adults drew on life course perspectives when discussing influences on their current digital technology use. As they suggested, in quantitative analyses more frequent adolescent technology use and greater device access weakly predicted increased technology frequency. Current school enrollment and several current peer factors predicted technology time. Interviewees emphasized the influence of parenting around technology use during adolescence, but parenting did not predict young adult screen time in quantitative analyses. Further qualitative analyses suggested that instead of influencing current technology time, earlier parenting shaped current emotional responses and imagined future technology use. We found young adults' technology use frequency to be informed by earlier experiences but highly malleable. Past technology use and current social contexts matter, but only up to a point. Moving beyond time use to incorporate emotional responses and future plans can better capture how the life course shapes technology use.

KEYWORDS: Transition to adulthood, digital technology use, life course, mixed methods, time use, adolescence

1. Introduction

Internet-enabled mobile devices have changed everyday life and family relationships by making technology use, or "screen time," pervasive and routine (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013). Digital technology use typically refers to use of digital media technologies such as smartphones, tablets, television sets, computers, videogame consoles, smart speakers, and electronic reading devices (Rideout & Robb, 2019). Simultaneously a driver of human capital, a sedentary health behavior, a way of engaging socially, a tool for cognitive development, and a salient focus of parenting efforts, young people's technology use is complex, rapidly evolving, and not yet well understood. A burgeoning literature on technology use among children and adolescents is examining effects in domains including health behaviors and cognitive and psychosocial development.

Less well understood is whether a person's immersive technology use during childhood and adolescence persists into adulthood (Coyne, Padilla-Walker, & Howard, 2013). On one hand, continuity across early life in a behavior like technology use is to be expected if childhood circumstances shape behavior during adulthood (Hayward & Gorman, 2004). In the contemporary context, this expectation is freighted with public concern about the potentially addictive nature of new technologies (Christakis, 2010). On the other hand, young adults' screen time may be more strongly shaped by contemporaneous social roles and contexts.

To date, little research has considered how individuals' technology use carries over from childhood through the transition to adulthood, in part because of an absence of suitable data. Our mixed-method study focuses on screen time among US young adults, recursively analyzing qualitative interviews collected in 2018 and nationally representative, longitudinal cohort data collected from 2007 to 2017 to inductively build, test, and refine a conceptual framework articulating *influences on young*

adults' contemporary technology use. Responding to researchers' calls to integrate principles from the life course perspective (Elder, 1994) to improve our understanding of technology use (Dworkin, Rudi, & Hessel, 2018), *we asked whether and how life course principles can help us to understand variation in young adults' technology use.* We found that a life course lens is fundamental for understanding young adults' technology use in two ways. First, qualitative participants' narratives deployed several core principles of the life course perspective when explaining why they use technologies in the ways they do: Age, historical period, and cohort; earlier experiences with technology use and technology-related parenting; young adult social roles related to school and work; young adult peer contexts; and human agency are all relevant influences in the inductively derived conceptual framework, and they were largely supported by subsequent quantitative analyses. Second, the core life course principle of human agency was fundamentally important in our findings. The results support further investigation of the "life course of technology use" and suggest that young adults' technology-related behaviors, far from becoming fixed in childhood, are highly malleable. Understanding young adults' technology use requires both capturing earlier experiences, current social contexts, and individual agency and moving beyond screen time to incorporate emotional responses and future plans. Our findings have broader implications for life course research by underscoring the importance of articulating and measuring human agency, developing a life course of emotions, and understanding how the nature of employment within the social role of "worker" influences behavior.

2. Background

2.1. Technology use in the mobile internet era

Young people's screen time has changed rapidly as new digital devices and modes of access have emerged. US adolescents spent 33 hours per week using technology outside of school in 2014 (author 2019a), a 17% increase compared to 2002. The mode and content of technology use also changed over this period. In the early 2000s, people often used stationary devices to accomplish a single task

with a slow internet connection, if any (Kleinrock, 2008). Devices such as desktop computers and television-based gaming stations were expensive and often shared with family members (MacGill, 2007). Recent technological developments have made communication more pervasive, internet access faster, and devices more mobile, personalized, and prevalent (Pew Research Center, 2018; Sefton-Green, 2006).

Today's digital screen-based devices have many uses. Time diary and survey data document that watching television and video content remains the most frequent primary screen time activity among US children and adolescents (author 2019a,b; Rideout & Robb, 2019), but stationary and portable digital devices are also used for school, work, producing content, communication, gaming, and entertainment, sometimes at the same time (Ito et al., 2019). These diverse activities make it harder to understand the benefits and drawbacks of time spent using technology because it is simultaneously (among other things) a sedentary health behavior, a powerful educational tool, and a cultural symbol infused with classed meaning (Rafalow, 2018). Despite these complexities, rapid changes are fostering a "moral panic" focused disproportionately on the dangers of digital technologies for young people, as did the emergence of earlier technologies like radio, film, and television (Wartella & Jennings, 2000). Like other socially constructed "problems," moral panics can negatively impact young people's lives by provoking fears and judgments that can result in stigma and sanctions.

At the same time, computers and internet access are perceived as fundamental for educational success, and technological competencies can lead to well-compensated careers (Rafalow, 2018; Russ, Larson, Franke, & Halfon, 2009). But not all forms of screen time foster such competencies. The production, rather than the consumption, of digital technologies and content is viewed as building human capital competencies (Ito et al., 2019). This division is mirrored in stereotypical classifications of "bad screens" (used for consumption of noneducational content) versus "good screens" (for reading, learning, and production; Seiter, 1999). The effect of children's and adolescents' technology

use on health and development is a frequent topic of research, but rapidly evolving technologies and conflicting conclusions have left many scholars with little consensus about the direction or size of effects (Stiglic & Viner, 2019; Yan, 2018).

2.2. The transition to adulthood

Our study focuses on the transition to adulthood, ranging from approximately ages 18 to 30. Defined as the period when young people transition to financial and residential independence and to various adult roles such as worker, parent, and spouse, the transition to adulthood is an increasingly heterogeneous experience in the US and other societies (Benson, 2014). Because the density of life transitions experienced by young people makes it a sensitive developmental period, attention to this life stage is important (Shanahan, 2000).

Young adults' screen time looks different than that of previous cohorts. Nationally representative US surveys found that young adults reported widespread social media use, internet access, and internet-enabled device access in 2016 (Smith & Anderson, 2018; Villanti et al., 2017), more so than did older generations (Vogels, 2019). Young adults spend more time on average using digital technologies than on any other activity (Coyne et al., 2013). Substantial increases in social media usage since 2014 suggest that young adults' technology use has changed rapidly, warranting the use of recent data such as that in our study.

Coyne, Padilla-Walker, and Howard (2013) have called for more developmentally sensitive research on screen time that attends to the life stage and developmental goals of young adulthood. Some research suggests that newer technologies ease the transition to adulthood. Studying adolescents, Warren and Aloia (2018) found that communication via mobile devices can be a useful "relational buffer" facilitating closeness with family while still fostering young people's independence. Vaterlaus, Beckert, and Schmitt-Wilson (2019) found parent-child technology-mediated communication to be

universal and often associated with adolescents' and young adults' feelings of closeness while using the technology.

Yet relatively little is known about factors that shape time spent using technology in the transition to adulthood. Few studies have taken even a retrospective longitudinal perspective to understand the impacts of technology in childhood on young adult technology use. Cingel and Hargittai (2018) used retrospective reports from a nonrepresentative US sample, finding that college students' reports of their parents' motivations to set technology-related rules in childhood were negatively, if at all, related to college academic outcomes. Also using retrospective reports from a nonrepresentative US sample, Ching, Basham, and Jiang (2005) found that college students who had access to a home computer before age 10 more often used technology for consumption, communication, and production.

2.3. The life course perspective

The life course perspective is a particularly promising theoretical tool for understanding how technology shapes people's lives. As Dworkin, Rudi, and Hessel (2018, 807) have argued, "Life course theory is particularly well suited to understanding [the] many influences on family and social media. Life course allows for the analysis of individuals' lives in structural, social, and cultural contexts." Technology use varies substantially across ages, historical periods, and cultures, making a life course lens particularly salient (Dworkin et al., 2018). Age has gained significance as an organizing social characteristic that shapes institutions, interactions, and individuals alike (Riley, 1987). The life course perspective not only foregrounds age as an organizing social force but also incorporates several related key principles (Elder, 1994). McLeod and Almazan (2003) have argued that more explicit attention is needed to core life course principles in research on the links between childhood, adolescence, and adulthood. Several of these principles were implicitly or explicitly used by interview participants in making sense of their own screen time.

