

# ABCD Human Subject Study

Adolescent Brain Cognitive Development – ABCDSTUDY.org

## Release Notes: Adolescent Brain Cognitive Development Study<sup>SM</sup> (ABCD Study<sup>®</sup>) Data Release 4.0

### Mobile Technology

<http://dx.doi.org/10.15154/1523041>

October 2021

#### Change Log

October 2021 – Data Release 4.0

- Initial release

### List of Instruments

Name of Instrument	Short Name
ABCD Youth Fitbit Baseline	abcd_yfb01
ABCD Youth Fitbit Follow-up	abcd_yff01
ABCD Pre-assessment Youth Survey for Fitbit Protocol	abcd_fbpry01
ABCD Post-assessment Youth Survey for Fitbit Protocol	abcd_fbpay01
ABCD Parent Fitbit Baseline	abcd_pfb01
ABCD Parent Fitbit Follow-up	abcd_pff01
ABCD Pre-assessment Parent Survey for Fitbit Protocol	abcd_fbprp01
ABCD Post-assessment Parent Survey for Fitbit Protocol	abcd_fbpap01
ABCD Fitabase Raw Data	aurora01
ABCD Parent Screen Time Survey	stq01
ABCD Youth Screen Time Survey	abcd_srq01

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<b>ABCD Parent Screentime Questionnaire</b>	screentime_psq_p01
<b>ABCD Youth Mobile Tech Pre-assessment</b>	abcd_mtpry01
<b>ABCD Youth Mobile Tech Post-assessment</b>	abcd_mtpay01
<b>ABCD Parent Mobile Tech Pre-assessment</b>	abcd_mtpap01
<b>ABCD Parent Mobile Tech Post-assessment</b>	abcd_mtpa01
<b>ABCD Mobile Tech from EARS Company</b>	abcd_mte01
<b>ABCD Mobile Tech from Vibrent Company</b>	abcd_mtv01
<b>ABCD Sum Scores Mobile Tech Youth</b>	abcd_ssmt01
<b>ABCD Youth Fitbit Daily Physical Activity Summaries</b>	abcd_fbdpas01
<b>ABCD Youth Fitbit Weekly Physical Activity Summaries</b>	abcd_fbwpas01
<b>ABCD Youth Fitbit Daily Sleep Summaries</b>	abcd_fbdss01
<b>ABCD Youth Fitbit Weekly Sleep Summaries</b>	abcd_fbwss01

## General Information

The following information refers to the Adolescent Brain Cognitive Development Study<sup>SM</sup> (ABCD) Data Release 4.0 available from <https://nda.nih.gov/abcd>. An overview of the ABCD Study<sup>®</sup> is at <https://abcdstudy.org> and detailed descriptions of the assessment protocols can be viewed at <https://abcdstudy.org/scientists/protocols>.

This document describes the contents of various instruments available for download. To understand the context of this information, see *Release Notes ABCD README FIRST* and *Release Notes ABCD Imaging Instruments*.

## Instrument Descriptions

### Youth Fitbit Baseline

A customized questionnaire was developed and given to participants in the Fitbit substudy when they enrolled before they had worn the Fitbit to establish a self-reported “baseline” of activity, sedentary behaviors, and sleep for participants in relation to their peers. These data were collected in baseline and included 150 youth wore Fitbit Charge 2 devices for a 3-week period.

### **Youth Fitbit Follow-up**

A customized questionnaire was developed and given to participants in the Fitbit substudy after they completed the 3-week Fitbit protocol to determine their use experience with the Fitbit and situations when they had to take the Fitbit off (“Followup”). The same questions given at “baseline” (before the Fitbit) were repeated at follow-up. These data were collected in baseline and included 150 youth wore Fitbit Charge 2 devices for a 3-week period.

### **Parent Fitbit Baseline**

A customized questionnaire was developed and given to parents in the Fitbit substudy when they enrolled before the youth had worn the Fitbit to establish a self-reported “baseline” of activity and sedentary behaviors of the youth in relation to their peers. These data were collected in baseline and included reports from parents of 150 youth that wore Fitbit Charge 2 devices for a 3-week period.

