



Adolescent Brain Cognitive Development

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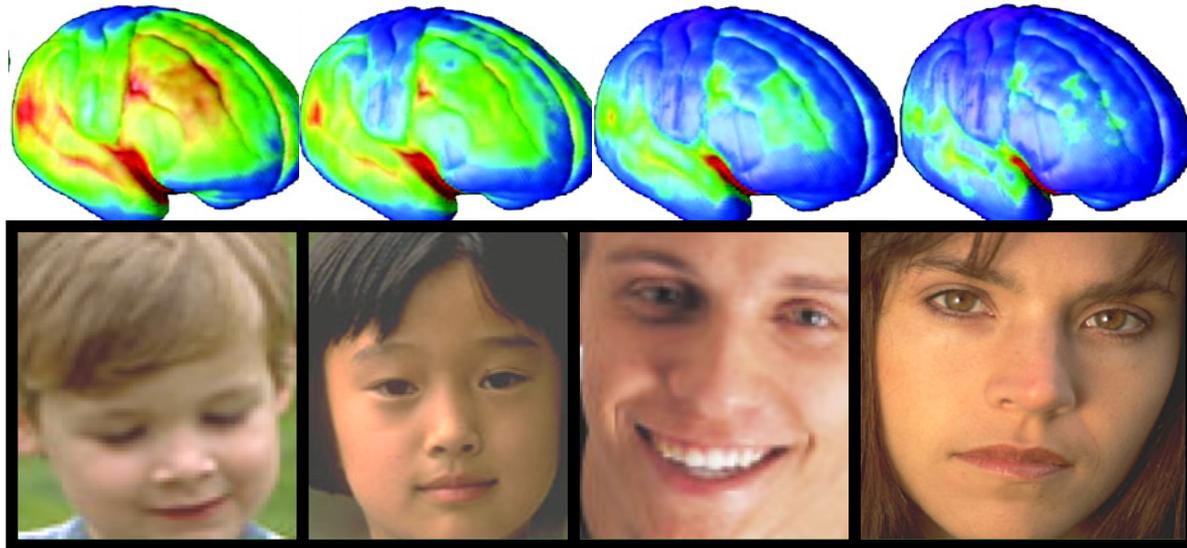
Measuring multiple behaviors in adolescents: The ABCD study

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Site Investigator, Laureate Institute for Brain Research

Adolescence

A time of extraordinary physical, emotional, and intellectual growth



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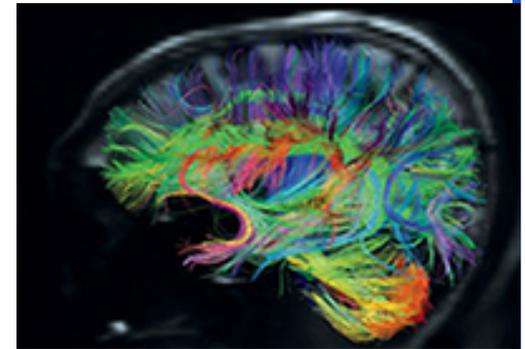
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Pressing Research Questions

- To what extent do drug use or other experiences change the adolescent brain, and to what extent do brain vulnerabilities (as a result of genetics, injury, or other environmental factors) lead to drug use and other adverse outcomes?
- How do different types of substance use interact, and can the effects of individual drugs be disentangled in individuals who use more than one?
- What impacts do diverse patterns of substance use (for example, moderate versus heavy marijuana use) have on brain development, academic achievement, social functioning, and other aspects of life?

The Time is Right

- Technological advances
- Changing Drug Laws and Markets



Federal Collaboration

National
Institute on
Drug Abuse



National
Institute on
Alcohol Abuse
and Alcoholism



National
Cancer
Institute



*Eunice Kennedy
Shriver* National
Institute of Child
Health and Human
Development



National
Institute of
Mental Health



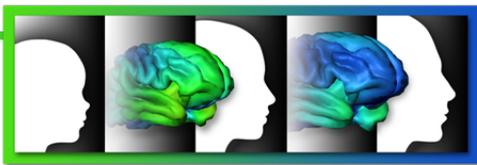
National
Institute on
Minority Health
and Health
Disparities

National
Institute of
Neurological
Disorders
and Stroke

NIH Office of
Behavioral and
Social Sciences
Research

Centers for
Disease Control
and Prevention -
Division of
Adolescent and
School Health

