ADHD and Screen Time: Research, Reality, Benefits, and Concerns

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Take Aways

- Knowledge of research on impact of technology and digital media on children with ADHD.
- Identify how technologies and digital media can improve executive functions, working memory, selective attention, and processing speed.
- Understand the use of games and technologies for children with ADHD and strategies to enhance generalization of game-based skills to real-world activities.
- Identify and learn how to use popular games and apps to improve executive-functioning, self-management, and academic skills in children with ADHD.
- Develop expertise on how and when to apply limit setting from the perspective of a parent, coach or clinician.

It's Not Just Video Games Anymore

- Screen-based technologies or digital-media use are more encompassing terms than video games.
- Games, apps, software, and websites are merging.
- Access, particularly mobile and tablet-based, requires a new type of monitoring and understanding.
- Academic and classroom are increasing requiring games and technology.
- No choice for parents.



Among all 8- to 18-year-olds, amount of time spent with each medium in a typical day:



Media Use Over Time

Among all 8- to 18-year-olds, average amount of time spent with each medium in a typical day:

	2009	2004	1999
TV content	4:29 ^a	3:51 ^b	3:47 ^b
Music/audio	2:31 ^a	1:44 ^b	1:48 ^b
Computer	1:29 ^a	1:02 ^b	:27 ^c
Video games	1:13 ^a	:49 ^b	:26 ^c
Print	:38 ^a	:43 ^{ab}	:43 ^b
Movies	:25 ^a	:25 ^{ab}	:18 ^b
TOTAL MEDIA EXPOSURE	10:45 ^a	8:33 ^b	7:29 ^c
Multitasking proportion	29% ^a	26% ^a	16% ^b
TOTAL MEDIA USE	7:38 ^a	6:21 ^b	6:19 ^b

How Much Do Kids with ADHD Play?

Clinical and anecdotal observations – too much!!!!!!!!

- 10- to 12-year-olds in France are exactly like their peers (Bioulac 2008)
- Milwaukee study of teens, same amounts with more variability (Fischer and Barkley 2006)
- More video-game play than music, in contrast to peers (LearningWorks for Kids 2011)
- 90% of ADHD rather than 80% of TD kids spend more than one hour a day on computer (Linginerni, 2012)

How do children with ADHD perform on video games?

- Cogmed data and observations on Wisconsin Card Sorting Test (Oznoff)
- Persistence is dramatically increased with a computerized task, resulting in success, although
- Sometimes requiring longer processing and more effort.
- Improved performance on reading tasks (Clarfield and Stoner)
- Improved on mathematics (Ota and DuPaul) No difference in inhibitory performance of children with ADHD and TD Kids with Crash Bandicoot and Frogger (Shaw 2005). The similarity of performance in this study suggested that "enjoyable video games provide a context in which their performance is enhanced."

LearningWorks for Kids 2013 Study

How often does your child show signs of ADHD such as loss of focus, fidgeting, and disorganization while: (Scale 0 to 9 with 0 meaning never, 9 always)

Activity	Mean	SD
1. Playing video games	1.59, N = 64	1.87
2. Doing homework	5.89, N = 64	2.24
3. Having a conversation with you or other	4.14, N = 64	2.16
4. Doing chores	5.51, N = 64	2.42
5. Watching TV	2.32, N = 64	1.96
6. Reading	3.67, N = 64	2.34
7. Playing with Legos or blocks	2.23, N = 62	2.12
8. Playing with action figures/dolls	2.30, N = 63	2.16
9. Playing on the Internet/computer	1.94, N = 64	1.76

LearningWorks for Kids 2013 Study

Parenting strategies with children with ADHD:

1. Do you monitor the length of time your child plays with video games and is on the computer?

Never: 6.2% Sometimes: 18.8% Often: 28.1% Always: 46.9%

2. What best describes your approach to setting limits for your child with digital media?

Approach	Percentage
1. No access to games or the Internet	3.1
2. Only on weekends and vacations	10.9
3. After homework is completed	40.6
4. Limited number of hours a day	14.1
5. Do well in school and play games	14.1
6. No specific rules	17.2

LearningWorks for Kids 2013 Study

On a typical weekend or vacation, about how much time does your child spent with the following technologies and activities:

0 1	2	3	4	
None <30	30-60	60-120	ו 120<	minutes
Activity	Mean (N = 65)		Standard Deviation	
Watching TV	2.8		.96	
Reading or doing homework	1.37		.96	
Playing outdoors or sports	2.31		1.34	
Talking/texting on cell phone	.63		1.10	
Doing homework on the computer	.51		.83	
Listening to music	1.86		1.26	
Using the Internet	1.49		1.31	
Playinng organized sports	1.05		1.32	
Playing video games	2.05		1.27	
Playing with toys/board games	2.14		1.40	

How Much do You Believe Video Games can Help Your Child in the Following Areas?