### **Parent Fitbit Follow-up**

A customized questionnaire was developed and given to parents in the Fitbit substudy after youth had completed the 3-week Fitbit protocol to determine their use experience and opinions on whether the youth had changed their behaviors while wearing the Fitbit. Customized questions about daily eating/drinking habits of the youth were included in this questionnaire, although unrelated to the Fitbit protocol. These data were collected in baseline and included reports from parents of 150 youth that wore Fitbit Charge 2 devices for a 3-week period.

### **ABCD Pre-assessment Youth and Parent Survey for Fitbit Protocol**

A customized questionnaire given to youth and parents in the Fitbit substudy before youth had worn the Fitbit. This questionnaire established a self-reported for youth and parent-reported for youth “baseline” of activity, sedentary behaviors, and sleep for participants in relation to their peers. Youth and parent completed independent forms. These surveys are revised versions of the baseline surveys for use in data collection for participants in the two-year follow-up.

### **ABCD Post-assessment Youth and Parent Survey for Fitbit Protocol**

A customized questionnaire given to youth and parents in the Fitbit substudy after youth had worn the Fitbit for 21 days. This questionnaire allows for comparisons of change from the pre-assessment questionnaire of self-reported for youth and parent-reported for youth activity, sedentary behaviors, and sleep for participants in relation to their peers. Youth and parent completed independent forms. These surveys are revised versions of the baseline surveys for use in data collection for participants in the two-year follow-up.

### **Fitbit Raw Data**

Data tracked by Fitbit and compiled by Fitabase for each participant are stored as TGZ compressed files available for downloading. A complete description of the variables and how they are derived can be found here:

<https://www.fitabase.com/media/1748/fitabasedatadictionary.pdf>. Each file contains csv

spreadsheets for each variable defined by Fitbit, aligned with recording date and time [mm/dd/yyyy hh:mm:ss], as follows:

- (1) 30secondSleepStages: Sleep data are presented in 30 s epochs and comprise the three standard outputs available in 30 s from Fitabase. 'Level' describes each sleep stage (wake, light, deep, rem sleep). 'ShortWakes' describes awakenings that last less than 180 seconds; these episodes are reported as 'wake' if part of a short wake is detected. 'SleepStage' combines 'Level' and 'ShortWakes' for true sleep stage time series.
- (2) heartrate\_1min: Mean heart rate data (sampled by Fitbit every 5 to 15 seconds, on average) for 1 min epochs are presented.
- (3) minuteCaloriesNarrow: Total number of estimated calories burned per minute are presented.
- (4) minuteIntensitiesNarrow: Categories of intensity of activity per minute are presented; there are 4 possible categories determined by Fitbit: 0 = Sedentary; 1 = Light; 2 = Moderate; 3 = Very Active
- (5) minuteMETsNarrow: Estimated metabolic equivalents (METs) per minute, reflecting exercise intensity, are presented. Note that MET values are presented as multiples of 10 and need to be divided by 10 to get accurate values.
- (6) minuteSleep: Classic sleep states assigned per minute. There are 3 possible categories: 1 = asleep, 2 = restless, 3 = awake.
- (7) minuteStepsNarrow: Total number of steps taken per minute, as tracked by Fitbit.

### **Parent Screen Time Survey**

This measure includes two customized questions about the overall amount of time that the youth spends using visual media (e.g. cellphone, iPod, videos), on a typical weekday and weekend day, not including time spent on school-related work. From year 2, parents also answered questions about their experiences with their child's media use.