National
Institute of
Justice

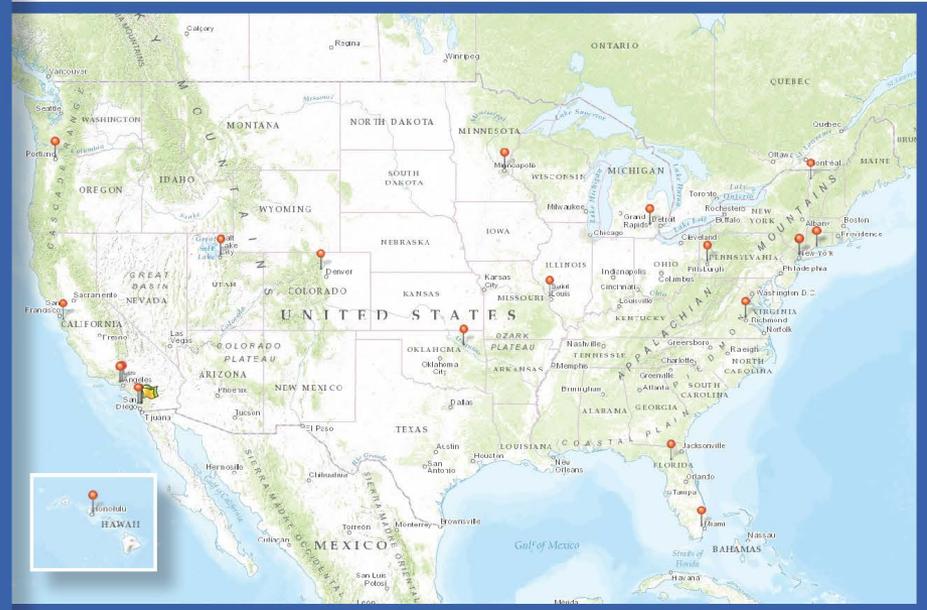


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Locations of ABCD Research Sites in the United States



- Coordinating Center** University of California, San Diego
- Data Analysis and Informatics Center** University of California, San Diego
- Research Sites**
 - Children's Hospital of Los Angeles
 - Florida International University
 - Laureate Institute for Brain Research
 - Icahn School of Medicine at Mount Sinai
 - Oregon Health & Science University
 - SRI International
 - University of California, Los Angeles
 - University of California, San Diego
 - University of Colorado
 - University of Florida
 - University of Hawaii at Manoa
 - University of Michigan
 - University of Minnesota
 - University of Pittsburgh
 - University of Utah
 - University of Vermont
 - Virginia Commonwealth University
 - Washington University in St. Louis
 - Yale University

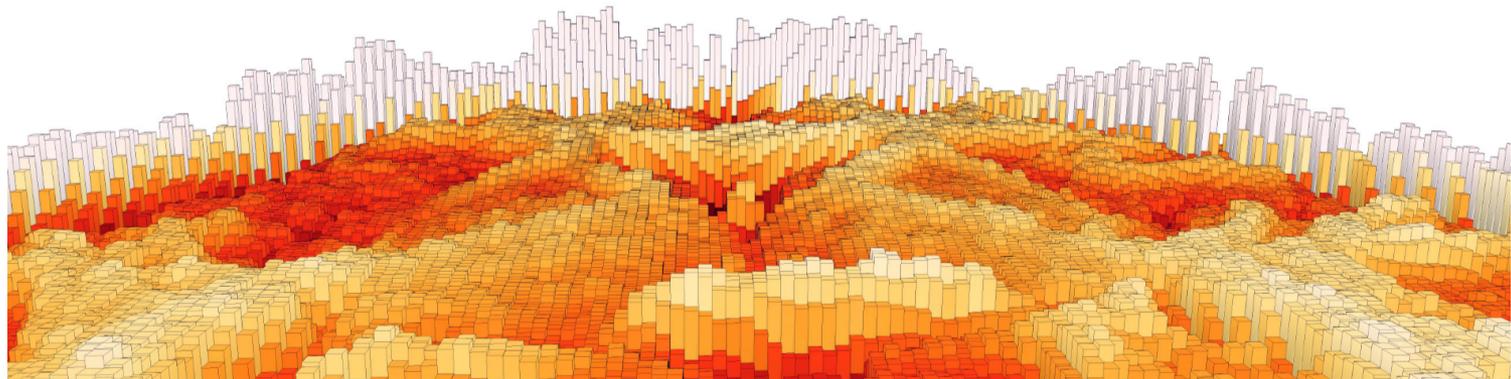


Come Learn More: Tuesday, March 12, 2019 - 12:30 pm - 2:00 pm

Accessing and Understanding the Adolescent Brain Cognitive Development (ABCD) Study: An Introduction to the Adolescent Brain Cognitive Development Study Dataset

