

Interdisciplinary Research (IDR) Origination Awards

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Project Title

Title: Problematic Media use Across the Transition to a Child's First Cell Phone

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Track

Track one

Abstract

Learning to manage media and thrive in a media environment is vital for children. Although many children effectively manage media, approximately 10-20% of them show significant evidence of problematic media use (PMU), defined as excessive media use that interferes with a child's ability to function (Domoff et al., 2020; Swit et al., 2023). PMU is related to negative psychosocial outcomes including inattention, hyperactivity, and conduct problems (Domoff et al., 2019). Unchecked, PMU may develop into a pathological use of media. This includes internet gaming disorder (IGD) or social media dependency, both of which have severe social, emotional, and relational consequences for individuals (Cheng et al., 2021).

Despite the consequences associated with PMU, no research has examined how the transition to a first cell phone impacts PMU and associated behavioral outcomes. Thus, the transition to a child's first cell phone may represent a potentially sensitive period for PMU development. This varies across children, though the average age of first smartphone ownership is around 10 years old (Coyne et al., 2023). Little research has examined the transition to first cellphone ownership and whether that is related to PMU or developmental outcomes. The unique longitudinal nature of this study will position us to capture this important transition in real time and will examine developmental outcomes both before and after the transition to the first cell phone. This study will provide guidance around the transition to a child's first cell phone will may reduce PMU over the course of an individual's lifespan.

Summary of Plans for External Funding

We plan on submitting an RO1 to the National Institute of Health to follow our sample for an additional five years. We previously had NIH funding for the early stages of the project, but this expires August 2025 and we will be unable to move forward without new funding. The IDR will help us test most of the early adopters for cell phones, while the NIH will focus on mid-older adolescents. We hope to submit the NIH grant October of 2027.

Project Narrative

Problematic Media Use

Problematic media use (PMU) is defined as excessive media use that interferes with daily social and emotional functioning (Domoff et al., 2020) and is associated with decreased social behaviors (Limtrakul et al., 2018), attention deficit-related behaviors (Poulain et al., 2019), academic difficulty (Domoff et al., 2020), poor motor skills, and decreased physical activity (Felix et al., 2020). In adolescence, PMU is associated with depression, anxiety, body image problems, and poor school performance (Samaha & Hawi, 2020). In adulthood PMU may take the form of job loss, academic failure, child neglect, and dissolution of romantic relationships (Smyth et al., 2019). Limiting PMU significantly improves the social, emotional, and mental health of adolescents and adults (Gentile et al., 2011). Little is known, however, about the impact(s) of PMU on children or whether these behaviors extend into adulthood.

Identifying risk and protective factors for PMU is essential for creating effective prevention and intervention programs for those most at risk for clinically meaningful negative effects of PMU. However, very little data on PMU in childhood exists, which makes identifying risk factors currently impossible. Indeed, most existing research on PMU with children focuses on screen *time* rather than disruptions caused by media. Screen time is a blunt measure that does not consider the content nor the context of media use, which are more predictive of positive and negative socio-emotional outcomes (AAP, 2021; Barr et al., 2024). Recent work has shown that PMU in young children may manifest as increased difficulty transitioning away from media, sneaking media, or lying about media to parents, and is associated with attention problems, poor emotion regulation, and family conflict (Domoff et al., 2020). Additionally, children with underlying social, emotional, or developmental concerns may also be at higher risk for developing PMU early in development (Alper et al., 2023).

Serious gaps in the PMU literature still exist. Specifically, a lack of longitudinal research on PMU during childhood makes it difficult to understand how PMU progresses across childhood and whether it relates to PMU during adolescence, when serious consequences appear (Gentile et al., 2011). We also know little about key moderators around the development of PMU, like the transition to a child's first cell phone and how parents manage that first transition.

Transition to the First Cell phone

A significant change in media use occurs when children are given their first phone. This varies across children, though the average age of first smartphone ownership is around 10 years old (Coyne et al., 2023). Additionally, some children receive smartwatches or cell phones that cannot access the Internet (e.g., Gabb phone), before they receive a smartphone (Ankrah, et al., 2022). A few scholars have argued delaying the age of first smartphone ownership until much later in adolescence (e.g., Haidt, 2024). However, little research has examined the transition to first cellphone ownership and whether that is related to PMU or developmental outcomes. The few studies that exist tend to be retrospective and show mixed results with mental health (Coyne, et al., 2023; Sapien Labs, 2023).