One core insight from the life course perspective is that age, historical periods, and their intersection shape people (Elder, 1994). Birth cohorts—people who were a particular age at a particular historical time—are important for understanding how populations effect social change through new behaviors and attitudes (Ryder, 1965). Born in the dozen or so years before the turn of the millennium, the cohort we studied was in adolescence when smartphones were released and in their late teens and early twenties when tablets became popular. They bridge the population of older adults who first encountered the internet through personal computers and telephone-based internet connectivity and younger cohorts who were born into an era of wireless and cellular internet access and portable internet-enabled devices. Focusing on this cohort provides insight into how today's young adults make sense of being at the forefront of the mobile internet revolution and how they have assimilated technology into their adult lives. Beyond major technological changes, this cohort has experienced greater economic insecurity and less attractive job prospects, which can substantially affect human lives (Elder, 1974).

A second life course perspective insight is that earlier life experiences shape later ones (Elder, 1994) in a complex interplay with other social factors (McLeod & Almazan, 2003). Dynamic processes shape the accumulation or redirection of social advantages and disadvantages across an individual's life course (DiPrete & Eirich, 2006). Third, social roles and transitions matter across life (Elder, 1994). A fourth principle is "linked lives" (Elder, 1994), and technology is one way in which links can be forged, strengthened, or broken (Carvalho, Francisco, & Relvas, 2015; Mesch, 2003; Mullan & Chatzitheochari, 2019). Finally, human agency is fundamental for understanding the transition to adulthood (Benson, 2014). As traditional role-based markers of adulthood have become more variable and difficult to attain, many have turned to self-focused understandings to achieve an internal sense of becoming adult (Arnett, 1997; Silva, 2012). Strengthening neoliberal trends emphasizing individuals'

responsibility for their own lives (LeBesco, 2011; Luna, 2019) may be further driving the growth of individualistic perspectives on adulthood that emphasize agency and downplay social structures.

3. This study

We take a novel mixed-method approach to inductively build, then assess and refine, a life course framework for explaining technology-related time use in young adulthood. We follow earlier research on young people's technology use by focusing on time use, viewing screen time as a behavior that is related to young people's health lifestyles and that can encourage or crowd out other health-related and developmental activities (e.g., author 2019a, Hofferth, 2010; Rideout, 2015; Vandewater et al., 2007). Combining qualitative interview data with nationally representative longitudinal survey data allowed us first to articulate influences on screen time through thick description, then assess whether these perceived influences were reflected in nationally representative survey data on young adults' technology use frequency. The framework was refined by returning to the qualitative data to explain discrepancies between the qualitative and quantitative findings. This preliminary "life course of technology use" framework, which speaks to the value of studying time use together with other facets of technology use such as emotional reactions and future plans, may spur future research on evolving technology use in human lives.

4. Method

4.1. Qualitative data

This study's qualitative data source was 56 interviews with young adults living in a large metropolitan area in the US mountain west. The interviews were collected in 2018 using peer interviewing techniques. An interview with a familiar young adult peer can yield a less carefully managed self-presentation and more open disclosure than with an older adult interviewer (England, Shafer, & Fogarty, 2007; Mollborn, 2017; Tinkler, 2012). Undergraduate students in a senior-level sociology course elected to conduct an interview and were trained on the topic and on qualitative interviewing

techniques. Student interviewers recruited a peer through personal contacts. Students were encouraged to recruit participants who would diversify the sample by family and community socioeconomic status, race/ethnicity, sexual orientation, gender identity, and/or college enrollment and work status (Lofland, Snow, Anderson, & Lofland, 2006).

The interviews lasted about 45 minutes, and participants were paid $10. A semi-structured interview guide articulated primary interview questions, included potential follow-up questions, and instructed interviewers to probe further with customized questions when interesting themes arose. The interviews covered topics related to the participant's life and technology use at ages 10, 17, and in young adulthood. We elicited details on how they used technology at each age; what messages they received regarding technology use and health; what influences they think those messages had or did not have on them; what factors shape their current technology use including follow-up prompts for specific social influences; how they think about their own past, present, and future technology use; and how they think technology use relates to health. Interviewers completed post-interview notes describing the setting, the interviewee, their emotional reactions, and other thoughts. A university institutional review board approved the project, which included appropriate protections for course-based research.[1]

The resulting nonrepresentative sample was more diverse than the student interviewers but overrepresented privileged young adults. Participants grew up in every US region, with a preponderance from the mountain west. They reported home communities ranging from very conservative to very liberal, with the average in the middle. All categories of community socioeconomic status (SES) were represented as measured by participant-reported community wealth,

[1] These included giving students alternative assignment options, asking both participants and interviewers to consent to release their interview to the research project, and releasing consent information only after final grades had been submitted.

and the average fell between middle and upper middle class. A bit over half of participants' fathers and a bit less than half of mothers were in managerial/professional occupations, and about one third of respondents had no parent in a managerial/professional occupation. Combining community and family SES, we coded a small proportion of respondents as having a lower-SES background, more as mid or mixed, and just over half as higher-SES. Most reported being white, with a few Asian American, Black, Latinx, and multiracial participants. A few reported being gay, bisexual, queer, pansexual, and/or asexual. Just over half identified as female, slightly fewer as male, and a small number as nonbinary. Most were enrolled in college at a variety of institutions with one public four-year university overrepresented, a few had graduated from college, and a few were not enrolled and had no college degree. Participants' ages ranged from 19-25 years.

All interviews were audio recorded and transcribed. We analyzed the interviews as actively constructed narratives allowing participants to make sense of their own lives (Holstein & Gubrium, 1995; Scott & Lyman, 1968). Such narratives, situated in social contexts and interpersonal interactions, cannot adjudicate whether technology use is good or bad; instead, they permit people to construct their identities, justify behaviors, and manage impressions (Swidler, 2001). Narratives illuminate processes related to norms, subjective understandings, decision-making processes, and inequalities. Our interpretive analysis explored how and why young people believed their past and current life course mattered for their technology use and the implications they thought it might have. We coded interviews by responses to specific questions, read entire transcripts and identified major emergent themes, then returned to the transcripts to code these inductive themes systematically. Two researchers compared identified themes and resolved any discrepancies. Some codes were compared across major categories of participants, such as college students versus graduates and non-students.

4.2. Quantitative data

To our knowledge, this is the first study in the mobile internet era to examine young people's digital technology use using prospective, longitudinal nationally representative data. Quantitative data came from two youth-focused supplements to the US Panel Study of Income Dynamics (PSID), the world's longest-running household panel study (McGonagle, Schoeni, Sastry, & Freedman, 2012). Original PSID householders joined the study in 1968, and up to six generations of descendants have participated. The PSID sample was refreshed in 1997 with families headed by foreign-born people who immigrated after 1968. The Child Development Supplement (CDS) began as a longitudinal study in 1997 with a cohort of children aged 0 to 12 years in PSID families. Although time diary data are best for assessing technology use (Hofferth & Sandberg, 2001), for this study we relied on retrospective survey reports, as many other researchers have done. We used survey data from the 2007 wave of CDS (CDS-2007), when the young people in our sample were aged 10-18. (The oldest original cohort members were adults by 2007 and were not interviewed for CDS in that year.) The primary caregiver (usually a child's mother) reported on the household and the particular child in survey interviews. Each child also completed a survey interview. After aging out of CDS, respondents were included in the Transition into Adulthood Supplement (TAS). We used the 2017 wave of TAS (TAS-2017), collected when this same sample was aged 20-29 (86 percent response rate; Panel Study of Income Dynamics *Panel Study of Income Dynamics, Transition into Adulthood Supplement 2017: User guide*, 2019). Although TAS-2017 included respondents who were not included in CDS, we restricted our analyses to respondents who participated in both CDS-2007 and TAS-2017. Thus, our quantitative sample captured a similar age cohort and time period to our qualitative data but was nationally representative. The analytic sample included 1,168 young adults aged 20-29 in 2017.

4.3. Quantitative measures

Our outcome measure of *technology use frequency* from TAS-2017 was a retrospective count of self-reported monthly days in which the respondent used digital technologies for various purposes in

young adulthood. Additional analyses examined dichotomous indicators of engaging in specific technological activities in the past 30 days at least "a few times a week" compared to once a week or less: watching shows on a television or internet-enabled device; playing games on an electronic device; emailing; interacting with people on social media; and using the internet for school or a job. These activities, as well as casual web use, formed the basis of the main outcome, which was constructed as the mean number of days per month of reported use for each activity type. Although TAS also asked about text messaging, we omitted it because nearly all respondents (96 percent) texted frequently.