Scale

- 1. Not at all
- 2. A little bit
- 3. Somewhat
- 4. Quite a bit
- 5. A great deal

Activities	Mode Response	Quite a Bit to Great Deal
Writing	Not at all (81)	7
Understanding Self & Others	Not at all (68)	11
Adaptability/Compromise	Not at all (45)	12
Making Friends	Not at all (68)	14
Self-Control	Not at all (59)	16
Time Management	Not at all (54)	20
Math	Somewhat (39)	26
Reading	Not at all (34)	34
Planning	Somewhat (41)	36
Memory	Somewhat (40)	43
Focus	Somewhat (41)	45
Problem Solving	Somewhat (39)	46
Teamwork	Not at all (40)	46
Physical	A little bit (34)	47

Instant Poll of Adult Media Use

Talk to 2 or more colleagues.

How many of you...

- Do something else while watching TV?
- Take your cellphone virutly everywhere?
- Check you cell phone more than 5 times per hour?
- Read a newspaper?
- "Read" audiobooks the majority of the time?



- Listen to the radio?
- Love today's action movies?

Do parents, educators, and healthcare professionals have a choice?

- Many homework and supplementary programs are available only on websites.
- Libraries are still for research (but only if you use the Internet to search).
- Everybody else is playing.
- 21st century skills require digital literacy.
- Communication requires digital technology.

Does technology cause ADHD?

- NO.....but think more about our short attention spans
- Cicking through 100's of channels
- Always needing something to do
- I'm bored
- Not just kids

How Much Time Do Kids with ASD Use Digital Media?

- Numerous studies cite anecdotal data regarding ASD kids' overinvolvement with visual digital media
- None of the available studies provide a direct measure that pairs with the Kaiser Foundation study of 2010
- Forty-one percent of ASD youth spend most of their free time playing video games, which is higher than the 18 percent of youth in the general population considered to be high users of video games (Mazurek 2011).

Technology use by Children with ASD

ASD kids spend more time engaged with electronic media than any other leisure activity, most notably television and movie viewing, with animated programs preferred (Shane and Albert 2008)

Children with ASD and intellectual disabilities make the most use of television, as it may be less cognitively- and socially-demanding (Mazurek 2011).

Sixty-four point two percent of ASD kids spend their free time using non-social media, including television and video games; only 13.2 percent spend time with social media.

Why Are Technologies So Engaging To Kids with ASD?

- Computers do not involve social factors and are consistent and predictable, and a child can take control and determine the pace of the activity (Swettenham 1996).
- Numerous studies cite the visual modality of video games and television as a reason for the engagement of screen-based technologies.
- The skills and challenges of video games and escaping to a fantasy reality (Winter-Messiers 2007).



Why Are Technologies So Engaging To Kids with ASD-2 ?

- Alleviates the discomfort and anxiety of emotional interactions (Bellini 2006, 2007).
- Interest in video games may provide a focus for discussion and exchange of information with peers and opportunity to have similarity with others (Durkin 2010).
- Motivation to play video games is greater than the difficulty task demands of using executive skills such as planning, working memory, and set shifting that are typically problematic for ASD use (Durkin 2010).

What Technological Activities Do Children with ASD Prefer?

- Compared with other disability groups, including speech and language, Learning Disabilities, and intellectual abilities, the rate of non-social media use are higher among the ASD group, and the rates of social-media use are lower (Mazurek 2011)
- Video games appear to be one of the major obsessive/perseverative interests of children with ASD, but because they are such a popular activity amongst TD peers, this may not be identified as such (Klim 2007).
- The relatively constrained area of a screen may focus attention on the relevant stimuli and help them to ignore irrelevant ones (Mineo et al. 2008).

What Technological Activities Do Children with ASD Prefer-2 ?