### **Youth Screen Time Survey**

This measure includes customized questions about the overall amount of time that the youth spends using visual media, on a typical weekday and weekend day. Media activities assessed include: (1) Watching TV shows or movies; (2) Watching videos (such as YouTube); (3) Playing video games on a computer, console, phone or other device; (4) Texting on a cell phone, tablet, or computer; (5) Visiting social networking sites like Facebook, Twitter, Instagram; (6) Video chat. Seven response options were: none, < 30 minutes, 30 minutes, 1 hour, 2 hours, 3 hours, and 4+ hours. From Year 2, response options were changed to open format, of number of hours and minutes spent on each screen usage activity. Also in Year 2, 6-item social media addiction and video game addiction questionnaires were added, as adapted from the Bergen Facebook

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Addiction Scale (Andreassen, C. S., Torsheim, T., Brunborg, G. S. & Pallesen, S. Development of a Facebook Addiction Scale. *Psychol Rep.*, 2012:110, 501-517). Another addition in Year 2 were customized questions about timing of screen usage around bedtime, mobile phone ownership and usage, social media accounts, and online dating.

#### **ABCD Parent Screentime Questionnaire**

The Parent Screentime Questionnaire is a parent self-report of screentime behaviors and behavior modeling. Parents are asked about the amount of time that they themselves spend using various forms of visual media, on weekdays and weekends. Questions about screentime behavior modeling are from Tang L, Darlington G, Ma DWL, Haines J; Guelph Family Health Study. Mothers' and fathers' media parenting practices associated with young children's screen-time: a cross-sectional study. *BMC Obes.* 2018 Dec 3;5:37.

#### **ABCD Youth and Parent Mobile Tech Pre-assessment**

Questionnaire of weekday and weekend time on devices (e.g., "screen time") for non-school activities and household rules for device and app usage. These data were acquired for the passive assessment of phone use substudy. Youth and parents completed independent questionnaires with parents reporting on their youth. These instruments were collected prior to participation in the EARS or Vibrent assessment of device and app usage.

#### **ABCD Youth and Parent Mobile Tech Post-assessment**

Questionnaire of weekday and weekend time on devices (e.g., "screen time") for non-school activities and household rules for device and app usage. These data were acquired for the passive assessment of phone use substudy. Youth and parents completed independent questionnaires with parents reporting on their youth. These instruments were collected following participation in the EARS or Vibrent assessment of device and app usage.

#### **ABCD Mobile Tech from Effortless Assessment Research System (EARS) – Ksana Health**

Objective screen time and application use data from EARS for the passive assessment of phone use substudy. Data include measures of time spent in calls and total time spent in various app categories (e.g., Youtube, gaming, productivity, communication).

#### **ABCD Mobile Tech from Vibrent Health**

Objective screen time and application use data from Vibrent Health for the passive assessment of phone use substudy. Data include measures of time spent in calls and total time spent in various app categories (e.g., Youtube, gaming, productivity, communication).

#### **Sum Scores Mobile Technology Youth**

Scores summed across electronic media categories are provided for youth screen time responses for weekday and weekend.

### **ABCD Youth Fitbit Daily Physical Activity Summaries**

This instrument includes daily physical activity (and sedentary behavior) at the minute level based on heart rate and accelerometer data from Fitbit.

### **ABCD Youth Fitbit Weekly Physical Activity Summaries**

This instrument includes weekly physical activity (and sedentary behavior) for all days with sufficient wear time for inclusion (>600 minutes of daytime wear) from Fitbit. Data include minutes in a variety of activity intensities and steps taken that are broken into weekday only, weekend only, and all days of week.

### **ABCD Youth Fitbit Daily Sleep Summaries**

This instrument includes sleep data for each participant night that had sufficient wear/sleep duration to achieve sleep "stages" – minimum of 180 minutes of in-bed time. Metrics include number of instances and number of minutes in each sleep stage. Data include average HR within each stage.

### **ABCD Youth Fitbit Weekly Sleep Summaries**

This instrument includes sleep level aggregated to the week level for all valid days (i.e. >180 minutes of sleep time). Metrics include sum of and average number of instances and number of minutes in each sleep stage. Average HR within each stage are included. Weeks are broken into weekday only, weekend only, and all days of week.

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