

# Children With Autism Spectrum Disorder and Screen Time: Results From a Large, Nationally Representative US Study

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The author declares that he has no conflict of interest.

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## ABSTRACT

**OBJECTIVE:** To test the hypotheses that children with autism spectrum disorder (ASD) have higher screen time than other children on a US nationally representative sample and that children with ASD are overrepresented among children who exceed the American Academy of Pediatrics (AAP) screen time recommendation (2 hours or less a day).

**METHODS:** The National Survey of Children's Health 2011–2012, a nationally representative survey, asked parents to report their child's (aged 6–17 years) average daily media usage. The ASD subpopulation ( $n = 1393$ ) was compared to children without ASD (non-ASD,  $n = 64,163$ ). Differences were compared by design-corrected  $F$  tests. Regression models were estimated for both groups separately. Adjusted Wald tests were used to rigorously test the hypotheses.

**RESULTS:** More than half of US children exceed the AAP screen time recommendation. Compared to non-ASD, children with ASD had similar amounts of total screen time (3.21 hours per day vs 3.46 hours per day;  $P > .05$ ), media (TV/video) time,

and computer/mobile device leisure time. Children with ASD have a milder age gradient than the general population on computer/mobile device usage. Children with ASD were proportionally represented among high users (more than 2 hours per day). Data did not support hypotheses.

**CONCLUSIONS:** In a large, nationally representative US sample, there was no evidence that children with ASD differ in their screen time habits from other children. Both groups have high screen time use. Caution should be exercised before assuming that children with ASD are at higher risk of exceeding AAP screen time recommendations. Efforts to promote adherence to the recommendation are needed, but they should neither target nor exclude children with ASD.

**KEYWORDS:** autism; computer; media; media use; National Survey of Children's Health; screen time; television; United States; video

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## WHAT'S NEW

More than half US children exceed the American Academy of Pediatrics' recommendation for screen time. No evidence indicates that children with autism spectrum disorder differ from other US children in total, media, or computer leisure screen time; they display a milder age gradient for computer time than other children.

AUTISM SPECTRUM DISORDERS (ASD) are characterized by social, communication, and behavioral deficits. Children with ASD are known to have deep interests in relatively narrow subjects.<sup>1</sup> There is anecdotal evidence that children with ASD have great interest in computers and technology. In some cases, preoccupation with screen time activities can become problematic among children with ASD.<sup>2–4</sup> High screen time has been associated with poor health outcomes such as increased sleep problems and has also been identified as a barrier to physical activity among children with ASD.<sup>5,6</sup>

In the general population, studies have shown that almost half of children spend more than 2.2 hours per day in screen time sedentary activities (television, video, and leisure computer time, on any device). Screen time is negatively associated with household income, parental education, being female, and being white (vs African American).<sup>7–11</sup> The American Academy of Pediatrics (AAP) recommends a maximum of 2 hours per day total screen time for leisure.<sup>12</sup>

Research on children with ASD's usage of screen time is limited. An early study estimated that children with ASD spent 2.3 hours per day watching television and 1.7 hours per day on the computer.<sup>13</sup> Other studies have reported that the majority of children with ASD spent most of their leisure time on screen time activities.<sup>13,14</sup> Recently it was estimated that adolescents with ASD watch about 2 hours per day of television but spend 5 hours per day using computers.<sup>15</sup> Children with ASD also differ in the type of content they use, engaging more in solitary activities (television) and less in socially interactive media.<sup>14</sup>

All these studies<sup>13–15</sup> do not have comparisons to the US general population of children, comparing instead to children who have other impairments or to siblings of children with ASD. It is speculated, however, that children with ASD have a higher prevalence of screen time than the general population.

Consistent with the literature, this study hypothesizes, first, that children with ASD will spend more time in screen-based leisure activities than other children in the general US population, and second, that they will be over-represented among children who exceed the AAP recommendation of a maximum of 2 hours per day total screen time.