Cell-phone use - ASD kids rank playing games first and talking to friends as fourth most important compared to TD kids, who rank calling friends first and playing games fourth (Durkin 2010).

Relative preference for non-social as opposed to social media for children with ASD.

ASD teenagers may use their interest in video games to integrate themselves into peer-group activities, but upon further investigation have differing interests.



Why use video games and digital media to help kids with Autism Spectrum Disorder?

Kids with Autism SpectrumVideo Games and Digital MediaDisorders

Often display poor fine or gross motor coordination.

All video games practice some degree of fine and gross motor skills, particularly those with motion controls.

May be inflexible or rigid and struggle with changes or making mistakes.

Video games help kids practice being flexible in a safe and engaging environment by learning the rules of the game through trial and error and guided discovery.

Often do not share common interests with peers.

Most kids play at least a few video games, so having a knowledge of gaming will give ASD kids a topic of conversation to use with their peers.

Why use video games and digital media to help kids with Autism Spectrum Disorder?

Kids with Autism Spectrum Disorders

Video Games and Digital Media

Often unaware of social cues and convention.

Massive Multi-player Online Games are particularly good for becoming part of a group and require that players learn the "customs" of the game world, allowing kids with ASD to socialize in a more comfortable environment.

May become vulnerable to bullying, while not understanding when they are being teased or how to protect themselves. Many online multi-player games contain the same types of social interactions a child will find at school-both the good and the bad. However parents can sit with their ASD child (without the other players knowing) to help coach them through any difficult social interactions that may occur.

Concerns About Video Games Among Children with Autism Spectrum Disorders

• Because children with ASD often struggle in social relationships, they can become overly drawn to single-player games or immerse themselves on the Internet.

• Require that your child predominantly play multi-player games, and games that facilitate social interactions.

• Kids with ASD may find that they're more readily accepted by their peers in these games, as they have more skill at identifying social cues in game-based communication than in translating nonverbal cues

Concerns About Video Games Among Children with Autism Spectrum Disorders-2

- While social gaming can be helpful for kids with ASD, they may become so comfortable in these online social settings, that they lose sight of the importance of face-to-face communication.
- Carefully monitor how much time your child is spending in these online social settings, and always make sure to use them as an opportunity for practicing face-to-face communication skills.
- Ask your child questions about specific online social interactions, and have him try to explain how such an interaction would play out in the "real world."

Research: negative impact of video games on children

- Increasing levels of obesity with screen-based time, primarily television
- Poor psychological adjustment in kids who play more than 3 hours per day - Pediatrics report
- Violence and video games Bushman data
- 7 hours 38 minutes per day of digital-media time ignoring other activities Kaiser Foundation data
- Video game addiction 3- 8% cited-DSM-V category internet gaming disorder

Problematic behavior in video-game play in children with ADHD

- More than one hour a day is associated with short term increased signs of inattention (Taharoglu)
- Increased difficulty in transitioning and stopping video-game play, resulting in more oppositionalism
- More video-game time is associated with increasing signs of inattention (Mazurek and Engelhardt 2013 study)
- Video-game play can be associated with video-game addiction related to Dopamine release in the brain (Han and colleagues 2009)
- Total time spent with screen media is positively associated with attention problems (Swing, Gentile, et al. 2010).



The Power and Allure of Technology



Reading

Phonological Awareness

• Working memory - keeping different sounds in mind while decoding

• Fluency

• Focus - ability to sustain attention to the task, keep going without getting distracted, not give up.

Comprehension

- Planning ability to form/plan comprehension goals before reading, use organizers, think about prompts
- Organization have to be able to organize information that was read in order to make sense of it sequencing events, most important info.
- Working memory keep track of pieces of info to complete understanding

The power of eBooks



Meet Heckerty- Early Reading



Writing

Vocabulary

• Working memory - Recalling previous vocab learned and being able to use it when appropriate

Fluency

- Focus sustain attention to the task without being distracted or giving up, goal directed writing as a problem and step-by-step process, writing in stages.
- Task initiation ability to define the first step and begin organizing thoughts with minimal hesitation and self-doubt, getting something onto the page
- Working memory keeping multiple ideas in mind at once, recalling grammar/spelling rules

Organization

• Working memory - ability to pull spelling rules from long-term memory and use when writing



Narrato Journal and Day One





Friendstrip Kids Pro-Write with Comics


Mathematics

Computation

- Working memory keeping different steps to solving a problem in mind, recalling which formulas to use to solve which problems, keeping parts of a multi-step problem in mind
- Focus sustaining attention to the task, not getting distracted in the middle of completing a problem, setting goals and working to meet them

Fluency

- Working memory keeping all of the different components to a problem in mind while solving it, thinking about previous steps while doing the current one, retrieving previously-learned information to apply it to the current problems/task, applying math rules.
- Flexibility shifting between different representations written in sentences, computation, etc. Being able to switch your approach/strategy when it is not working.

