Prospective study of mobile phone acquisition and ownership and well-being among low-income Latinx children

Xiaoran Sun,* K. Farish Haydel, Donna Matheson, Manisha Desai, Thomas N. Robinson
Stanford University School of Medicine; *Correspondence: xsb5014@stanford.edu

Background
At what age should children receive their first mobile phone? Is owning a mobile phone harmful to children? Growing evidence about potential benefits and harms of mobile phones (Orben & Puts, 2019; Twenge et al., 2018) have mainly examined frequency and time of use, without directly addressing these questions. Few studies have prospectively observed children as they acquire mobile phones. Further, we know little about mobile phone ownership effects among ethnic minority children, including Latinx youth who are the fastest-growing racial/ethnic group under age 18 in the U.S. (Lopez et al., 2018). Findings from predominantly White samples may not generalize to low-income Latinx youth (Garcia Coll et al., 1996).

Study Aims

Aim 1: Describe the prevalence of Latinx children’s mobile phone ownership by age, and the age when first acquired.

Aim 2: Examine longitudinal associations between mobile phone ownership and the age when first acquired with measures of well-being (i.e., depressive symptoms, sleep, and academic achievement).

Aim 2a: Examine the within-person longitudinal associations between mobile phone ownership status and levels and changes in well-being.

Aim 2b: Examine the between-person longitudinal association between PHONE acquisition age and well-being.

Aim 2c: Examine the acquisition age as a moderator of the associations between ownership status and levels of changes in well-being.

Participants

• Data come from the baseline and 12-, 24-, 36-, and 48-month follow-up assessments (i.e., 5 yearly time points) of Stanford GOALS, a randomized controlled trial of a multi-level intervention on weight gain among low-income, 7-11 year old overweight and obese children and their families (Robinson et al., 2013).

N = 263 Latinx children from 236 families:
• 55% female
• Baseline M age = 9.5 years, SD = 1.5
• Family income median = $15,000-$24,999
• 86.5% families with married parents
• 9% of children born in U.S.
• Retention rates after 1, 2, 3 and 4 years: 99.2%, 97.0%, 93.9% and 62.0%

Statistical Considerations

Analysis plan is pre-registered on OSF.

Modeling:
• multilevel modeling (2-level models), for each outcome
• main effects of onset age and ownership status (Model 1)
• interaction effect of ownership status × time (Model 2)
• interaction effects of ownership status × onset age, and ownership status × onset age × time (Model 3)
• Controlling the False Discovery Rate (FDR) using Benjamin-Hochberg approach for the 5 associations tested of each well-being outcome
• multiple imputation (mi=5) to address missing data issues

Power Calculation:
• power estimation: Monte Carlo simulation shows the detectable (80% power) effect sizes:
  • Level 1 (within-person) direct effect: 2.10
  • Level 2 (between-person) direct effect: 19 to 29
  (varying by ICC = .10, .30, .50)
  • Cross-level interaction effect: 33

Results

FIGURE 1: Age when mobile phone acquired. Acquisition (i.e., ownership onset age): M = 11.62, SD = 1.41, Range = 7.70-15.25, 1st Quartile = 9.10, Median = 11.60, 3rd Quartile = 12.55

Discussion

In a 4-year prospective study of mobile phone ownership among low-income 7-15 year old Latinx children, the mean age of first mobile phone acquisition was 11.62 years (ranging from 7.70 to 15.25 years). We did not find statistically significant associations between mobile phone ownership status and first age of acquisition and measures of children’s well-being (depressive symptoms, academic performance, and sleep parameters).

This result was based on a rigorously designed, pre-registered analysis plan, with multiple imputation for missing data and tests on a variety of well-being outcomes reported by children and parents as well as sleep objectively measured with accelerometers. The ethnic homogeneous sample allowed us to focus on a previously understudied racial-ethnic minority group.

Despite prior research revealing both positive and negative effects of mobile phone use on child well-being outcomes, and existing debate about when and whether children should have their own mobile phones, this pattern of null results is consistent with prior findings based on predominantly White samples that have identified little evidence for effects of digital technology use on child well-being (George et al., 2020; Jensen et al., 2019; Orben & Puts, 2019). An important future direction is to investigate the implications of children’s specific digital activities and behaviors for their well-being.