

# Brain Training for Kids and Adults with ADHD - Can We Make it Work?

Randy Kulman, Ph.D.

[Learningworksforkids.com](http://Learningworksforkids.com)

[randy@learningworksforkids.com](mailto:randy@learningworksforkids.com)

[www.facebook.com/LearningWorksForKids](https://www.facebook.com/LearningWorksForKids)

Twitter- @lw4k @rkulman

Pinterest.com/lw4k

401-515-2006

# LearningWorks for Kids: Helping Parents and Professionals Leverage Technology to Improve Executive Functions and SEL

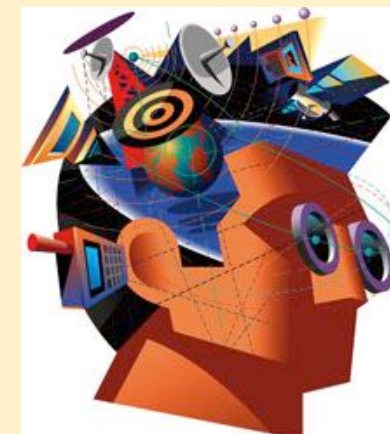
- Learningworksforkids.com: <http://learningworksforkids.com/>
- For these slides and more information about our programs for kids, parents, clinicians, and coaches go here:  
<http://learningworksforkids.com/adhdcon/>

# Take Aways

- Understanding of “brain training” and how it can improve executive functions and processing speed
- Knowledge about why technology-based brain training is so popular
- An accurate reading of the research on brain training
- Recognize the issues of generalization, transfer, and maintenance
- Compare brain-training technologies, games, and apps to determine what might be most helpful for individuals with ADHD
- Describe a set of strategies that can enhance the generalizability of brain-training objectives to real-world skills

# What is Brain Training?

- Process to achieve proficiency or to improve a brain-based skill, ability, or knowledge base.
- Training typically involves practice, exercise, instruction, discipline, and repetition.
- Training usually involves a teacher or specific guidance, tools and techniques.
- Brain training is designed to improve the efficiency of our brain- to learn more, go faster, retain our abilities, and develop new skills.
- Implication- train the brain and you will be improved across many areas- training all aspects of brain functioning
- Train the brain-train the body-if you are a runner, will you be stronger or have better hand/eye coordination?



# Low Tech Brain Training

- Learning new strategies and tricks - eg. mnemonics for memory, speed reading techniques, study skills.
- Practice and drills - eg. practicing the multiplication tables.
- Automaticity strategies- freeing the brain up for other cognitive challenges
- Board games, chess, ongoing education- all vital for healthy brains
- Exercise - Is this the best form of brain training to improve attention, memory, executive functions, learning, stress management, processing speed, and cognitive abilities with age

# 21st-Century View of Brain Training

- Technology-based – designed to train the brain directly
- Generally refers to screen-based, computerized tools and techniques
- May be referred to as cognitive training
- Focuses on building specific skills including executive functions, sustained attention, and working memory
- Specialized programs such as Lumosity, CogniFit, BrainHQ, etc.
- “Traditional” technologies such as neurofeedback and biofeedback
- Supportive technologies that support brain-based skills
- Video games designed for brain training such as Big Brain Academy, Brain Age-which are no longer sold
- Do they work? Criticized for teaching a skill that is not transferable



# The Basis for Brain Training- Neuroplasticity

- Brains can change and grow
- Can develop over the course of a lifetime not just in early childhood
- Neurogenesis – the birth of new neurons initially reveals that we are not limited to neurons from birth
- Michael Merzenich, Ph.D. found changes in the brain of adult monkeys after surgeries
- Early research on songbirds, who grew new brain cells coinciding with new songs-Fernando Nottebohm
- Brain training can structurally change and improve the brain

# Daily Brain Training

- Of course we can train our brain! Why do kids go to school?
- Training our brains to help with our work- recognition of common occurrences
- Training our brains to help with athletic skills- recognize the spin on a ball or the type of defense one is facing
- Training to learn a skill- playing a musical instrument
- Learning a new language
- Learning to read