Concepts

• Self-awareness - being able to explain and communicate your reasoning in writing or to others, think about and explain the steps you use to solve different kinds of problems, explain the reasoning behind completing a math problem a certain way.

Khan Academy

Khan Academy



Platform/Console: Android, iPad, iPhone, iPod, Online LWK Recommended Age: 6+ Thinking Skills Used: Self-Awareness, Time Management Academic Skills Used: Mathematics









Games and Learning -1

- Play = Learning: Psychological perspectives from Piaget, Elkind, Brown, Gray, Singers
- Play- Test and explore observations, learn about relationships, cooperation, frustrations, success (SEL)
- Play- How kids learn about expressing selves, restraining impulses, taking perspectives, imitating, and creating
- Play- learn to plan, think of the future, executive functions
- Digital play = learning: Gee, Squire, organizations such as Serious Play, Games for Change and Health, University of Wisconsin

(Video) Games and Learning

- Academics Reading, math fluency, topical areas
- Cognitive skills Processing speed, attention abilities
- Job-related skills e.g., Laparoscopic surgery, military functions, leadership
- Social-emotional functioning -Social skills
- Executive functions Working memory, cognitive flexibility, focusing



How Popular Games and Apps Improve Executive Functions

- Practice primarily with games with the skill is used repeatedly in order to achieve goals
- Support, primarily apps where a skill is scaffold by the functionality
- Mastery, primarily apps and games with built-in generalizability and practice

Research on executive/thinking skills and video games

- LWK pilot research on differentiated instruction, targeting areas of EF weakness with video games
- Combination of board and video games improve fluid reasoning and processing speed (Mackey, 2011)
- Working memory video games improve WM, fluid reasoning skills (Cogmed) Intensity/duration
- Computer-based training improves executive attention in preschoolers (Rueda, 2005)
- Video game-like math and reading programs improve learning, reduces attention symptoms (Kulman)
 - Games (non-video) increase cognitive load teaching tool by parents reduces ADHD signs in preschoolers (Halperin, 2012)
 - Study on games to improve working memory (Davis, 2011)

Research on executive/thinking skills and positive effecs of video games

- Increasing Processing Speed (Green and Bavelier 2009)
- Improving Working Memory (Klinberg et al. 2007)
- Increasing Pro-Social Behavior in Children (Gentile et al 2009)
- Improving Social Involvement

(Ferguson, 2010)

Hyperlinks Continued...

- Building Brain Regions (Kuhn and colleagues study of <u>Tetris</u>)
- *Starcraft*: Improves Brain Flexability (Glass et al. 2013)
- Rayman Raving Rabbids: Improves Reading Fluency (Franceschini, Gori, 2013)

Games practice Efs

- What are Executive Functions
- Planning as major tool
- Flexibility to learn new strategies
- Organizing "stuff"
- Working memory for later tasks
- Focus throughout the game
- Time management on timed tasks

Why use video games and digital media to help children with EDFs or ADHD?

- Video game play requires the use of executive functioning skills.
- Other skills such as organization and metacognitive skills are required for success.
- Both simple and complex video games regularly use skills such as planning, cognitive flexibility, self-control, and time management.
- Many games specifically tax working memory skills and

Why use video games and digital media to help kids with ADHD?

Kids with ADHD or Attention Difficulties

Video Games and Digital Media

May become easily bored and unable to sustain attention

Good video games and digital media are often multi modal, requiring ever-changing skills and employing video, sounds, words, and actions that help keep kids interested and engaged.

Often require immediate reinforcement or consequence to stay focused on a task. Video games provide clear and immediate feedback, constantly letting the player know what he is doing wrong, and what he is doing right.

Often require that their body or mind to be actively engaged.

Video games and digital media are extremely engaging and many require physical and cognitive involvement.