To our knowledge, no research has examined the real time transition to first cellphone ownership and whether this transition is related to PMU and developmental outcomes, such as social competence or mental health. We suspect that patterns around PMU may vary around the transition to first cell phone, with PMU possibly increasing during this important transition. Children may be thought of as “cell phone novices” when they receive their first cell phone. Many may not be developmentally ready for the responsibility or management of their own device. Missteps around accessing information or communicating with others may be common. Children may also struggle to manage their own behavior around media, increasing the likelihood of developing symptoms of PMU during this transition. Thus, the primary aim of the study is to examine how PMU functions across the transition to a child's first cell phone.

Family Media Ecology

The Dynamic, Relational, Ecological Approach to Media Effects Research (DREAMER) framework considers the reciprocal effects of digital media use among children and adults in a family system (Barr, et al., 2024). According to the DREAMER model, the child's media use functions in a dynamic system, where the child's use of media then impacts other family members' media use and

relationships. We will examine two aspects of the family media ecology as potential predictors of PMU: *parent's own media use*, and *parental media monitoring*.

According to the DREAMER model, parents' own media use contributes to the wider family media ecology and models healthy or problematic media use. This might include the time parents spend on media, their own problematic media use, the content they view on media, and interruptions caused by media. For example, when the home environment is saturated with media, it is possible for media to interfere with the interaction between parent and child, a behavior termed "technoference". This may contribute to an environment where media takes precedence over parent-child interactions (e.g., Zurcher, et al., 2020). When parents model this type of behavior, children might learn maladaptive coping strategies around media, perhaps leading to increased PMU over time. Parental PMU and technoference are generally related to poor child outcomes and lower levels of perceived parental warmth (McDaniel & Radesky, 2018). Our earlier research has found that parental PMU is related to child PMU (Holmgren, et al., 2024), and that technoference is distressing to young children (Stockdale, et al., 2018), however, no research has examined how parent PMU, parent media content, or technoference might be important in modeling habits around the child's first transition to a cell phone. *We predict that if parents model maladaptive media use through PMU, maladaptive content, and technoference, children are likely to show higher levels of PMU during the transition to a first cell phone.*

Additionally, many parents attempt to help their children manage their media use as their child develops. Such strategies could serve as protective factors that moderate risk of PMU development. Parental media monitoring consists of three strategies that parents might use: (1) restrictive media monitoring (setting rules and guidelines around media time and content), (2) active media monitoring (discussion with children aimed at encouraging critical thinking around media messages), and (3) co-viewing (viewing media with children without guidance; Piotrowski, 2017). Overall, parental media monitoring tends to be related to positive outcomes for children, including less media time, more positive content, and lower levels of aggression during early childhood (Collier et al., 2016) and lower levels of PMU during adolescence (Chng et al., 2015). Although parental media monitoring appears to be important in shaping a child's media environment, there is no research on how parental media monitoring looks during the transition to a child's first cell phone. The proposed research will help us understand whether parental media monitoring at this important transition is a protective factor for reducing PMU. *We predict that higher levels of parental media monitoring (restrictive, active, and co-viewing) will moderate any increases in PMU during a child's first transition to a cell phone.*

Social Competence

Social competence is related to peer rejection, emotion regulation, and social cognition (e.g., Silva et al., 2019) and PMU may impact the development of social competence over time, particularly in the context of the transition to a child's first cell phone. Our earlier longitudinal research from Project MEDIA found that an increasing PMU trajectory (between ages 2-5) was associated with social problems and aggression at age 5, even when controlling for those behaviors at the initial time point (Coyne, et al., 2024). Additionally, early aggression predicted PMU growth over time. Thus, there is some preliminary evidence of a bidirectional link between PMU and social competence. However, research has not examined these associations in the context of the transition to a first cell phone.

As children age, they have more control over their social interactions, and (particularly when they get a phone), can choose to interact with peers or spend time alone with media. Social motivation (the extent to which individuals want to approach or avoid other people; Asendorf, 1990) varies between individuals, including children and might be related to PMU. It is possible that transitioning to a first cell phone has a mixed effect on social competence. For example, getting a phone might increase social interactions with peers through texting, social media, or video chatting. Alternatively, time spent on a new cell phone might decrease face-to-face time with peers, ultimately decreasing social competence. We will examine social competence as both a predictor of PMU during the transition to a first cell phone and also as an outcome to obtaining the first cell phone. *We predict that low social competence will be related to higher levels of PMU during the transition to a first cell phone. Additionally, we expect differential effects of social competence after the transition, with some children experience positive gains and other losses in social competence.*

Study Aims and Hypotheses

The first aim of the current study is to examine a child's transition to their first cell phone and how this is related to changes in PMU. We hypothesize that patterns around PMU may vary around the transition to first cell phone, with PMU possibly increasing during this important transition. The second aim of the study is to examine how the family media ecology might also impact PMU during this important transition. We hypothesize that a supportive family media ecology might predict lower PMU during the transition to the first cell phone. The third aim of the study is to examine changes in social competence before and after the transition to the first cell phone. We predict that social competence may decline slightly after the transition to the first cell phone for some children.