Adolescent Brain Cognitive Development

Welcome to the resources of the ABCD-DAIC



Overview

- **11,877 youth age 9-10 to be enrolled nationwide, followed 10 years**
 - School-based recruitment, nationally representative sample
 - 800 twin pairs recruited from twin registries
 - Multimodal neuroimaging
 - Extensive health and behavioral assessment
 - Activities and environments monitored
 - Biosamples: hormones, epi/genetics, substance use
 - Novel wireless, web based, and nanoengineered assessment technologies



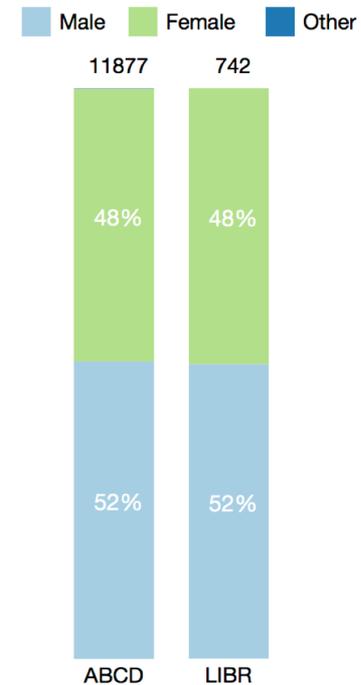
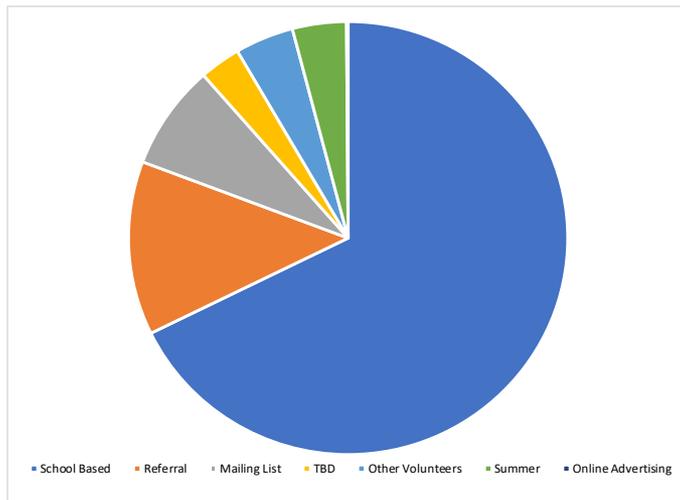
Representative Sampling Strategy

- Recruit a sample that broadly reflects the US population of 9-10 year old's on sex, race/ethnicity, SES and urbanicity
- 11,877 participants, including 1,600 twins (800 twin pairs) to arrive at a final sample of 10,000 (10-15% attrition)
- 50% of the non-twins will be at “High Risk” for transition to early alcohol and drug use (externalizing behaviors, negative affect, and nicotine use in the home)



Excluding Birth Registry Twins

Recruitment Source	%
School Based	67.8
Referral	13.0
Mailing List	7.8
Other Volunteers	3.0
Summer	4.3
TBD	4.0
Online Advertising	0.1