Why use video games and digital media to help kids with ADHD?

Kids with ADHD or Attention Difficulties

Video Games and Digital Media

Usually have problems with following directions.

Video games teach by trial and error or through guided discovery, requiring that the player understand the instructions in order to succeed.

May struggle to learn new information and experience frustration or low self-esteem as a result. Most negative feed back from video games and other digital media occurs privately. This causes less embarrassment and frustration, while teaching the player how to handle these emotions

Cautions	Solutions
Children with ADHD or attention problems may become "hyper-focused" on video games and other digital media, neglecting other important responsibilities.	Require that your child complete all of her homework, chores, or other responsibilities before being allowed some digital play time. By making him put-off these fun activities until after her work is done, he won't be able to use digital play as a means of procrastination.
Kids with ADHD or attention problems often become so absorbed with activities they find interesting, that they may lose track of how much time they have spent on their digital play.	Use a timer if you need to limit your child with ADHD. Time management and having a sense of time are often significant deficits for children with attention problems. You can use online timers such as TabTimer.com or even an everyday kitchen timer to keep your child on track.
Kids with ADHD or attention problems may choose to engage with digital play instead of the physical activities that are part of a healthy treatment process.	Exercise has been shown to improve Focus and learning in children with attentional problems. Tell your child to go out and run around before playing video games, and to play active games such as Wii Tennis or Kinect Adventures.

Why use video games, apps, and digital technologies to improve Efs

- Engage kids
- Catch them with what they are already doing
- Willing practice
- Sustained attention and effort
- Uses skills (Efs) that are crucial to 21st century success
- Research support for games and learning



How well do game-based skills transfer to the real world?

- Game play alone results in modest improvements in real-world executive skills
- Children with learning and attention problems have problems in generalizing strategies
- Kids like to talk about playing video games and may be willing to learn from that
- Games prompt partnering and motivation to learn executive skills

Practice and rehearsal of executive skills

Video of Planning in Games

• Youtube Learningworks for Kids Lets Play

But Games are Not Enough!!!

- The key to success is effective mediation (can be done in the game) teaching from the game
- Teachers (including peers, parents, and embedded instruction) make the connection between game-based learning and real-world skills
- Actual learning requires knowledge of the skill, an understanding of how and when to use it, and practice across many situations

How well do game-based skills transfer to the real world?

- It is all about generalization!
- Games alone results in modest improvements in real-world executive skills
- Children with learning and attention problems have problems in generalizing strategies
- Games as a teaching tool with mediators

The Importance of Generalization-Part 1

- *A definition* The ability to take something you've learned in one place and apply it in another place.
- *Why it is so important?* It is a key to making classroom (or home-based) learning into real-world learning.
- *Where does it help children?* Everywhere!
- Generalization insures that individuals can utilize the skills they have learned in one environment in various settings, with other people, and with different materials

Generalization, motivation, and metacognition with tech-Part 2

- The key Ingredient Making game-based learning into real world skills
- Games are play, Play=Learning
- Games (traditional, think chess) require problem solving
- Games are motivational
- Games sustain attention and effort
- Games require a variety of executive skills

Games promote extended practice

Generalization, motivation, metacognition and technology-Part 2 continued

- Games are social, and learning occurs with others
- Games foster communication amongst kids
- Games get special needs kids to participate
- Games get kids to think about what they are doing
- Flow and engagement
- Attention, practice, and effort lead to generalization

How Popular Games and Apps Improve Executive Functions

- Practice primarily with games with the skill is used repeatedly in order to achieve goals
- Support, primarily apps where a skill is scaffold by the functionality



• Mastery, primarily apps and games with built-in generalizability and practice



Prescriptions for using popular games and apps to improve executive functioning skills

- Typically requires more than game play alone
- Modeled after the SharpBrains method of effective brain training
- Training engages a specific brain-based skill such as speed of processing or working memory
- Training targets an area of weakness, assessed by tools such as the TEAS (Test of Executive and Academic Skills)
- Adaptive games and prescriptions increase the demands on cognitive resources

Prescriptions for using popular games and apps to improve executive-functioning skills - 2

- Dosage and intensity needs to be sufficient minimum dose of (approx 15 hours per target area over eight weeks)
- Choose games that target slightly different aspects of the same skill, similar to doing a variety of exercises to build biceps
- Continued long-term practice is necessary to maintain benefits
- Additional training outside of the game using metacognition and practice opportunities improves generalization