Participants

Participants will include a total of 619 children from the Denver, Colorado area who will be tested once a year for two consecutive years (between the ages of 8-10 approximately). 519 of these participants were enrolled during infancy in Project M.E.D.I.A., a longitudinal study focused on discovering the long-term impact of media on children, while an additional 100 racial minority youth were included in the study when children were aged 7. We have over an 80% retention rate across 8 years of data collection and have excellent relationships with the families and children.

We are working with BIPOC parent advisory groups in Denver to establish community relationships, ensure all study methods are culturally sensitive, and to connect us with families for recruitment. All study materials have been translated into Spanish and we employ multiple RAs who are fluent in Spanish. Finally, all RAs complete mandatory cultural competence/humility training (Sha et al., 2017). This will result in a final sample of 619 children (51% male) and their caregivers with 42% of the sample being non-White.

Basic Protocol

Each wave of data collection occurs during spring/summer approximately one year apart. Previously, data collection occurred on site in Denver (with the exception of Wave 4 where a reduced version of the study was done online due to the COVID-19 pandemic). A group of approximately 16-20 trained research assistants previously lived in Denver between May-August and collect data in family homes. Study PIs and our part-time project manager take turns living in Denver for several weeks at a time to supervise data collection. Additionally, approximately 8-10 trained research assistants stay in Utah to code the data. Our funding from the NIH will run out this year, thus, the current proposal will be done online and over zoom. We believe this will be successful, given our experience with working with families online during the COVID-19 lockdowns.

Measures

First Cell Phone

Parents are currently asked to describe the devices their child utilizes, including television, video games, tablet, AI technology, and cell phones. We have asked these questions each year since the child was born to examine when a particular type of media is introduced to the child. Specific to cell phones, we ask if the child received their own cell phone in the previous year and whether it was a smart phone. For our sample, 96% of children at 7 years old did not have their own cell phone yet, putting us in an excellent position to capture this transition. We will continue to do this on a yearly basis. However, we will also text parents once every three months to ask for an update on whether their child received their own phone in the prior three months. If so, we will ask several questions involving parental mediation strategies of the phone, child media use, and the social and emotional competence questionnaires as described above. Parents will receive an extra \$20 for this data. We will also examine gender, race, and SES as moderators for any analysis involving first cell phone. **Problematic Media Use**

Parent and Child Report. (Domoff et al., 2019). Parents will complete a questionnaire each year to identify PMU in their children. This will be the main measure utilized to examine PMU over time.

Objective Report. We will measure PMU through passive sensing apps installed on child's screen devices using an app called "Chronicle", developed by Methodic, a company we have been working with since 2017. This app provides continuous data regarding timing and content of children's mobile device use, with cloud-based storage. A list of all apps used each week (including time spent on each app) is

collected by Chronicle. This method provides a more accurate estimate of mobile device usage than survey-based recall (Radesky et al., 2020) and may be able to capture context related to PMU during and after the transition to a child's first cell phone. This app will monitor child media use continually over the course of the two years of the study. Measuring PMU is likely more difficult to do via passive sensing (hence why we include other measures), but we anticipate that passive sensing may be able to provide some unique insight into some behaviors that might represent PMU.

We will use data on sleep and other activities, paired with the passive sensing data to examine how much time the device is in use during the night which might indicate deception in use. For example, an estimate of *unsuccessful control* could be captured by increasing length of sessions across bursts of data collection and annual waves of data collection. *Deception* might be captured by examining phone use after the parent reports the child has gone to sleep for the night (which we will do in the time use diary). *Tolerance* might be expressed by increasing individual amounts of time spent on the device, suggesting the child needs to spend longer and longer on the screen to have the same effect. Passive sensing will primarily be utilized to examine short-term longitudinal effects, but also longer effects since we will use this same method over the entire two-year period of the study.