# What are the Advantages of Screen-based Brain Training?

- Accessibility- screens are everywhere and can be used at any time
- Scalability-great from a business perspective and does not require an individual teacher
- Adaptability-effective brain training gets harder and more challenging over time and accomplishment
- Focus and attention- well-made programs can capture and hold attention
- Persistence and sustained effort- no pain, no gain
- Less expensive than individualized instruction
- We have models in video games and entertainment media

# Learning Through Play and Technology

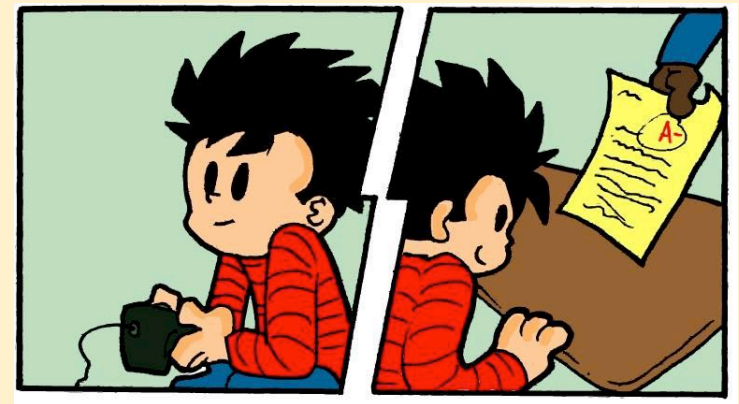
- Play = Learning: Psychological perspectives from Piaget, Elkind, Brown, Gray, Singers
- Play - Test and explore observations & learn about relationships, cooperation, frustrations, success (SEL)
- Play- How kids learn about expressing themselves, restraining impulses, taking perspectives, imitating, 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 Make You Smarter -YouTube



# Specific 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



# Video Games can Change your Brain

- Improve processing speed (Green and Bavelier, 2009)
- Improve working memory (Klingberg et al., 2007)
- Increase pro-social behavior (Gentile et al., 2009) in children.
- Improve social involvement (Ferguson, 2010)
- Build brain regions Kühn and her colleagues' study of Super Mario Bros, Haier's Tetris research
- Improve Brain Flexibility with StarCraft
- Rayman Raving Rabbids and Reading Fluency

# Executive Functions in Game Play: What does this mean for ADHD

- Executive functions as the defining feature of ADHD
- Games as a teaching tool for ADHD- encourages and requires EFs, attention, persistence, flexibility, and control
- Planning - Anticipating an enemy attack in a first person shooter
- Working Memory - Recall a series of moves in battle
- Flexibility - Change approach with new levels
- Self-Awareness - Learning from mistakes
- Self-Control - Controlling frustration to progress
- Organization - Manage inventories and supplies

# How Popular Games and Apps Improve Executive Functions

- **Practice** - primarily with games where 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

- LW4K pilot research on differentiated instruction, targeting areas of EF weakness with video games
- Combination of board and video games improves 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 reduce attention symptoms ([Stoner, DuPaul](#))
- Non-video games increase cognitive load - Teaching tool by parents reduces ADHD preschoolers ([Halperin, 2012](#))
- Study on games to improve working memory ([Davis, 2011](#))



# Why Use Video Games, Apps, and Digital Technologies to Improve Executive functions

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



# LETS PLAY!!!!!!!

- Lumosity.com It's OK to make up a fake email but put your age in as you are (I asked the company for some free codes, but I did not get them)
- Cognifit.com Click on the personal use and give information. You do not need to use your actual email address.

# Limitations Of Popular Games As Brain Training Tools

- Lack of peer-reviewed research
- Games are not designed to assess areas of need
- 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

# 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 result in modest improvement 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

- *A definition* - The ability to take something you've learned in one place and apply it in another
- *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