Age

Age 9: 52%

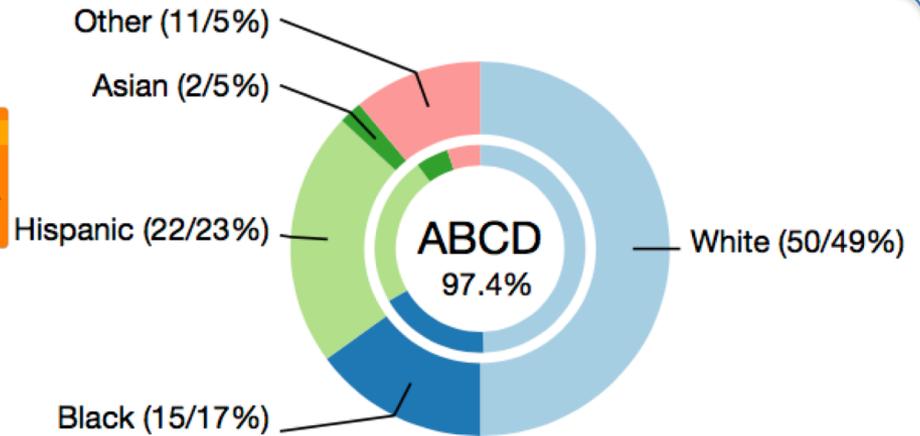
Age 10: 48%



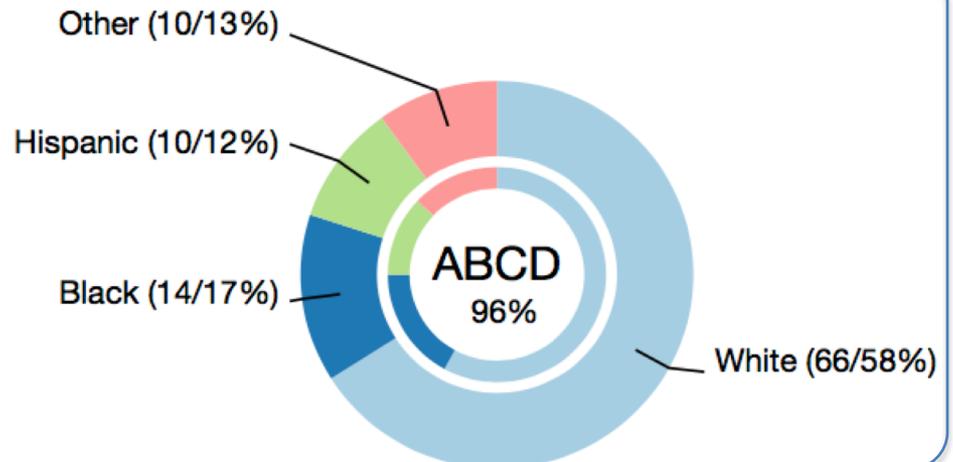
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Race and Ethnicity

General Population



Twins Population



Retention

2/355 SRI 0.6%	6/339 ROC 1.8%	19/705 WUSTL 2.7%	26/606 UMB 4.3%	28/454 UFL 6.2%	69/632 FIU 10.9%	104/635 YALE 16.4%
4/578 UVM 0.7%	24/1,002 UTAH 2.4%	24/739 UCSD 3.3%	547/11,879 ABCD 4.6%	36/552 VCU 6.5%	58/456 UPMC 12.7%	
4/385 UWM 1%	15/607 UMN 2.5%	13/379 MUSC 3.4%	23/406 CHLA 5.7%	36/434 UCLA 8.3%		
8/743 LIBR 1.1%	14/565 CUB 2.5%	26/722 UMICH 3.6%				
8/585						

Participants with any missed visits per site (%)

0/339 ROC 0%	2/578 UVM 0.4%	7/1,002 UTAH 0.7%	5/585 OHSU 0.9%	8/722 UMICH 1.1%	7/406 CHLA 1.7%	18/632 FIU 2.9%	29/635 YALE 4.6%
0/385 UWM 0%	2/355 SRI 0.6%	4/552 VCU 0.7%	6/705 WUSTL 0.9%	139/11,879 ABCD 1.2%	13/739 UCSD 1.8%		
0/379 MUSC 0%	5/743 LIBR 0.7%	5/606 UMB 0.8%	6/607 UMN 1%	7/565 CUB 1.2%	12/456 UPMC 2.6%		
0/454 UFL 0%	3/434 UCLA 0.7%						

Participants with 2 or more missed visits per site (%)