We used multiple indicators from CDS-2007 to describe the context and nature of *childhood technology use*. The number of devices in the household (the sum of televisions, videogaming consoles, and computers available in the home for children's use, as well as cell phones in the home) was based on primary caregiver reports and represents the variety of children's access to technology at home. Frequency of technology use was based on: (1) averaged reports of the child's days per month engaged in activities including videogame play, general computer use, email, and internet-based activities; and (2) primary caregiver reports of how many hours per day a television was on in the household.

Parenting strategies related to children's technology use included a number of measures. Household rules about television use was constructed as the mean of three ordinal items measuring the frequency with which parents enforced limits on the amount and content of children's television viewing or permitted children to watch television during meals (reverse-coded). (0=never, 1=less than half of the time, 2=half of the time, 3=most of the time, 4=all of the time). A measure of limits on other types of technology use was constructed as the mean of caregiver-reported ordinal items (0=never, 1=hardly ever, 2=sometimes, 3=often) regarding how frequently they set rules for activities including videogames, computer games, internet use, and email. A measure of technology encouragement was constructed as the mean of five ordinal items regarding how frequently primary caregivers encouraged children to engage with email and with specific content via TV, videogames, computer games, and

internet. Finally, we accounted for whether the caregiver reported discussing TV shows with children after watching them together.

Measures of *young adults' current social contexts* were created from TAS-2017. School and work status were represented by dichotomous measures of current educational enrollment and paid employment. Young adult peer context included: (1) primary residence with parents, in campus housing, away from parents but not on a campus, or other (e.g., military bases, other work-related housing); and (2) the shares of friends who were working for pay and not in college, were in college or graduated from college, were in a vocational training program, were unemployed and looking for work, were married or cohabiting, had children, regularly got drunk, or regularly used drugs.

Young adulthood control variables from TAS-2017 included respondent-level equivalent measures of these peer variables to disentangle peer from individual influences. Educational attainment was coded as less than a high school diploma, high school diploma or GED, some postsecondary education, or Bachelor's degree or more. Union status was coded as single, cohabiting, or married. The respondent's number of biological, adopted, or stepchildren represented parent status. Health behavior measures captured past-year alcohol use (none, non-binge drinking, and binge drinking [4 or more drinks on one occasion for women and 5 or more drinks for men]) and any past-year use of marijuana or illegal drugs.

Sociodemographic background was measured by the respondent's 2007 age, gender, race/ethnicity (non-Hispanic white, non-Hispanic Black, Hispanic, and other/multiracial), primary caregiver years of education, a 2007 binary measure of whether the respondent lived with two biological parents in adolescence, and 2006 household income as a proportion of the federal poverty threshold for the household's size.

4.4. Analyses

Our recursive mixed-method approach inductively built, assessed, and refined a conceptual framework articulating life course influences on young adults' screen time in the mobile internet era. First, we articulated an initial framework using inductive qualitative analyses of interviews with young adults. Rooted in grounded theory, we analyzed participants' perceptions of processes and influences related to their technology use in young adulthood (Strauss & Corbin, 1998). Two coders independently read and annotated complete transcripts. We used open coding to identify and categorize emergent themes. Themes were further refined by comparing and discussing the coders' work.

Second, quantitative analyses of adolescents' technology use and social contexts as they aged into young adulthood assessed whether the initial framework was reflected in nationally representative survey data. Among eligible cases, 35 percent were missing information on one or more variables of interest, most frequently parental education. Multiple imputation is recommended in such situations because listwise deletion relies on problematic assumptions (Little & Rubin, 2014). We used multiple imputation by chained equations in all quantitative analyses, imputing 20 datasets and weighting results to be representative of young adults aged 20-29 years whose families had been in the US at least since 1997. Weights also accounted for attrition between CDS-1997 and TAS-2017. Descriptive information is presented by tertiles of technology use frequency in young adulthood, followed by ordinary least squares (OLS) regression models predicting technology use frequency. Although count outcomes are generally measured using Poisson or negative binomial regression models, our primary outcome of technology use frequency was normally distributed. Therefore, we chose OLS to simplify interpretation of findings. Binary logistic regression models estimated the likelihood of near-daily engagement with each of several specific near-daily technology activities using the same covariates as in Table 4 (results not shown): television content, videogames, email, social media, and technology use for school and/or work.

Finally, we explored discrepancies between qualitative and quantitative findings by returning to the qualitative data to identify potential explanations why anticipated relationships were not present. We used these further qualitative analyses to refine the framework and suggest steps for future research. This second step of qualitative analysis focused on specific themes rather than taking an inductive thematic approach.

5. Results

5.1. Qualitative framework creation

Analyses of our interviews showed that participants used a life course lens to understand their own technology use in young adulthood. See Table 1, which summarizes and aligns the influences on young adult technology use identified by qualitative participants, the life course principles they represent, and subsequent findings from our recursive analyses.

TABLE 1 HERE

5.1.1. A life course perspective on young adults' screen time

Participants' narratives about influences on their current screen time explicitly or implicitly drew on major principles of the life course perspective (Elder, 1994). *Age, historical period,* and *cohort* were crucial in participants' understandings. They viewed heavy technology use as especially widespread among people in their cohort, in part because technologies are ubiquitous in this historical period, and in part because of age—viewing young adulthood as a life phase that is particularly conducive to technology use. Many said that they used technology more as young adults than ever before and expected to use it less when they grew older.

Sarah exemplified heavy technology use among young adults (see Table 2 for sociodemographic characteristics of all quoted participants).[2] She detailed a typical day:

[2] All participant names and some potentially identifying details have been changed.

> Well, I wake up. After I get ready, I'll go downstairs, and I'll check my phone, and I'll check my e-mails, and I'll cruise around on the internet before I need to head to work or to school. And then once I get to work, my job's really based off the computer, so I'll be on the computer most of the day. … So my day's pretty much consistent with computer use. And then when I come home, I'll try to decompress and either watch a show, or play a videogame, or something like that. But for the most part, like, my day's kind of consumed around technology.

Sarah described using digital technologies regularly for school, work, relaxation, and recreation, tying her technology use to her current life situation, social roles, and relationships.

TABLE 2 HERE

Sean reported a typical life course of technology use, with lighter use at age 10 that turned heavier by age 17 and remained heavy in young adulthood. He subscribed to a cohort-based explanation for his heavy technology use: "I think our generation has no problems with technology. … I think older people are really the only people that oppose internet usage and cell phones and stuff." Yet Sean also believed his technology use would decrease in the future because as people get older, "you use less technology. It becomes less of an important thing. … We'll kind of be the first group of people to grow up with technology and grow old with technology. So we'll see. I think it'll just get less as time goes on."

Participants often identified *age-graded institutions* that are prevalent in young adulthood as important drivers of heavy technology use. Kim described unsuccessfully trying to reduce her technology use:

> I live in a sorority, and everything that we do is posted on Facebook, posted in GroupMe, posted in something. So that environment, that community, definitely makes me check my phone and my email and all that kind of stuff *way* more because that is the only source we get information from. Same thing with school. I mean, everything that we—our due dates, our syllabi, our homework is always online. … So pretty much everything that I invest my time in, that I have surrounded my life with, makes me look at my technology a lot.

Although we discuss educational influences on technology below, Kim said that her involvement with the age-graded institutions of college and sororities pressured her into using technology despite her ambivalence. Kim is aware that the social structures in which she is embedded require pervasive

technology use for organizing her schoolwork and social life. She would prefer to use it less but butts up against structural constraints when attempting to do so.

5.1.2. Influences from early life

Further supporting a life course lens, participants felt that their *earlier technology use in childhood and adolescence* shaped their technology use in young adulthood. Some focused on how curtailing early access to technology was important for promoting healthier technology use later on. Like many others, Wade felt the limits his parents set on his childhood technology use facilitated physical activity and time spent outdoors. He said, "Growing up, I was always playing some sort of sport, which always kept me in really good shape. Outside at a really young age." Wade told us that his childhood behaviors affected him in young adulthood, even though like most others, he still thought he used technology heavily now. "I mean, the biggest thing for me was my parents … not giving too much access [to technology] too early, 'cause then you're so consumed in it. Obviously, as you grow up, you're gonna start using it a lot more." Wade thought that young adulthood inevitably leads to increased technology use but that his earlier experiences mattered.

Other participants, often men, articulated that positive early experiences with technology afforded opportunities in young adulthood. Kevin emphasized the upsides of his major hobby in childhood and adolescence: videogaming. He said, "I think like what you enjoy and your hobbies are always part of who you are as a person. … Growing up, I was never the most talkative or sociable. And I think playing games with other people … really helped me develop some of the skills and make connections that are still meaningful today." Instead of social advantages, Neil stressed a skills-based perspective for understanding the benefits of early technology use: "From a young age, my parents really stressed being good with technology. And so, I feel like that's put me in a good place now. … Understanding technology is just, like, so important. It's another language. If you can't speak the language, you're not going to have an easy time understanding things."