The LW4K Model

- Integrate strategic teaching principles
- Explicit goals, partnerships with child, previewing, engamement, individualization, teachable moments
- Detect, Reflect, Connect

Effective Game-based Learning

- Embedded teaching in games
- Practice in games for real-world skills
- Going outside of the game as a part of the game
- Collaborative game play learning social skills and leadership
- Discussion and modding outside of the game



How to use digital technologies to teach executive functions

- Educational and psychological principles that enhance effective learning with digital technologies:
- Develop a partnership with the child for learning executive skills
- Have the child identify areas that she wishes to improve
- Practice skills in an interesting and reinforcing manner
- Preview and review strategiess child "detect" use of executive skills with digital tech
- Teaching strategies that help a child "reflect" on use of executive skills and her game play

Point of performance strategies - "connect" executive functions from games to real world

Improving generalization by building it into the games

- New games such as **IF** (If You Can)
 - For improving social awareness and self-control skills
- Innovations in technology to create brain change such as a Akili and other potential tools
- Cogmed Working Memory training
- Lumosity/ other brain-training tools
- Still very limited, and the critics of brain training tools are quite vocal

Limitations of using popular games and technologies to improve executive functions

- Lack of peer-reviewed research
- Difficulty in tracking engagement and progress in the game and relating it to real-world skills and improvement
- Skills that are practiced may be less focused or lack intensity and duration
- Extraneous information and objectives that occur within the game
- Focuses on fun and not skill development
- Attitude of educators and researcher is often negative and skeptical
- No evidence of generalizability

What are the characteristics of interventions that

work best with children With ADHD?

- Point of performance interventions
- Immediacy of feedback
- Powerful and engaging feedback and meaningful consequences
- Multimodal presentations and multiple intervention agents
- Individualized to child's capacities
- Strategic teaching principles including: previewing, setting explicit goals, partnering, metacognition, and generalization strategies

What makes a game or app a good teaching tool for children with ADHD?

- It is engaging and sustains attention.
- It practices a specific skill the child needs to improve such as focus, planning, or time management.
- It promotes persistence of effort and a willingness to overcome obstacles.
- It is complex and interesting enough to result in duration and intensity of game play.
- Generalization of game-based skills can be applied to the real world.

What Types of Games and Apps Should a Child with ADHD Use?

- Developmentally rather than chronologically age-appropriate
- Genres rather than specific games
- Active games, the more active and vigorous movement the better
- Puzzle games- Help with time management and focus
- Continued long-term practice is necessary to maintain benefits
- Additional training outside of the game using metacognition and practice opportunities improves generalization

Recommendations for Video Games and Technologies for Children with ADHD

- Apps and Video Games "made" for ADHD
- Tend to be psychoeducational or simply not fun
- Select technologies based upon a child's individual needs
- Engagement which increases attention and persistence to the task is important
- Technologies with near transfer or direct connections to a skill are best
- Practice, intensity, and limitations are important

Research-based technological recommendations

- Cogmed Working Memory Training
- Action video games for improving selective attention (Green and Bevalier)
- DDR and Improved reading
- Headsprout and ADHD kids
- Computer-based math programs and ADHD
- Strategy games for flexibility
- Complex puzzle games improve EFs (Cut the Rope)
- Other studies, e.g., Interactive metronome, Play Attention, Brain Train Products, Lumosity, Posit Science's BrainHQ LWK research on EFS

How Much Should Your Child with ADHD Play Video Games?

Age	Amount of Time
0 to 24 months	not at all
2 to 5 years rule)	30 to 60 minutes a day (joint media engagement the
6 to 9 years	30 to 60 minutes a day (parents select games)
10 to 13 years selection)	30 to 60 minutes a day (parents monitor game

14 years old older

30 to 90 minutes a day (emphasize social gaming)

Neurotechnologies used to teach attention and other skills



- Working-memory training programs – Cogmed
- Neurofeedback/ biofeedback
- Attention trainers Akilli, Play Attention
- Brain-training suites such as Lumosity and Fit Brains
- Apps and games designed for special needs kids with autism, ADHD, LD
Neurotechnologies- office and screen-based treatments for ADHD and attention