Substance Use

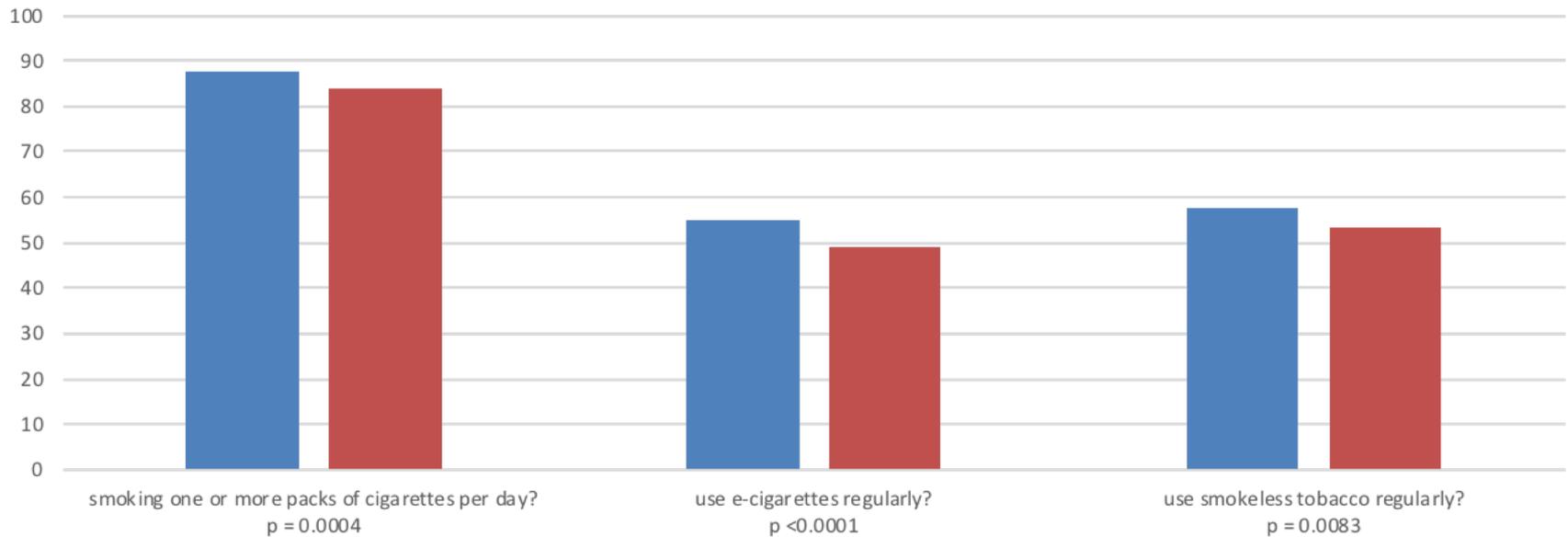
- Current or past alcohol or substance use disorder was an ineligibility criteria
- Youth were screened for risk for future substance use
- Baseline Alcohol use:
 - 2034 had a sip of alcohol; 33 reported finishing drink after sip
 - 1108 had 1 sip
 - 786 had 2-5 sips
 - 87 had 6-10 sips
 - 53 had more than 11 sips
- Baseline Tobacco use:
 - 75 had a puff; 11 reported continuing after the first puff
- At the first follow-up assessment (n=4847) there was still little to no use
 - 11 youth reported tobacco use since baseline
 - 339 youth reported 1 or more non-religious sips of alcohol since baseline