As these narratives suggest, participants viewed *parenting practices and messages* related to technology use in childhood and adolescence as important for shaping concurrent and later technology use. Wade felt that his parents had set strong, positive limits around his technology use growing up, but he acknowledged that it is a tough dilemma for parents: "It is a parenting thing because you have to decide when you should allow your child access to all the new technology. Or should you kind of do what my parents did, and keep it pretty strict until they're a certain age?" Wade and others believed their parents' past decisions mattered for their lives.

Matt stressed that not only his parents' rules, but also the messages justifying them were important for shaping his views and behaviors: "'The message I was receiving was, 'This is something we need to control. … Kids your age play too many videogames, don't develop other parts of their lives that they may need to. … You need to be putting your time into more important things.'" Anne, in contrast, described encouragement from her parents, who worked in the technology industry, that shaped her technology use. They promoted not only coding, but also web surfing and videogaming. She said, "I had so many different video consoles. … it was a way to play … to enjoy being a kid." Today, "just being exposed to technology as a young kid, … I'm able to navigate technology pretty quickly and easily, which is nice."

The experiences of some participants from class- and race-disadvantaged backgrounds suggested that a heavy focus on managing children's technology use was a privileged parenting practice. Ronald described his physical safety being his mother's priority in his very low-SES neighborhood. If he misbehaved, she would ground him (but not restrict his technology use), and he would stay inside, "taking my frustrations out on my videogames." During Ronald's adolescence, his mother hesitated to confiscate his cell phone as punishment because it provided them both with a "sense of security" that they could be in touch whenever necessary. His account suggests that for

some low-SES mothers of color, worrying about a child's technology use is a privilege that may pale relative to more pressing concerns (Elliott & Aseltine, 2013; Turner, 2020).

5.1.3. Influences of current social contexts

The life course perspective suggests that not just past influences, but current social contexts and "linked lives," shape people's behaviors. This idea was supported by participants' identification of specific social roles and peer influences on their young adult technology use. As accounts above have shown, *college enrollment and paid work involvement* were considered major reasons why they used technology heavily in young adulthood. Katy described the importance of schooling for prompting technology use when explaining why she was "always on my phone" and using technology more frequently than at younger ages: "I feel like if I was in a different culture, and it wasn't a big deal, then I wouldn't use it. But I live in a culture that does value technology use, and your teachers email. Laptop, you have to type your paper, research … that's probably why." In contrast, Robert was one of the few participants who said that technology "is not really a big part of my life." He believed that not being enrolled in school made his lighter technology use possible.

Anne, a college graduate in the labor force, felt that her college years were the peak of her technology use. Yet after college, technology use was still ubiquitous at work: "You literally use your computer to do your job. So it's a little bit hard to be like, 'I'm not going to use my computer,' because you have to. But I for sure use my phone all the time when I'm at work because I'm bored." Similarly, Blake described near-constant technology use at work, fueled by their job in the technology industry where they used four screens at once. Blake combated their weekday technology use with "detox" sessions outdoors with friends on weekends.

Finally, participants identified their *concurrent peer contexts* as important for encouraging technology use. Some, like Kim in her sorority house, lived with peers, constantly surrounded by peer influences to use more technology. Others cited physical distance from close friends as an important

reason for using technology to connect, like Ryan who considered technology "priceless" for this reason among others. Kelly perceived considerable pressure from both distant friends and dormmates to use social media: "I remember my freshman year of college actually, I was really adamantly against adding Snapchat because I thought it was conceptually very stupid. And then I got peer pressured into downloading it. [laughs] … But that was an atmosphere that I was really, really encouraged to use it." Caleb, describing his previous heavy social media use, said it was "how you showed that you had a life. … It was like social currency." Importantly, not only friends' technology use, but also the social situations of those friends, was important in these accounts. Peers who were enrolled in college and those who wanted to use technologies (often social media and videogaming) to connect with friends were perceived sources of social pressure.

5.1.4. Influence of human agency

Many participants, despite describing influences from social institutions and roles and experiencing peer pressure to use technology, ultimately fell back on individualistic narratives and their own sense of *agency* for understanding their technology use. Jane, who was trying to use technology less by tracking her time usage patterns, blamed herself: "And so I still look at it as a good thing, but I think one thing that has changed is I realize now how much of a personal responsibility it is hold yourself accountable for how you're using technology. Because so much of it is how one individual chooses to use it. And you have to be cognizant of how that affects yourself and make sure that you're taking care of yourself and your productivity." Jane's narrative was typical in identifying social influences on technology use but ultimately viewing it as an individual responsibility, in line with neoliberal cultural narratives. Jane also expressed a desire to agentically control her own technology use, even though many participants often felt out of control.

5.2. Quantitative framework testing

This initial conceptual framework, represented in the first column of Table 1, was assessed in the third column using nationally representative data that followed adolescents into young adulthood. We examined age differences in survey reports of technology-related time use, then investigated influences on young adults' screen time frequency of earlier technology use and technology-related parenting in adolescence and concurrent educational, work, and peer context. Multivariate models also controlled for sociodemographic background and individual-level equivalents of the peer measures (to ensure that any associations between peer measures and technology use were not a spurious function of individual-level measures due to homophilic friendship ties). Beyond individual-level measures already in our conceptual framework, these included young adult family formation and health behaviors.

5.2.1. Screen time frequency in young adulthood

Bivariate analyses reported in Table 3 show that as expected based on qualitative findings, respondents used the technology activities we measured more frequently on average in young adulthood than in adolescence. This comparison is imperfect because of (inevitable, given technological developments) differences in technologies measured in 2007 versus 2017, and both measurements are underestimates because of the 2007 exclusion of television and the 2017 exclusion of the nearly universal behavior of texting. Respondents used the technology activities we measured an average of 17 days in the past month, compared to 9 days for the same people in childhood. At 22 days per month, the highest tertile of young adults used technology twice as many days as the lowest tertile. These tertiles were significantly different from the sample mean on all near-daily technology activity measures, showing that variation in overall frequency was not driven by a subset of activities. We also expected less variation in the high frequency of technology use in young adulthood. Despite a much larger mean, the standard deviation for young adult technology use frequency (5 days) was smaller than in adolescence (6 days), suggestively supporting qualitative participants' notions of an intense and relatively standardized young adult life course stage of technology use.

Bivariate analyses supported at least some influences in nearly all measured domains, including controls, as potential predictors of young adult technology use frequency to be included in multivariate models. One exception, discussed further below, was technology-related parenting in adolescence. Two notable sociodemographic findings were the lack of a significant gender difference—which reflects findings from other populations of young people (e.g., Simón-Montañes, Solana, García-Gonzalez, Catalán, & Sevil-Serrano, 2019)—and the association of a more privileged socioeconomic background with more frequent technology use.[3]

Table 4 reports multivariate findings. The model incorporated all variables, but except as noted below, models that included only sociodemographic background controls and each particular domain (not shown) yielded similar results. For predictors that were significant in the main model, we also estimated binary logit models (not shown) that used the same variables as in Table 4 to predict the likelihood of near-daily versus less frequent engagement in each of several technology activities: television, videogames, email, social media, and technology use for school/work (see Table 1).

Age functioned as expected, with each additional year predicting a 0.06 standard deviation decrease in the frequency of young adult technology use.[4] Across the sample's age range, this represents a 0.53 standard deviation difference. Additional analyses (not shown) found that rising age was associated with a decrease in the likelihood of near-daily email and social media use.

5.2.2. Influences from early life

[3] Adolescent household income (but not parental education) was positively related to young adult technology use frequency in a baseline model (not shown) containing only sociodemographic variables, but not in the full model reported in Table 4. Household income predicted adolescent technology use frequency and young adult peer network measures, and these measures in turn eliminated the significance of household income when introduced into models predicting young adult technology use frequency. These analyses provided suggestive evidence that our model explains income-based differences in young adult technology use, further supporting its usefulness.

[4] Because of substantial collinearity between the age measures at the two waves, we included only one measure in the model.

As expected, *adolescent technology use* was positively—though weakly and inconsistently—associated with young adult technology use frequency. A one standard deviation increase in the number of devices in the household in adolescence predicted a 0.09 standard deviation increase in young adult technology use (see Table 4). And a one standard deviation increase in adolescent technology use frequency predicted a 0.16 standard deviation increase in young adult technology use frequency. Adolescent technology use frequency also predicted the likelihood of near-daily use in young adulthood of email, social media, and technology for school or work (not shown). Adolescent television exposure did not predict the outcome.

Parenting strategies related to technology use during adolescence were not associated with young adult technology use frequency (see below).

