

## Young Children's Use and Parent-child Co-use of Tablets: Investigating Mobile Media's Effects on Children's Executive Function

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### Project Description

With Apple's® introduction of the iPhone® in 2007 and the iPad® tablet in April 2010, a dizzying proliferation of mobile digital media and devices has inundated homes and schools in the last ten years.

These new, portable devices seemingly designed for young minds and hands, are introducing children to more visual, educational, and entertainment content than ever before.

In January 2015, Apple's App Store had more than 80,000 "educational" apps for children ages 3–6 (Apple, 2015). In response to this tsunami of content, and children's intense captivation and rapidly increasing usage, pressing questions are being posed by parents, teachers, program administrators, and developmental researchers. How much time do children *really* spend on mobile media? What apps are children accessing the most on mobile media? Is digital time affecting our children's ability to focus their attention? Yet, remarkably, studies about young children's use of interactive mobile media are scant, especially pertaining to young children from families managing limited resources.

Utilizing an experimental research design, the primary aims of the research are to ascertain whether Head Start (HS) children who independently and purposefully use high-quality apps on tablets demonstrate greater executive function (EF) than children who independently use apps of their choice, and whether children who co-use high-quality apps with their parents demonstrate greater EF than children who use the same high-quality apps independently.

Additional exploratory analyses will examine the relationships among children's EF, the amount of time spent using a tablet, types of content being used, and parents' co-use of tablets with their children.

This study also will introduce new, innovative, and more accurate methods of measuring the amount of time children and parents use mobile media, resulting in stronger validity of the study's analytical findings.

### Research Questions

1. Do children who independently use high-quality apps daily demonstrate greater executive function than children who use apps of their choice?
2. Do children who co-use high-quality apps daily with their parent demonstrate greater EF than children who use apps independently?
3. How does a child's amount of time using a tablet (all apps) relate to his/her EF?
4. How does a child's amount of time using high-quality apps independently relate to his/her EF?
5. How does a child's amount of time co-using high-quality apps with a parent relate to his/her executive function?
6. Does the amount of co-use interact with the amount of time a child uses a tablet when measuring executive function?

### Sample

Seventy-two (72) HS preschool children (ages 3 and up, in a preschool classroom) and their parents will be recruited from three HS programs in the Midwest to participate in this study.

### Methods

In this 8-week randomized control trial (RCT), participating families will be randomly assigned to one of three conditions, for 8 weeks:

- Control Group (business as usual) – children continue to use their family's mobile devices as usual, or
- Group 1 – children are given an Android 7" tablet with 23 pre-installed, high-quality apps to use independently, or

- Group 2 – children are given the same tablet with the same apps that the child uses, and the parent and child co-use together for 15 minutes a day.

The child assessment, Minnesota Executive Function Scale (MEFS), and the teacher-reported Devereux Early Childhood Assessment (DECA-P2) will be administered pre- and post-intervention.

Tablet usage data, obtained weekly, will include information on each user session, i.e., who used the tablet, the amount of time the user(s) played the tablet (per day), which apps were accessed, and how long the user played each app.

Parents will complete a pre-study survey that includes parent estimates of how much time their child spends playing on a tablet or smartphone per day. Parents will also complete a post-study survey that asks about their own and their child's most and least favorite apps on the research tablet.

The study will utilize a repeated measures ANCOVA with time as the within-subjects factor and group (C, G1, G2) as the between subjects. The repeated measures ANCOVA will allow the researcher to compare change in students' performance over two measurements during an 8-week period, treating students' prior EF development as a covariate variable. Other covariates may include age, gender, language, etc.

Exploratory multiple regression analyses that include testing for effects of time, parent co-use and interaction between time and co-use time on the outcome variables will be run.

#### **Creation and Use of New Measurement Tool**

A new measurement tool, the Android Logging Tool (ALT), will be developed and installed on the research tablets. This app will record who is using the tablet (child, parent-child co-use, or parent), which app is being accessed by the user, and how long the user is using the app. These data will be stored locally on each tablet. Once a week, the participants will upload the log data to the study's database through a preconfigured, secured Wi-Fi connection at the HS preschool. To upload the data, the participants simply

tap an "upload icon" and the data uploads automatically, in less than a minute.

#### **Progress Update** (as of February 3, 2017)

Parent recruitment will continue through February 10. Parent training will occur February 21–23 and pre-study child assessments will be completed by February 23. Tablet use will begin February 24 and continue through April 24, 2017.

#### **Implications for Policy and Practice**

This study will provide evidence-based information to HS parents, increasing their understanding of how mobile media use at home may impact their child's development. HS program administrators will also be provided with empirical evidence as they consider the use of mobile media in their programs, and when informing parents about home use of mobile media.

#### **Implications for Research**

The study's results will help to advance the nascent research found at the intersection of young children's development and mobile media. As well, the introduction of a new tool for measuring the actual time children spend using mobile devices, and what content they access, will improve the methodology practices used by researchers, strengthening the validity of future studies.

#### **For More Information**

Please contact the researchers for more information.

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