Substance Use

Great Risk

■ Low Risk ■ High Risk



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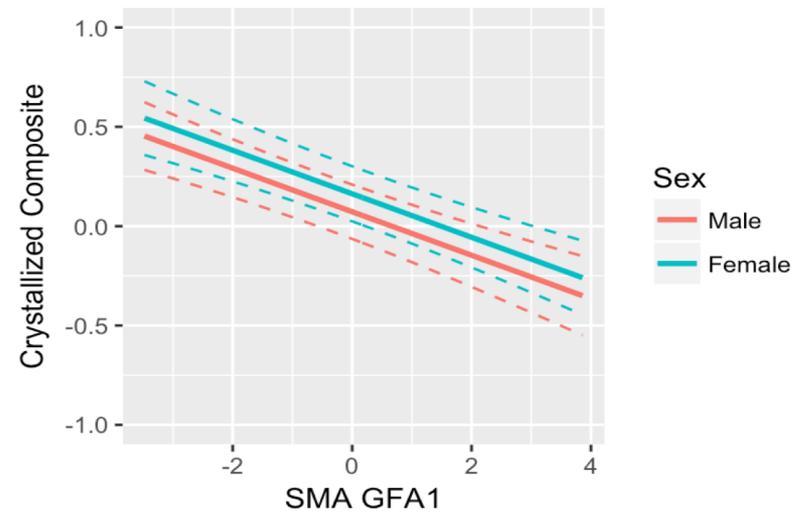
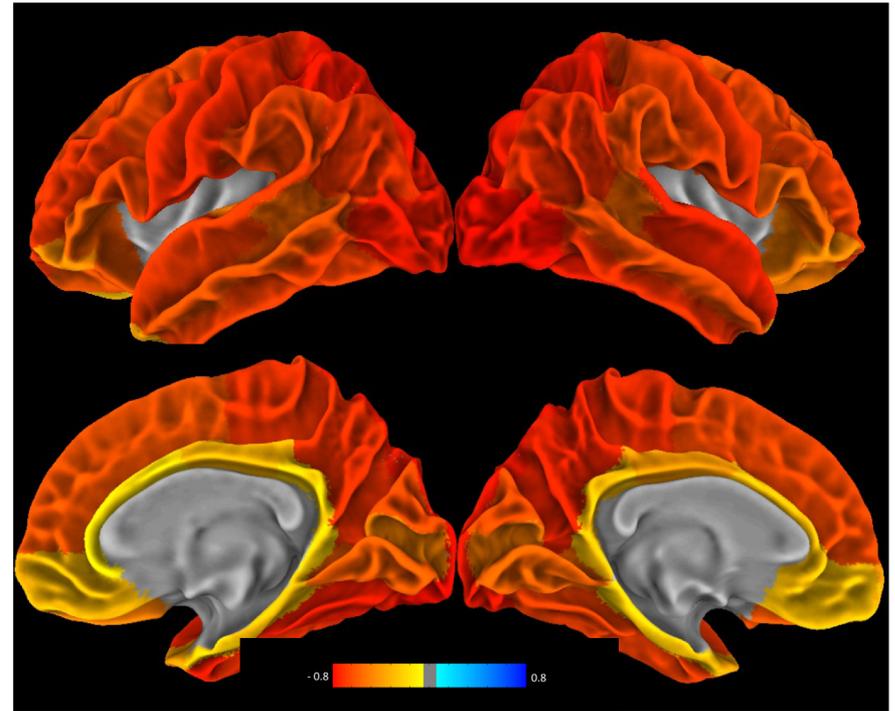
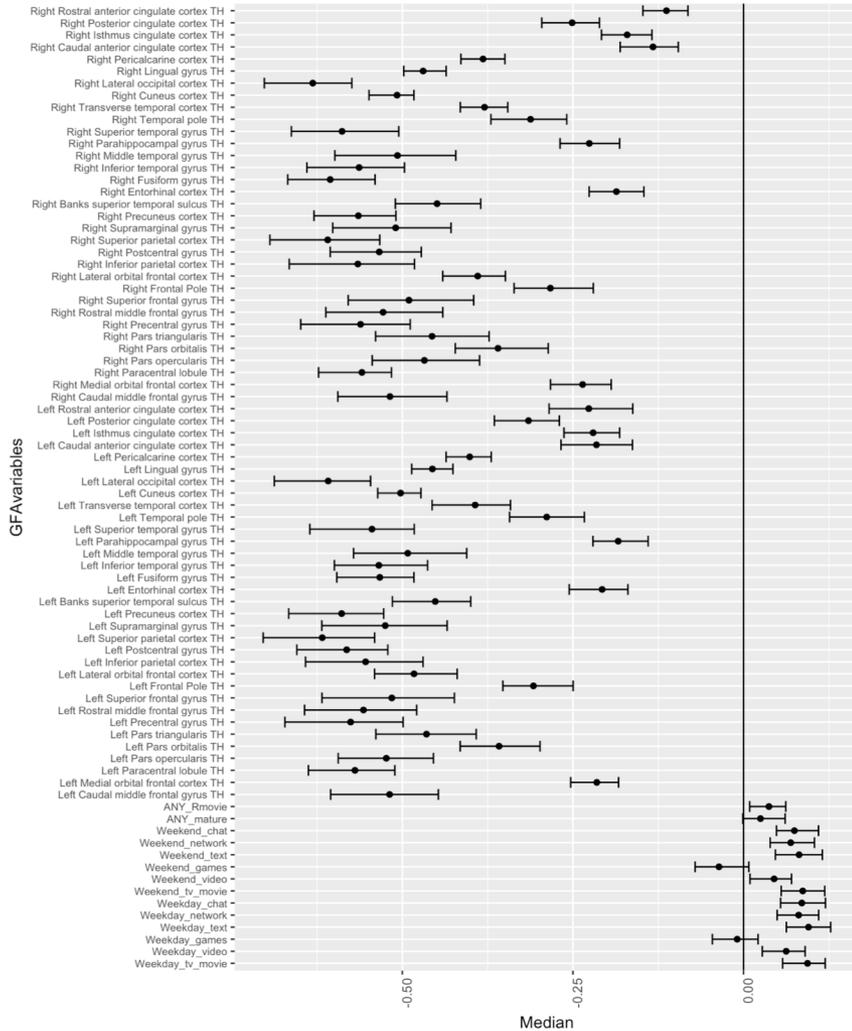
Screen Media

- Youth were asked to indicate how long they were engaged in the
 - Watch TV shows or movies
 - Watch videos (such as YouTube)
 - Play video games on a computer, console, phone or other device (Xbox, Play Station, iPad)
 - Text on a cell phone, tablet, or computer (e.g. GChat, WhatsApp, etc.)
 - Visit social networking sites like Facebook, Twitter, Instagram, etc.
 - Video chat (Skype, FaceTime, etc.)?
- Youth were asked:
 - How often do you play mature-rated video games (e.g., Call of Duty, Grand Theft Auto, Assassin's Creed, etc.)
 - How often do you watch R-rated movies