5.2.3. Influences of current social contexts

Young adult *work and school involvement* yielded mixed results. As expected, respondents enrolled in school used the technologies we measured 0.23 standard deviations more frequently than those not enrolled. Unsurprisingly, email and technology use for school/work were the near-daily activities that school enrollment predicted. But employment status did not significantly predict young adult technology use frequency (see below).

Three young adult *peer context* measures were weakly associated with technology use frequency. A one standard deviation increase in the percentage of respondents' friends who were in college or had a college degree predicted a 0.06 standard deviation increase in technology use frequency. Having friends with children similarly predicted more frequent technology use, at 0.11 standard deviations higher for a one standard deviation increase in friends with children. In contrast, a one standard deviation increase in having married or cohabiting friends predicted a decrease of 0.10 standard deviations in technology use frequency (significant in the full model but not in a model containing only sociodemographic and friendship network factors; not shown). These contrasting associations

between technology use frequency and married friends versus friends with children are indirectly supported by prior research (Baker, Sanders, & Morawska, 2017; Bartholomew, Schoppe-Sullivan, Glassman, Kamp Dush, & Sullivan, 2012; Kalmijn, 2003). Having college-educated friends increased the likelihood of near-daily email use, having friends with children predicted higher social media use, and having married or cohabiting friends predicted less frequent videogaming and technology use for school/work. Other peer context measures, including place of residence, were not significant. Although having more friends who were married/cohabiting or had children predicted technology use frequency, respondents themselves being married/cohabiting or having children did not.

5.2.4. Influence of human agency

In sum, our conceptual framework was fruitful for understanding technology use frequency among US young adults. Beyond sociodemographic background, adolescent technology use, current school enrollment, and peers' education and family formation predicted how often young adults used technology. The framework was also useful for understanding inequalities in young adults' technology use frequency by socioeconomic status of origin. Yet the R squared statistic shows that the full model in Table 4 explained just 15 percent of the variation in young adult technology use frequency. No single domain accounted for the majority of the R squared value; instead, the combination of domains in the final model was the most effective. As the relatively weak relationships between the significant predictors and the outcome suggested, our conceptual framework identified several significant predictors but was not very powerful overall for explaining variation in young adults' technology use frequency. This may be an indirect indicator of human agency spurring individual-level variation.

5.3. Qualitatively refining the framework

Two notable discrepancies between the conceptual framework generated by qualitative data and the quantitative assessment of the framework warranted further analysis. First, no *technology-related parenting* variables from adolescence predicted young adults' technology use frequency. Perhaps these measures

could not capture parenting messages that qualitative participants described internalizing. Our re-analysis of the qualitative data identified another potential interpretation: *Rather than operating primarily on young adult time use, earlier parenting messages and practices shaped young people's current emotions about technology use and how they imagined using technology in the future, making technology-related parenting potentially more influential for technology use later in adulthood.* This interpretation supports past research findings that parenting shapes young people's values (Kohn, Slomczynski, & Schoenbach, 1986), which are distinct from the concrete behaviors we measured.

Many qualitative respondents had negative emotional responses to their own technology use that appeared not to influence their current behavior. Olivia described having low technology use at age 10, with parents who set boundaries and discouraged screen time. Olivia described feeling nostalgic about her low levels of technology use in childhood: "I would like to think I was better for it in the end. Like, instead of looking at technology a lot, [I was] reading or like going outside. I feel like I have a lot more memories and solid foundations of things that I can remember doing, than maybe compared to kids today who have more technology." By age 17, she said "everyone was using technology," and her parents were less strict. As a young adult, she was using technology even more heavily and wishing she used it less. Olivia described her emotions and the influences that encouraged her to use technology more than she would prefer:

> I kind of wish that I used a little bit less technology. Because it is, like, more convenient to come home and just relax and watch TV. But I wish that I was doing more other things to stimulate my mind … It's so easy to avoid circumstances by being on your phone or just pretending like you're not paying attention. So I think that I would like to steer away from that, 'cause even though certain experiences can be uncomfortable and you wish you could look at your phone, I feel like that's still a genuine memory and a real interaction.

Olivia's negative emotional reaction to her own technology use did not alter her current behavior.

Alice was more explicit about the disjoint between her emotional reaction to technology use and her behavior. She said that in childhood, her parents thought technology would "rot our brains" and "was just not good for you." In young adulthood, her low childhood technology use had ballooned

to several hours daily. She thought her parents' messages were still "important to me, just in the way that it's nice to know that you should sometimes take a break. But I also don't go on that similar path. Like, I use my phone a lot more than my mother would care to have me doing. … It bears on the back of my mind, but it doesn't really influence my technology use."

Perhaps reflecting such negative emotional reactions, many of our participants felt their heavy technology use in young adulthood was an anomaly in their life course, more frequent than in the past and in their imagined futures. Other behaviors such as alcohol use and smoking are more prevalent in early young adulthood than in either adolescence or later young adulthood (Maggs & Schulenberg, 2004; Pampel, Mollborn, & Lawrence, 2014), reinforcing the possibility that technology use may follow suit. Arun used technology very little in childhood and had "very restrictive" parents. By age 17 and continuing in young adulthood, he said, "technology consumed my life." He implied that his heavy technology use would be temporary and linked it to being in college: "Another aspect of college for sure is the fact that you are independent … So when I'm independent, I feel like I'm using my devices more. But when I have things planned, I do have a hard and fast rule [about technology use]. … I feel like the beauty of college is the fact that we … get to decide when to use our phone. We get to decide when to stop." Arun foresees using technology less as he ages: "As my life progresses and, you know, as I have a family … Then it's like … get home to my kids [instead of using technology]. Do I want to stop using my phone, or do I want to check on updates and such, or should I only use it for an hour?" Peter echoed these sentiments, saying that right now "I've chosen to sit around and watch TV every single night as opposed to going on a hike or something. … Once I get out of college and once I get a job and I'm living on my own, I probably wouldn't feel the need to just sit around all day and binge watch." These participants envisioned more authentic future selves whose technology use behaviors would conform more to the parenting practices and messages they experienced growing up and the emotions they were feeling in young adulthood. These narratives were also a way to imagine

reclaiming their agency and control over their behavior in the future, perhaps leading to wider variation in technology use behaviors as this cohort ages.

The second discrepancy between the qualitative framework and quantitative findings was that neither bivariate nor multivariate analyses found that *paid work involvement* predicted young adult technology use frequency. Returning to qualitative data to better understand this finding, we examined the accounts of working participants. We found that although many participants' jobs required substantial technology use, some did not. Both the educational credentials needed for the job and the type of occupation mattered for the amount of technology use required. Michael and Caleb used technology heavily for their specialized jobs in the technology industry. But other jobs, such as Hannah's position as a server in a restaurant or Chloe's contract work as an artist, entailed using technology very frequently without requiring an advanced degree or being in a STEM (science, mathematics, engineering, and technology) field. This loose relationship between technology requirements at work and educational attainment and occupation suggests that although paid work matters considerably for young people's technology involvement, it must be measured in a more fine-grained way to understand the relationship. Researchers should also consider what activities happen in place of paid work. As Arun's and Peter's narratives suggested above, young adults may use technology more frequently when they do not have structured plans such as work shifts, with this dynamic potentially balancing out increases in technology use caused by paid work.

6. Discussion

Digital technology use is rapidly changing and increasingly prevalent. We asked whether insights from life course perspective—for example, that behaviors and social contexts from both current and past life phases are important for people's technology use (Elder, 1994)—can help us to understand variation in young adults' technology use. Research on the life course of "screen time," especially in the mobile internet era, is sparse. We analyzed 56 interviews with young adults in the western US,

coding emergent themes drawn from their narratives of influences shaping their technology use in young adulthood. These themes integrated core life course principles and had implications for life course researchers. Using nationally representative US data following adolescents into young adulthood from 2007-2017, we explored the extent to which our participants' understanding of their own experiences was reflected in nationally representative survey reports of digital technology use frequency, a process that spurred us to refine the framework through further qualitative analysis.

The conceptual framework strongly supported adopting a life course perspective on understanding young adult technology use as socially influenced yet highly malleable. Age shaped young adult technology use frequency, with a lifetime peak in technology use potentially occurring in early young adulthood for many. More frequent technology use in adolescence (approximately ages 10-18) predicted increased technology use in young adulthood, as did increased access to devices in adolescence. Current school enrollment in young adulthood was related to more frequent technology use, as was having more friends in college or with a college degree. Having more friends with children predicted more, but having more married or cohabiting friends predicted less, frequent young adult technology use. Adolescent technology use frequency and young adult peer network factors appeared to explain income-based disparities in young adults' technology use. In other words, early life experiences and current social contexts and convoys matter for understanding young adults' screen time, but only up to a point. Considerable variation in young adults' screen time frequency was left unexplained, underscoring the importance of studying human agency and other drivers of within-group variation in technology use.