- Music and music therapy- stimulates dopamine production in the brain, using music to block out other distractions, classical music http://www.additudemag.com/adhd/article/9558.html
- Neurofeedback/ biofeedback neurofeedback is a specific technique under biofeedback therapy,
- How it works Therapies that reduce the amount of "slow," or low-frequency, brainwaves and boost the number of "fast" or high-frequency brain waves can relieve some symptoms of ADHD.
- In large-scale clinical trials, the efficacy of EEG biofeedback for AD/HD is comparable to that of stimulant medications. Many different EEG biofeedback protocols for AD/HD are available. – Hirshberg

Six months of neurofeedback training in school reduces his ADHD symptoms 3 times per week - Steiner et al.

Neurotechnologies - apps for executive-functioning and attention issues

• Akili - multitasking cognitive trainer, provides a targeted way potentially to improve cognition and disease symptoms through at-home video-game play. Provides patient compliance tracking and progress analytics.

• Interactive metronome - Focusing attention and body movements on a rhythmic beat - Limited validity. (Now being marketed as <u>Brainbeat</u>)

 uHealth - Eye Tracking Brain Training - for attention and focus <u>http://www.geektime.com/2015/01/26/umooves-uhealth-wants-to-boost-your-concentrat</u> ion-with-eye-tracking-games/

Fit Brains: Focus Trainer - designed to improve your attention span and concentration through a collection of fun, targeted brain games <u>https://itunes.apple.com/us/app/fit-brains-focus-trainer/id738363980?mt=8</u>

Cogmed Working Memory training

- Research-based, clinically-proven computer program to improve working-memory capacities
- Targeted, regimented exercises
- Demonstrated to promote structural changes in the brain based upon principles of neuroplasticity
- 50+ peer review studies demonstrated to improve reading, math, and sustained attention
- Generalization is improved by using additional tools and strategies in conjunction with Cogmed

Cogmed Working Memory training

Apps+: Cogmed Working Memory Training

OVERVIEW HOW IT HELPS MAKE IT WORK ADHD ALTERNATIVES



Title: Cogmed Working Memory Training Category: Education, Utility Thinking Skills: Focus, Working Memory Academic Skills: Mathematics, Reading LWK Recommended Age: 5+ Website: Cogmed Working Memory Training



Description

Cogmed Working Memory Training is a research-based, clinically proven computer-based program designed to improve memory capacity through targeted, regimented exercises. There are 3 different age-based versions of *Cogmed Working Memory Training*. Cogmed RM, for school-aged children, consists of 25 computerized training sessions, each 30-45 minutes long. These training sessions involve a variety of game-like working memory tasks that are fun and engaging. The training is lead by a Cogmed qualified coach such as a psychologist, physician, or trained clinician who organizes the training and provides feedback and progress.

Due to the range of age-specific programs Cogmed offers, use of the training program is recommended for ages 5 and up.



Technologies to supplement accommodations

- Improve written-language skills with typing and keyboarding
- Lectures presented on powe points available to students
- Livescribe pens to support working memory
- Homework assignments and details always available online
- Use of cell phones permitted to take pictures of assignments and to use for calendars
- Dictation tools available for assignments for keeping track of and completing
- homework available online and not paper that can be lost
- Organizational tools such as Google calendar, note
 - Using iPad, ebooks to focus attention on reading

Dragon Dictation

Dragon Dictation



ESRB Rating: N/A Platform/Console: iPad, iPhone, iPod, Mac, PC LWK Recommended Age: 6+ Thinking Skills Used: Flexibility, Focus Academic Skills Used: Writing







LQ: 9 Brain grade: 9.6 Fun score: 8.4

Notablitiy



Platform/Console: iPad, iPhone, iPod LWK Recommended Age: 10+ Thinking Skills Used: Organization, Time Management Academic Skills Used: Writing







LiveScribe

Apps+: LiveScribe

OVERVIEW	HOW IT HELPS	MAKE IT WORK ACADEMICS ADHD	
+		Title: LiveScribe Category: Education Thinking Skills: Organization, Time Management, Working Memory Academic Skills: Mathematics, Writing LWK Recommended Age: 8+ Website: livescribe.com Buy Now: Download Now on iTunes	LQ: 9.3 Brain grade: 9.5 Fun score: 9.1 What is this? Tavorite