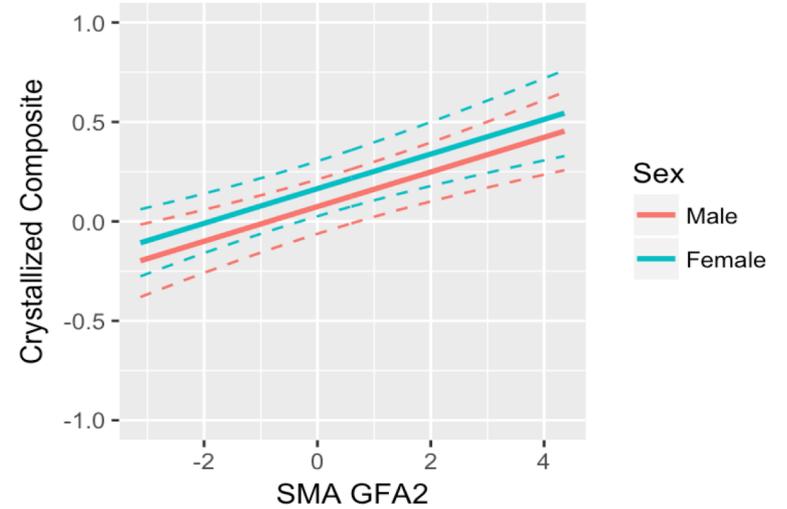
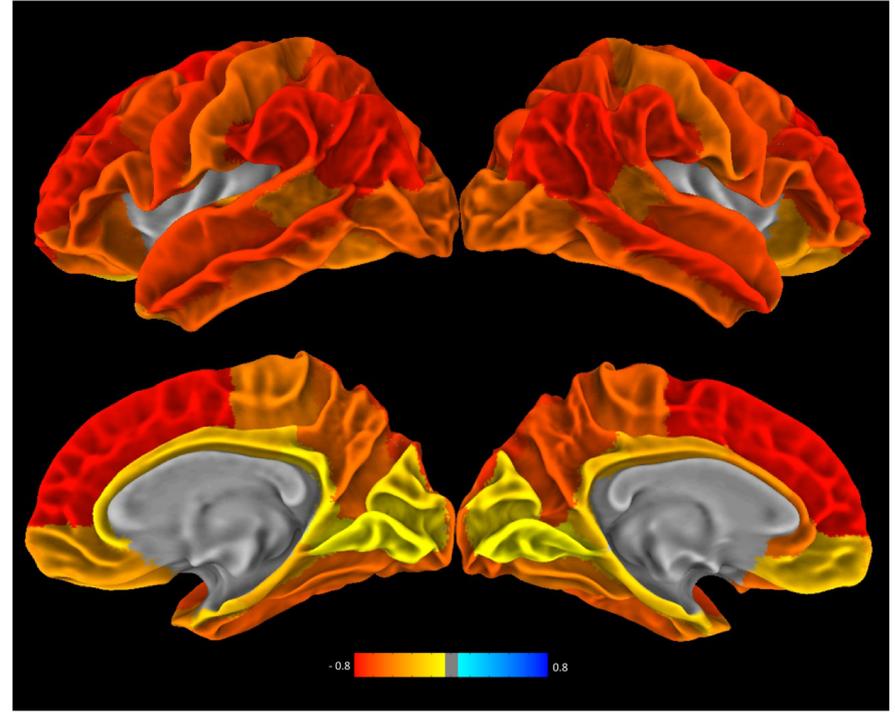
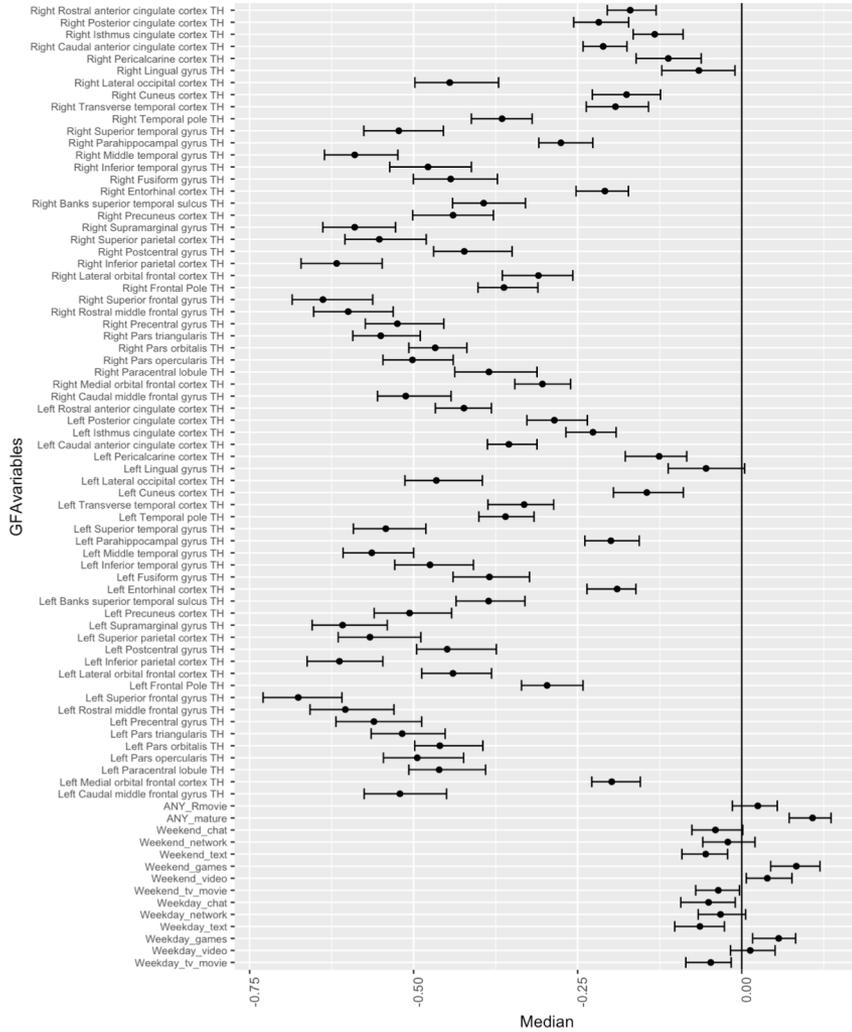