Interview participants identified paid employment as another driver of technology use, but this finding did not generalize in quantitative analyses. Further qualitative analysis suggested this may be because different jobs have very different technology use requirements and because a lack of employment also increases technology use. Technology-related parenting in earlier life, another factor

participants emphasized, was not related to young adult technology use frequency in nationally representative data, but qualitative analyses suggest it shaped emotional responses and imagined future technology use, giving it potential for influencing time spent using technology at older ages. These findings speak to the importance of broadening the focus on time use to incorporate emotional responses and future planning in order to best understand young adults' relationships to digital technologies. Our findings suggest that life course research could benefit from further articulation and measurement of human agency, an exploration of the life course of emotions, and consideration of how variations in social roles (e.g., occupation) within social statuses (e.g., "employed") can lead to stark differences in behaviors such as technology use.

Our conceptual framework identified numerous factors associated with young adult technology use frequency, but its predictive power was fairly limited. This may mean that young adult technology use is quite malleable across a person's life, which would make technology use more amenable to policy interventions. It may also be promising for adults who are concerned that children's avid engagement with technology leads to an inevitable future of heavy technology use. We interpret our findings to mean that a life course perspective on technology use is clearly warranted, but future research needs to identify additional social factors and processes that shape young adults' technology use. Future research must also measure and explain the role of agency, which plays an increasing role in technology use frequency as people age from adolescence into young adulthood.

Because technology use is changing rapidly, historical period is very important for understanding influences on it. The age cohort we studied here were adolescents in the early 2000s, and the technologies and technology-related parenting they experienced were different from those to which today's adolescents are exposed (Nelissen & Van den Bulck, 2018). Future quantitative work should analyze time diaries, which are less susceptible to social desirability bias (Orben & Przybylski, 2019), and use a broader set of technology-related measures beyond time use. The mixed-method

comparison of a nationally representative quantitative data source with a qualitative convenience sample would be strengthened by further diversity in the latter. Future qualitative data collection should target a wider variety of people and cover a broader range of ages and fuller life histories, facilitating comparisons of different sociodemographic groups' technology use in young adulthood.

The sociodemographic characteristics that shape an individual's life course should also be explored more fully in future work. Intersecting identities (e.g., race and social class) and levels of analysis (e.g., neighborhood- or school-level characteristics and individual characteristics) likely shape young people's technology use in ways that should be explored in future research (Rafalow, 2018). Gender was related to young adult technology use in complex ways that should be further investigated. Our quantitative analyses uncovered interesting and potentially unexpected racial/ethnic differences in young adult tech use that qualitative analyses could not address because the sample was not particularly racially diverse and few participants discussed race. Bivariate associations between socioeconomic status and young adult technology use did not persist after including the factors we identified, suggesting interesting relationships among SES, life course circumstances, and young adult technology use for future investigation.

Because it is changing quickly and becoming ubiquitous, technology use in the mobile internet era can seem like an exceptional phenomenon that social science researchers have yet to understand. But our mixed-method analyses suggest that bringing existing, influential theoretical frameworks—like the life course perspective—to bear is a fruitful approach for understanding emerging patterns of technology use and contextualizing them within historical change, linked lives, human agency, and social circumstances. For example, the COVID-19 pandemic is resulting in unprecedented changes in technology time use patterns and reshaping social contexts and interactions. Individual agency is greatly constrained during social distancing, and the effects of earlier experiences may matter less when

structural constraints are greater. This study's framework incorporates these phenomena and may be useful for understanding changes in digital technology use in the wake of this societal cataclysm.

Table 1. Influences on young adult technology use: inductive conceptual framework and recursively analyzed findings

Participant-identified influences in initial qualitative framework	**Related influences articulated in the life course theoretical perspective**	**Evidence from quantitative analyses of technology use frequency (direction of significant relationship)**	**Evidence from further qualitative analyses**
Age, historical period, their cohort	Age, historical period, and cohort	Within this cohort, age (-) (multiple periods and cohorts not observed)	
Earlier technology use	Earlier behavior	Adolescent technology use frequency (+)	
Parenting practices and parents' messages about technology	Earlier socialization, linked lives	Not significantly related	Parent practices/messages shape current emotions and future anticipated technology use frequency
College enrollment	Social roles and institutional norms	School enrollment (+)	
Paid work involvement	Social and institutional roles	Not significantly related	Direction of influence varies by job
Peer contexts	Linked lives	% friends in college (+) % friends with children (+) % friends partnered (-)	
Individualistic narratives, desire for control over own technology use	Human agency	Low % of variation in young adult technology use explained by the model	

Table 2. Characteristics of quoted interview participants (other participants not included)

Pseudonym	Gender	Race/ethnicity	SES	Sexual orientation	College student?	College degree?
Alice	Female	White	High	Heterosexual	Yes	No
Anne	Female	Asian American	Mid/mixed	Heterosexual	No	Yes
Arun	Male	Asian American	High	Heterosexual	Yes	No
Blake	Nonbinary	White	Mid/mixed	Pansexual	No	No
Caleb	Male	White	Mid/mixed	Gay	Yes	No
Chloe	Female	White	Mid/mixed	Heterosexual	No	No
Hannah	Female	White	Mid/mixed	Heterosexual	No	No
Jane	Female	White	High	Heterosexual	Yes	No
Katy	Female	Black	Low	Heterosexual	Yes	No
Kelly	Female	Asian American	Mid/mixed	Heterosexual	No	Yes
Kevin	Male	White	High	Heterosexual	Yes	No
Kim	Female	White	High	Heterosexual	Yes	No
Matt	Male	White	High	Heterosexual	Yes	No
Michael	Male	White	Mid/mixed	Heterosexual	Online	No
Neil	Male	White	High	Heterosexual	Yes	No
Olivia	Female	White	Mid/mixed	Heterosexual	Yes	No
Peter	Male	Black	Mid/mixed	Heterosexual	Yes	No
Robert	Male	White	Mid/mixed	Heterosexual	No	No
Ronald	Male	Black	Low	Heterosexual	No	No
Sarah	Female	White	Mid/mixed	Heterosexual	Yes	No
Sean	Male	White	High	Heterosexual	Yes	No
Wade	Male	White	High	Heterosexual	Yes	No

Table 3. Weighted means for adolescent and young adult variables, by tertile of young adult technology use frequency

Variable	Overall	SE	Low Tech		Mid Tech		High Tech	
Monthly Days of Technology Use	16.51	(0.22)	11.17	*	16.64		22.30	*
NEAR-DAILY TECHNOLOGY ACTIVITIES								
Television Content	0.84	(0.01)	0.69	*	0.88		0.96	*
Videogames	0.45	(0.02)	0.30	*	0.43		0.64	*
Email	0.78	(0.01)	0.57	*	0.86	*	0.94	*
Social Media	0.78	(0.02)	0.57	*	0.82	*	0.97	*
School/Work	0.74	(0.02)	0.58	*	0.75		0.89	*
AGE								
Age (CDS-2007; Years)	14.54	(0.08)	14.77	*	14.48		14.35	*
Age (TAS-2017; Years)	24.56	(0.08)	24.81	*	24.48		24.39	*
ADOLESCENT TECHNOLOGY USE								
Number of Devices in Household	9.77	(0.17)	9.31	*	9.91		10.14	*
Tech Frequency (Mean Days)	9.15	(0.28)	7.39	*	9.89	*	10.33	*
TV Hours on per Day	5.77	(0.23)	5.62		5.82		5.87	
TECH-RELATED PARENTING HISTORY								
TV Rules	2.32	(0.04)	2.37		2.31		2.26	
Tech Limits	1.66	(0.04)	1.67		1.64		1.68	
Tech Encouragement	0.95	(0.04)	0.91		0.95		0.98	
Discusses TV Programs with Children	0.79	(0.02)	0.81		0.77		0.79	
YOUNG ADULT SCHOOL/WORK								
Currently Enrolled in School	0.27	(0.02)	0.19	*	0.30		0.32	*
Currently Employed	0.81	(0.02)	0.78		0.81		0.83	
PEER CONTEXT								
Primary Residence								
With Parents	0.37	(0.02)	0.41	*	0.36		0.33	*
Away from Parents	0.56	(0.02)	0.55		0.56		0.59	
Campus Housing	0.05	(0.01)	0.03		0.05		0.07	
Other	0.02	(0.00)	0.01		0.04	*	0.01	
% Friends Working for Pay and Not in College	64.27	(1.06)	63.55		63.50		65.87	
% Friends in College or Graduated	57.28	(1.28)	53.51	*	58.03		60.68	*
% Friends in a Vocational Training Program	12.81	(0.68)	13.24		13.92		11.18	*
% Friends Unemployed and Looking for Work	12.47	(0.59)	12.36		12.60		12.46	
% Friends Married or Cohabiting	31.55	(0.97)	33.65	*	31.62		29.15	*
% Friends with Children	24.83	(1.29)	25.70		25.28		23.39	
% Friends Who Regularly Get Drunk	31.86	(1.26)	27.82	*	32.50		35.70	*
% Friends Who Regularly Use Drugs	19.04	(0.92)	16.36	*	18.50		22.58	*
YOUNG ADULT CONTROLS								
Educational Attainment								
Less than High School Diploma	0.07	(0.01)	0.09		0.07		0.05	
High School Diploma/GED	0.23	(0.01)	0.25		0.24		0.20	*
Some Postsecondary	0.39	(0.02)	0.41		0.36		0.39	
College Graduate	0.31	(0.02)	0.26	*	0.33		0.35	
Union Status								
Single	0.66	(0.02)	0.64		0.67		0.66	
Cohabiting	0.21	(0.01)	0.23		0.19		0.22	
Married	0.13	(0.01)	0.13		0.14		0.12	
Number of Children	0.33	(0.03)	0.39	*	0.30		0.28	
Alcohol Consumption								
No Drinking	0.25	(0.02)	0.30	*	0.20	*	0.23	
Non-Binge Drinking	0.25	(0.01)	0.23		0.29	*	0.23	
Binge Drinking	0.50	(0.02)	0.47		0.50		0.54	
Any Marijuana/Illegal Drugs	0.09	(0.01)	0.10		0.08		0.11	
SOCIODEMOGRAPHIC BACKGROUND								