Description

LiveScribe is a fascinating piece of note-taking technology. A "smart pen" that records voice notes, it has a playback speaker, and also uses an internal memory that records handwritten notes, audio, and drawings. Notes taken with the *LiveScribe* pen (on specific digitally equipped paper) can be uploaded into *Evernote*, a powerful note-taking and organizational tool. *LiveScribe* makes it easy to study notes, because it also saves the accompanying lecture. Users can tap on a handwritten word in their notes, and hear the audio that was going on when that word was written. This means users can go back and fill in missing gaps or re-listen to explanations from class. There are also countless applications for the *LiveScribe*, including a calculator and a tool for translating words to foreign languages. Handwritten or recorded notes become digital files that can be organized and stored much easier than piles of paper in a binder. *LiveScribe* is requires basic writing skills, and is best suited for use with children 8 and older.

Continue

Quizlet



Platform/Console: iPad, iPhone, iPod, Online LWK Recommended Age: 4+ Thinking Skills Used: Focus, Planning, Working Memory



Academic Skills Used: Reading, Writing







30/30

30/30



Platform/Console: iPad, iPhone, iPod LWK Recommended Age: 6+ Thinking Skills Used: Planning, Time Management









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When Limits are Needed

- When is too much, too much?
- Giving yourself a break as a parent of an educator
- Are "popular" limits realistic?
- How to start early
- What about your own media use?



Step One for Screen Time Limits: Create a Healthy Play Diet

- Include large doses of physical, social, creative, and unstructured play
- Make other forms of play more attractive
- Model a balanced play diet
- Screen based technologies should not be the "to go" activity
- Keep your kids very busy with other activities
- Foster the development of alternative long-term interests
- Strategy is preferred method as it focuses on overall health

Limit Setting-Parental Control of Access

- Control the controller
- Limit access to content such as violence or sexually
- No access during the school week
- Parents own the technology
- Time limiting tools such as timers, screen managers
- Strategies best for younger children, addictive tendencies, and inappropriate use



Books by Dr. Kulman

Train Your Brain for Success

A Teenager's Guide to Executive Functions

Randy Kulman, Ph.D.

This book will help you:

- get organized
- improve your focus and attention
- manage your time
- think before you act
- remember important information
- understand how your brain works

Playing Smarter in a Digital World

A Guide to Choosing and Using Popular Video Games and Apps to Improve Executive Functioning in Children and Teens



Randy Kulman, Ph.D.

Based on the LearningWorks for Kids™ Model

Illustrated by Peter J. Welleman

LW4K for CHADD

- http://learningworksforkids.com/members/signup/
- Discount Code CHADD50 50% off premium membership

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Angry Birds



Make a Schedule

- An hour a day
- After homework is done
- Only on weekends and vacations
- Anytime and anywhere
- Never
- Good for kids who struggle with school or find screen-based time too rewarding

Curation of Content

- Only educational games
- Differentiation based upon an individual child's characteristics
- Level of digital nutrition as judged by the parent
- Choose games and apps suggested by your kids
- Best for kids who can't choose appropriately or those with specific academic needs

ANGRY BIRDS

• Birds are used as projectiles to hit pigs that are protected by structures.

• Players plan out each shot and predict the consequences of their shot.

• Each level is set out uniquely so players flexibly change strategies.

Family Sensibilities, Modeling, and Playing with Your Child

- Play games together both at home or online
- Follow your on sensibilities about violence or other inappropriate content
- Choose games to foster shared family interests such as sports or classic board games
- Model appropriate amounts of screen-based activities
 - Good for families who use technology with their kids

Video Games Make You Smarter-YouTube



Sustained-attention skills are needed to:

- Be able to attend effectively to multiple sources of information
- Be able to listen and ask appropriate questions in a lengthy conversation
- Be able to remain focused while sustaining your efficiency and speed of completing a task
- Be able to ignore distractions while you are working
- Take notes from your teacher
- Read and understand a story

Transitioning from Games to Homework

- Easier said, than done, particularly for kids with ADHD, sandbox games like Minecraft, and older kids
- Have effective and readily available consequences for overuse of game time
- Start setting limits at an early age
- Develop reasonable rules and limits in advance
- Practice and reward appropripriate disengagement from fun activities
- If it seems impossible to set limits, parents must own the technology
- Control access to the Internet. <u>See tools at</u> <u>learningworksforkids.com/additude</u>

Thank You

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