Technoference

Parents will complete the DISRUPT questionnaire which examines parental perceptions of technoference when interacting with their child (e.g., McDaniel, 2021). Additionally, children will complete a technoference measure asking how common technoference is when interacting with their parents (Stockdale et al., 2018). For both the parent and the child devices we will align the passive sensing and a time use diary from the Comprehensive Assessment of Family Media Exposure (CAFE) Toolkit (Barr et al., 2020) to calculate when media is being used during routines such as mealtimes, bedtime and play for parents and child devices. We will also assess whether parent and child rates of media use during routines and activities are also related to each other. This will allow us to detail exactly when parents use their phones when they say they are spending time with their children, allowing for a more accurate measure of technoference during late childhood. The time use diary data has been collected since 2017 and parents are familiar with the measure.

Parental media monitoring

This will be measured in several ways. First, parents and children will complete surveys asking about parental media monitoring (including active, restrictive, and co-viewing) (e.g., Valkenburg et al., 2013). Second, we will ask about daily active media monitoring through the *EMA* method. Third, we will use an observational parental media monitoring task developed for Project M.E.D.I.A. (see Padilla-Walker et al., 2020). Parents and children will be instructed to go on YouTube and watch 5 minutes of content of the child's choice. Parents will be instructed to watch the clip as they normally would with their child. These interactions will be recorded and will be later coded for active media monitoring strategies (including talking about media, content of conversations, and quality of conversation).

Social Competence

We will use a variety of questionnaires to measure social competence including the CBCL (Achenbach & Rescorla, 2000) and the SRS-2 (Constantino & Gruber, 2012). We will assess social motivations by using both parent and child reports of the Child Social Preference Scale (CSPS – Coplan et al., 2004).

Data Donation

We will also use innovative methods to capture both parent and child media content that might be representative of PMU. Though passive sensing will give us time spent on different apps on the phone, it will not tell us anything about the content viewed on the phone. Therefore, we will also make use of Data Donation, a method that allows a researcher to collect digital trace data, by asking participants to request and share their Data Download Packages (DDPs). DDPs provide a full overview of the uses of a platform regardless of whether it was accessed; and regardless of how long ago that person created her social media account (Van Driel et al., 2022). In this study, we will do this for both Instagram and YouTube use.

After participants request their personal DDP at the platform of interest, they download it onto their own personal device. Then, only the features of interest will be extracted from that DDP. The participant

can choose what they want to donate (or decline to donate). Only after selecting the data for donation and clicking the button *donate*, the selected data is sent to a storage location and can be accessed by the researcher (Van Driel et al., 2022). Coders from the communication department and computer scientists from BYU will help analyze this data in meaningful ways. This might include interactions between the child and peers, parents or other family members on social media, comments and likes on YouTube videos, and any content the child posts.

Analysis

We will utilize latent growth curve modelling to examine the stability of PMU over the course of childhood, including age at first cell phone use as a time variant moderator to understand how PMU, family media ecology and social competence are related to the transition to first cell phone.

Project Team

This study will include BYU professors from three different colleges (Family, Home, and Social Science, College of Computational, Mathematical, and Physical Sciences, and the College of Fine Arts and Communications) and three different departments at BYU (School of Family Life, Computer Science, and Communications). Dr Coyne will manage the entire study. Drs Page, Hughes, and Deccio from Computer Science will assist with the data donation and passive sensing data management and analysis. Drs Brubaker and Zurcher from Communications will help to create a practical guide for families and public scholarship report (see below) and will supervise communications students to help collect the data. All members of the team will assist in writing up the project for publication and future grant submissions.

Outputs

The major output from this study will be the development of a practical guide for families around the transition to the child’s first cell phone. This type of research-based product does not currently exist and we anticipate it being popular among families. We also will create a public scholarship report to be sent to the Utah State Government. The PI has had several conversations with the Utah State Legislature around children and media and they are likely focusing on young children and media over the next few years. We will also create a series of social media posts to be published on Psychology Today. Finally, we will write up the results for publication in academic journals and presentation at professional conferences.

Project Summary and Implications

An understanding of how PMU develops throughout childhood is vital to helping children thrive in this new media environment and to prevent serious problems around media later in development. The child’s transition to their first cell phone may represent a critical period in the development of PMU over time. By understanding risk and protective factors to the development of PMU we hope to provide anticipatory guidance for educators and practitioners who can inform parents and ultimately identify children who would benefit from early evidence-based intervention.

Timeline

IDR (BYU): Timeline												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
					First Phone: Survey, Passive Sensing, EMA							
2026	RA Training				Collect Survey Data				Data Cleaning	Data Analysis		
					First Phone Check-in			First Phone Check-in		First Phone Check-in		
2027					First Phone: Survey, Passive Sensing, EMA							
	RA Training				Collect Survey Data				Data Cleaning	Data Analysis		
		First Phone Check-in			First Phone Check-in			First Phone Check-in		First Phone Check-in		