Male	0.50	(0.01)	0.53		0.49	0.49	
Race/Ethnicity							
Non-Hispanic White	0.62	(0.03)	0.59		0.66	0.59	
Non-Hispanic Black	0.13	(0.02)	0.12		0.13	0.14	
Hispanic	0.16	(0.03)	0.23	*	0.14	0.12	
Other	0.09	(0.01)	0.07		0.07	0.15	*
Parental Years of Education	13.77	(0.17)	13.45		13.71	14.20	*
Lived with Two Biological Parents in Childhood	0.61	(0.02)	0.56		0.66	* 0.61	
Childhood Income to Poverty Ratio	4.26	(0.25)	3.81		4.24	4.77	*
N	1,168		383		384	401	

Source: Panel Study of Income Dynamics 2017 Transition into Adulthood Supplement/2007 Child Development Supplement.
Notes: * p<.05 comparing that technology use tertile to the overall mean. SE=standard error.

Table 4. OLS regression coefficients predicting young adult technology use frequency

Variable	B		SE	Also significant for activities
AGE				
Age (CDS-07; Years)	-0.32	*	(0.13)	Email, social media
ADOLESCENT TECHNOLOGY USE				
Number of Devices in Household	0.13	*	(0.06)	None
Tech Frequency (Mean Days)	0.14	***	(0.03)	Email, social media, school/work
TV Hours on per Day	0.01		(0.03)	
TECH-RELATED PARENTING HISTORY				
TV Rules	-0.12		(0.24)	
Tech Limits	0.11		(0.23)	
Tech Encouragement	0.08		(0.25)	
Discusses TV Programs with Children	-0.53		(0.33)	
YOUNG ADULT SCHOOL/WORK				
Currently Enrolled in School	1.18	*	(0.53)	Email, school/work
Currently Employed	0.56		(0.42)	
PEER CONTEXT				
Primary Residence [with Parents]				
Away from Parents	0.39		(0.38)	
Campus Housing	0.87		(0.81)	
Other	0.44		(1.22)	
% Friends Working for Pay and Not in College	0.01		(0.01)	
% Friends in College or Graduated	0.01	*	(0.01)	Email
% Friends in a Vocational Training Program	-0.00		(0.01)	
% Friends Unemployed and Looking for Work	0.00		(0.01)	
% Friends Married or Cohabiting	-0.02	*	(0.01)	Videogames, school/work
% Friends with Children	0.02	**	(0.01)	Social media
% Friends Who Regularly Get Drunk	0.01		(0.01)	
% Friends Who Regularly Use Drugs	0.02		(0.01)	
YOUNG ADULT CONTROLS				
Educational Attainment [<High School Degree]				
High School Degree/GED	0.52		(0.80)	
Some Postsecondary	0.35		(0.87)	
College Graduate	1.29		(1.06)	
Union Status [Single]				
Cohabiting	-0.22		(0.41)	
Married	0.86		(0.50)	
Number of Children	0.05		(0.22)	
Alcohol Consumption [No Drinking]				
Non-Binge Drinking	-0.12		(0.54)	
Binge Drinking	0.25		(0.46)	
Any Marijuana/Illegal Drugs	-0.47		(0.65)	
SOCIODEMOGRAPHIC BACKGROUND				
Male	-0.71	*	(0.32)	Videogames (+), email, social media
Race/Ethnicity [Non-Hispanic White]				
Non-Hispanic Black	1.37	*	(0.61)	Email
Hispanic	-0.13		(0.56)	
Other	2.26	**	(0.77)	Email, school/work
Parental Years of Education	-0.02		(0.09)	
Lived with Two Biological Parents in Childhood	0.09		(0.45)	
Childhood Income to Poverty Ratio	0.02		(0.05)	
Constant	15.04	***	(2.28)	
R-squared	0.15			

Source: Panel Study of Income Dynamics, 2017 Transition into Adulthood Supplement/2007 Child Development Supplement.
Notes: N=1168. * p<.05 ** p<.01 ***p<.001. B=coefficient, SE=standard error. Reference categories in brackets. Last column denotes significant logit coefficient with tech activity outcome; coefficient sign is same as in main model unless noted.

References

Arnett, J. J. (1997). Young people's conceptions of the transition to adulthood. *Youth & Society, 29*(1), 3-23.

Baker, S., Sanders, M. R., & Morawska, A. (2017). Who uses online parenting support? A cross-sectional survey exploring Australian parents' internet use for parenting. *Journal of Child and Family Studies, 26*(3), 916-927.

Bartholomew, M. K., Schoppe-Sullivan, S. J., Glassman, M., Kamp Dush, C. M., & Sullivan, J. M. (2012). New parents' Facebook use at the transition to parenthood. *Family relations, 61*(3), 455-469.

Benson, J. (2014). Transition to adulthood. In A. Ben-Aryeh, F. Casas, I. Frønes, & J. E. Korbin (Eds.), *Handbook of child well-being: Theories, methods and policies in global perspective* (pp. 1763-1783). Dordrecht: Springer Science+Business Media.

Carvalho, J., Francisco, R., & Relvas, A. P. (2015). Family functioning and information and communication technologies: How do they relate? A literature review. *Computers in Human Behavior, 45*, 99-108.

Ching, C. C., Basham, J. D., & Jang, E. (2005). The Legacy of the Digital Divide: Gender, Socioeconomic Status, and Early Exposure as Predictors of Full-Spectrum Technology Use Among Young Adults. *Urban Education, 40*(4), 394-411.

Christakis, D. A. (2010). Internet addiction: a 21 st century epidemic? *BMC Medicine, 8*(1), 61.

Cingel, D. P., & Hargittai, E. (2018). The relationship between childhood rules about technology use and later-life academic achievement among young adults. *Communication Review, 21*(2), 131-152.

Coyne, S. M., Padilla-Walker, L. M., & Howard, E. (2013). Emerging in a digital world: A decade review of media use, effects, and gratifications in emerging adulthood. *Emerging Adulthood, 1*(2), 125-137.

DiPrete, T. A., & Eirich, G. M. (2006). Cumulative advantage as a mechanism for inequality: A review of theoretical and empirical developments. *Annual Review of Sociology, 32*, 271-297.

Dworkin, J., Rudi, J. H., & Hessel, H. (2018). The state of family research and social media. *Journal of Family Theory & Review, 10*(4), 796-813.

Elder, G. H., Jr. (1974). *Children of the Great Depression: Social change in life experience*. Chicago: University of Chicago Press.

Elder, G. H., Jr. (1994). Time, human agency, and social change: Perspectives on the life course. *Social Psychology Quarterly, 57*(1), 4-15.

Elliott, S., & Aseltine, E. (2013). Raising teenagers in hostile environments: How race, class, and gender matter for mothers' protective carework. *Journal of Family Issues, 34*(6), 719-744.