## METHODS

### SAMPLE

The National Survey of Children's Health (NSCH) 2011–2012 is a random-digit, cross-sectional US nationally representative survey that interviewed 95,677 parents or guardians about a randomly selected child in their household. It was conducted between February 2011 and June 2012. It used the National Immunization Survey sampling frame and included cell phone–only households as well as traditional phone land lines. It reports a 23% response rate—lower than previous NSCH surveys because of the inclusion of cell phone–only households.<sup>16</sup> The public data file provides weights that adjust for nonresponse bias and allow generalization to the US noninstitutionalized child population. Information about the methods and approaches used for this survey, including consent procedures, are available.<sup>17</sup> The analytic sample was restricted to parents of children aged 6 to 17 years because media-related questions were only asked among parents of children in these ages.

### MEASURES

#### AUTISM

Parents were first asked, “Please tell me if a doctor or other health care provider ever told you that [child] had the condition, even if the child does not have the condition now” with the condition being autism, Asperger disorder, pervasive developmental disorder, or other ASD. Parents could answer yes, no, or don't know. Later on, parents who had answered affirmatively were asked, “Does [child] currently have autism?” with the same menu of possible answers. As in other studies,<sup>16</sup> an affirmative response to both questions was coded as the child having ASD.

#### SCREEN TIME

In section 7 of the NSchemes 2011–2012 survey, there is a brief subdomain on media consumption. Parents were asked to estimate the daily average time that their child spent “in front of TV, watching TV programs, videos, DVDs or playing video games” on a weekday. Parents could answer by giving time in minutes or hours. This variable, media time, was recoded so the time was expressed in hours for all respondents.

Similarly, parents were asked to estimate the daily average time, on a weekday, of computer/mobile devices usage by the question, “How much time does child usually spend with computers, cell phones, handheld video games, and other electronic devices, doing things other than school work?” This variable, computer/mobile device time, was recoded so the time was expressed in hours for all respondents. Total screen time was calculated by adding both variables. High users were children whose total screen time exceeded the AAP recommendation of a maximum of 2 hours per day total screen time.

#### KNOWN SOCIAL DETERMINANTS OF SCREEN TIME USAGE (COVARIATES)

Standard social determinants in the typically developing population were age, gender, race and ethnicity, household income, and parental education. Age, gender, and Hispanic ethnicity were available directly from the survey as either a question that was asked or as a derived variable available in the public data file. Minority was coded as nonwhite (black, other) versus white. Household income was measured as a 5-category variable that placed the household in one of the multiples of the federal poverty line (FPL), as follows: at or below 100% FPL, between 100% and 200% FPL, between 200% and 300% FPL, between 300% and 400% FPL, and above 400% FPL. These categories were entered as indicator variables in the regression models. Parental education was coded as 1 if the highest level of parental education (mother, father, or main guardian) was high school or lower, and 0 otherwise.

### ANALYSIS

All statistical analyses were appropriately weighted to account for the complex survey design following US Centers for Disease Control and Prevention recommendations for this type of survey.<sup>18</sup> Cross-tabulations used design-corrected *F* tests. Ordinary least squares was used to estimate the regression models. The dependent variables were positively skewed and were transformed with natural logs to normalize them before regression analyses. For each dependent variable, 2 models with the same regressors were estimated, one for the ASD group and another for the non-ASD group. This approach was chosen because it does not assume that covariates are associated with the screen time outcomes in the same manner for both groups. Adjusted Wald tests were used to test the joint hypothesis that all regressors had the same coefficients in both models (model equality) and to test individually the same hypothesis for each regressor (coefficient equality). All analyses were performed by Stata 13 (StataCorp, College Station, Tex). *P* values were set at the .05 level.

## RESULTS

### PREVALENCE AND DIVISION INTO GROUPS

There were 1393 children with ASD in the data set, for an estimated ASD prevalence of 2% for children aged 6

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