	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile	
	0 - 11	11 - 19.5	19.5 - 33.8	33.8 - 163	p
n	1076	1085	1034	1062	
Average Screen Time (hours/week)	6.94 (2.76)	15.25 (2.48)	26.08 (4.05)	54.01 (19.13)	<0.001
Age in Months (mean (sd))	119.38 (7.23)	120.32 (7.26)	120.38 (7.57)	120.04 (7.26)	0.006
Height (in) (mean (sd))	55.26 (2.92)	55.43 (3.12)	55.49 (3.15)	55.56 (3.41)	0.147
Weight (lbs) (mean (sd))	77.71 (19.23)	81.09 (21.32)	82.58 (23.02)	87.65 (25.89)	<0.001
Body Mass Index (mean (sd))	17.75 (3.45)	18.40 (3.75)	18.67 (4.04)	19.72 (4.39)	<0.001
Gender (female) (%)	625 (58.1)	520 (47.9)	453 (43.8)	421 (39.6)	<0.001
Race/ Ethnicity (%)					<0.001
White	745 (69.3)	700 (64.5)	587 (56.8)	487 (45.9)	
Black	43 (4.0)	55 (5.1)	99 (9.6)	202 (19.0)	
Hispanic	149 (13.9)	210 (19.4)	222 (21.5)	246 (23.2)	
Asian	36 (3.3)	30 (2.8)	21 (2.0)	10 (0.9)	
Other	102 (9.5)	90 (8.3)	105 (10.2)	116 (10.9)	
Parental Education (%)					<0.001
<= 12 grades	87 (8.1)	117 (10.8)	152 (14.7)	172 (16.2)	
HS Degree	25 (2.3)	38 (3.5)	46 (4.4)	50 (4.7)	
Some College	160 (14.9)	221 (20.4)	300 (29.0)	406 (38.2)	
Bachelor	363 (33.7)	400 (36.9)	290 (28.0)	263 (24.8)	
Higher	441 (41.0)	308 (28.4)	246 (23.8)	168 (15.8)	
Not known	0 (0.0)	1 (0.1)	0 (0.0)	3 (0.3)	
Parents married (yes) (%)	872 (81.0)	829 (76.4)	719 (69.5)	615 (57.9)	<0.001
Parental Income (%)					<0.001
[<50K]	144 (13.4)	171 (15.8)	252 (24.4)	399 (37.6)	
[>=50K & <100K]	243 (22.6)	313 (28.8)	327 (31.6)	310 (29.2)	
[>=100K]	610 (56.7)	517 (47.6)	378 (36.6)	262 (24.7)	
Refused to state	79 (7.3)	84 (7.7)	77 (7.4)	91 (8.6)	
Parental Age (mean (sd))	41.55 (6.09)	41.03 (6.31)	40.16 (7.16)	39.16 (7.19)	<0.001

Cortical Thickness: SMA_GFA1 Variance = 15.69%



Cortical Thickness: SMA_GFA2 Variance =9.15%



Acknowledgments



Adolescent Brain Cognitive Development

- ABCD Study Consortium
- All Federal Partners
- Laureate Institute for Brain Research
- William K Warren Foundation

Special Thanks to AAHB for inviting me to share ABCD!