England, P., Shafer, E. F., & Fogarty, A. C. K. (2007). Hooking up and forming romantic relationships on today's college campuses. In M. S. Kimmel & A. Aronson (Eds.), *The gendered society reader* (3rd ed., pp. 531-547). New York: Oxford University Press.

Hayward, M. D., & Gorman, B. K. (2004). The long arm of childhood: The influence of early-life social conditions on men's mortality. *Demography, 41*(1), 87-107.

Hofferth, S. L. (2010). Home media and children's achievement and behavior. *Child Development, 81*(5), 1598-1619.

Hofferth, S. L., & Sandberg, J. F. (2001). How American children spend their time. *Journal of Marriage and Family, 63*(2), 295-308.

Holstein, J. A., & Gubrium, J. F. (1995). *The active interview*. Thousand Oaks, CA: Sage.

Ito, M., Baumer, S., Bittanti, M., boyd, d., Cody, R., Herr-Stephenson, B., . . . Tripp, L. M. (2019). *Hanging out, messing around, and geeking out: Kids living and learning with new media* (Tenth anniversary edition ed.). Cambridge, MA: MIT Press.

Kalmijn, M. (2003). Shared friendship networks and the life course: An analysis of survey data on married and cohabiting couples. *Social Networks, 25*(3), 231-249.

Kleinrock, L. (2008). History of the Internet and its flexible future. *IEEE Wireless Communications, 15*(1), 8-18.

Kohn, M. L., Slomczynski, K. M., & Schoenbach, C. (1986). Social stratification and the transmission of values in the family: A cross-national assessment. *Sociological Forum, 1(1)*, 73-102.

LeBesco, K. (2011). Neoliberalism, public health, and the moral perils of fatness. *Critical Public Health, 21*(2), 153-164.

Little, R. J. A., & Rubin, D. B. (2014). *Incomplete data.* John Wiley & Sons, Inc.

Lofland, J., Snow, D., Anderson, L., & Lofland, L. H. (2006). *Analyzing social settings: A guide to qualitative observation and analysis* (4th ed.). Belmont, CA: Wadsworth/Thomson Learning.

Luna, J. K. (2019). The ease of hard work: Embodied neoliberalism among Rocky Mountain Fun Runners. *Qualitative Sociology, 42*(2), 251–271.

MacGill, A. (2007). Parent and teen internet use. Retrieved from Pew Research Center website: http://www.pewinternet.org/2007/10/24/parent-and-teen-internet-use/.

Madden, M., Lenhart, A., Duggan, M., Cortesi, S., & Gasser, U. (2013). Teens and Technology 2013. Washington, DC: Pew Internet & American Life Project.

Maggs, J. L., & Schulenberg, J. E. (2004). Trajectories of alcohol use during the transition to adulthood. *Alcohol Research & Health, 28*(4), 195.

McGonagle, K. A., Schoeni, R. F., Sastry, N., & Freedman, V. A. (2012). The Panel Study of Income Dynamics: Overview, recent innovations, and potential for life course research. *Longitudinal and Life Course Studies, 3*(2).

McLeod, J. D., & Almazan, E. P. (2003). Connections between childhood and adulthood. In *Handbook of the life course* (pp. 391-411): Springer.

Mesch, G. S. (2003). The family and the Internet: The Israeli case. *Social Science Quarterly, 84*(4), 1038-1050.

Mollborn, S. (2017). *Mixed messages: Norms and social control around teen sex and pregnancy*. New York: Oxford University Press.

Mullan, K., & Chatzitheochari, S. (2019). Changing times together? A time-diary analysis of family time in the digital age in the United Kingdom. *Journal of Marriage and Family, 81*, 795–811.

Nelissen, S., & Van den Bulck, J. (2018). When digital natives instruct digital immigrants: active guidance of parental media use by children and conflict in the family. *Information, Communication & Society, 21*(3), 375-387.

Orben, A., & Przybylski, A. K. (2019). Screens, teens, and psychological well-being: Evidence from three time-use-diary studies. *Psychological Science, 30*(5), 682–696.

Pampel, F., Mollborn, S., & Lawrence, E. M. (2014). Life course transitions in early adulthood and SES disparities in tobacco use. *Social Science Research, 43*, 45-59.

Panel Study of Income Dynamics, Transition into Adulthood Supplement 2017: User guide. (2019). Institute for Social Research, University of Michigan.

Pew Research Center. (2018). Internet/broadband fact sheet. Retrieved from: https://www.pewresearch.org/internet/fact-sheet/internet-broadband/.

Rafalow, M. H. (2018). Disciplining play: Digital youth culture as capital at school. *American Journal of Sociology, 123*(5), 1416-1452.

Rideout, V. (2015). *The Common Sense census: Media use by tweens and teens*. Retrieved from: https://www.commonsensemedia.org/sites/default/files/uploads/research/census_researchreport.pdf

Rideout, V. J., & Robb, M. B. (2019). *The Common Sense census: Media use by tweens and teens.* Retrieved from: https://www.commonsensemedia.org/sites/default/files/uploads/research/2019-census-8-to-18-key-findings-updated.pdf.

Riley, M. W. (1987). On the significance of age in sociology. *American Sociological Review, 52*(1), 1-14.

Russ, S. A., Larson, K., Franke, T. M., & Halfon, N. (2009). Associations between media use and health in US children. *Academic Pediatrics, 9*(5), 300-306.

Ryder, N. B. (1965). The cohort as a concept in the study of social change. *American Sociological Review, 30*(6), 843-861.

Scott, M. B., & Lyman, S. M. (1968). Accounts. *American Sociological Review, 33*(1), 46-62.

Sefton-Green, J. (2006). Youth, technology, and media cultures. In J. Green & A. Luke (Eds.), *Review of research in education. Vol. 30, 2006 Rethinking learning: What counts as learning and what learning counts* (pp. 279-306). Washington, D.C.: American Educational Research Association.

Seiter, E. (1999). Power rangers at preschool: Negotiating media in child care settings. In M. Kinder (Ed.), *Kids' media culture* (pp. 239-262). Durham, NC: Duke University Press.

Shanahan, M. J. (2000). Pathways to adulthood in changing societies: Variability and mechanisms in life course perspective. *Annual Review of Sociology, 26*, 667-692.

Silva, J. M. (2012). Constructing adulthood in an age of uncertainty. *American Sociological Review, 77*(4), 505-522.

Simón-Montañes, L., Solana, A. A., García-Gonzalez, L., Catalán, A. A., & Sevil-Serrano, J. (2019). "Hyperconnected" adolescents: sedentary screen time according to gender and type of day. *European Journal of Human Movement, 43*, 49-66.

Smith, A., & Anderson, M. (2018). Social media use in 2018. *Pew Research Center, 1*.

Stiglic, N., & Viner, R. M. (2019). Effects of screentime on the health and well-being of children and adolescents: A systematic review of reviews. *BMJ Open, 9*(1), e023191.

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research techniques*. Sage publications.

Swidler, A. (2001). *Talk of love: How culture matters*. Chicago: University of Chicago Press.

Tinkler, J. E. (2012). Resisting the enforcement of sexual harassment law. *Law & Social Inquiry, 37*(1), 1-24.

Turner, J. L. (2020). Black mothering in action: The racial-class socialization practices of low-income Black single mothers. *Sociology of Race and Ethnicity, 6*(2), 242–253.

Vandewater, E. A., Rideout, V. J., Wartella, E. A., Huang, X., Lee, J. H., & Shim, M.-S. (2007). Digital childhood: Electronic media and technology use among infants, toddlers, and preschoolers. *Pediatrics, 119*(5), E1006-E1015.

Vaterlaus, J. M., Beckert, T. E., & Schmitt-Wilson, S. (2019). Parent–child time together: The role of interactive technology with adolescent and young adult children. *Journal of Family Issues, 40*(15), 2179–2202.

Villanti, A. C., Johnson, A. L., Ilakkuvan, V., Jacobs, M. A., Graham, A. L., & Rath, J. M. (2017). Social media use and access to digital technology in US young adults in 2016. *Journal of medical Internet research, 19*(6), e196.

Vogels, E. A. (2019). *Millennials stand out for their technology use, but older generations also embrace digital life.* Pew Research Center. Retrieved from: https://www.pewresearch.org/fact-tank/2019/09/09/us-generations-technology-use/.

Warren, R., & Aloia, L. (2018). Parent-adolescent communication via mobile devices: Influences on relational closeness. *Journal of Family Issues, 39*(15), 3778-3803.

Wartella, E. A., & Jennings, N. (2000). Children and computers: New technology--old concerns. *The Future of Children*(2), 31-43.

Yan, Z. (2018). Child and adolescent use of mobile phones: An unparalleled complex developmental phenomenon. *Child Development, 89*(1), 5-16.