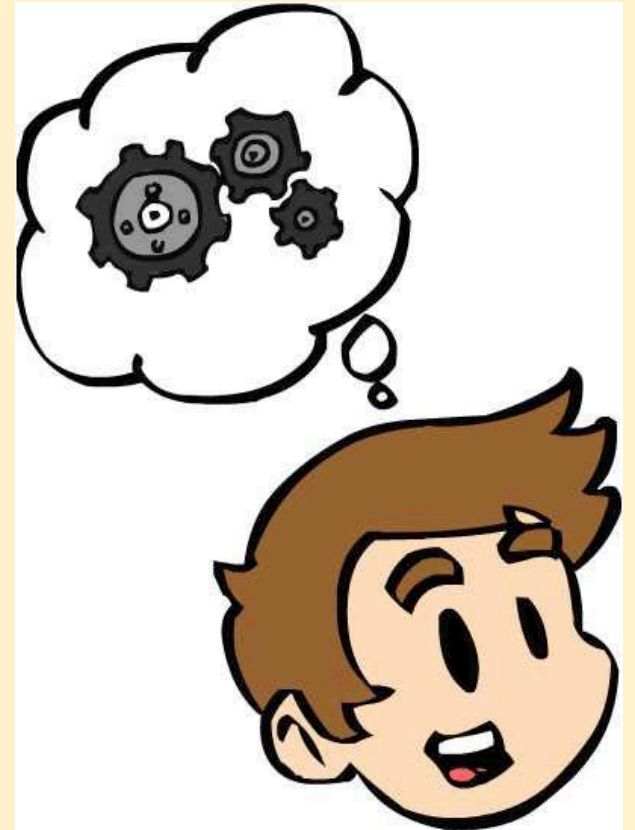
# Generalization, Motivation, Metacognition, and Technology

- Games are social, and learning occurs with others
- Games foster communication among kids
- Games get children with disabilities to participate
- Games get kids to think about what they are doing
- Games provide flow and engagement
- Games involve attention, practice, and effort that lead to generalization



# Characteristics of Brain Training Tools

- Designed to enhance and improve cognitive functioning
- Many have tools to assess areas of weakness
- Provide a more targeted practice, that focuses on specific brain-based skills
- The goal is not to get better at the game, it is to get better at the real world skills that are being targeted
- Most have clear feedback loops that provide “players” with information about their performance on targeted skills
- Adaptive and responsive to improvements and to “off” days





# Biofeedback

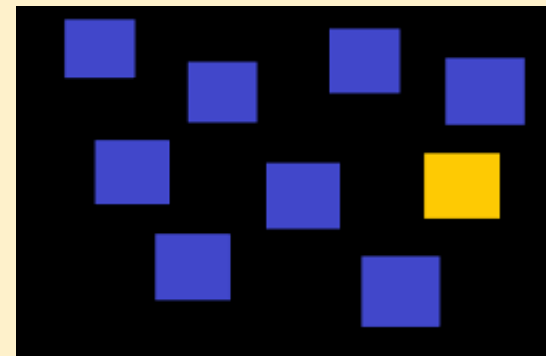
- A technique that helps control internal bodily functions normally outside of conscious control
- Uses instruments that measure and display the physical or mental processes
- Measures and displays physical bodily responses
- EMG (electromyelogram) using surface electrodes to detect a change in skeletal muscle activity
- Control heart rhythm using a heart monitor or HRV - heart rate variability feedback
- Control skin temperature- changing blood flow which may interrupt the onset of migraine headaches

# Neurofeedback

- Biofeedback for the brain
- Sensors on the scalp measure brain waves, the electrical impulses produced as brain cells communicate
- Helps to identify when the brain is in a more comfortable relaxed state
- Often set to control a positive reinforcer including on a computer screen controlling a videogame, music, or movie
- The feedback, through the screen is a signal informing the person that they are beginning to control their brain in a positive fashion
- Adaptable or increasing the difficulty leading to the ability to do so on one's own without feedback
- Neurofeedback to ADHD teaches to produce brainwave patterns associated with focus

# Brain Training Games and Psychological Tests

- Can neuropsychological tests practice and assess skills?
- How well do psychological tests measure specific skills?
- Do the tests measure a very narrow skill?
- Do games practice and improve a very narrow skill?
- Common examples such as the Stroop, flanker tests, n-backs, tower tests, spatial span test



# Brain Training Marketed for ADHD

- Cogmed Working Memory
- Play Attention
- BrainBeat
- BrainTrain
- Neurofeedback
- LearningRx
- Myndlift
- Cognifit
- Project Evo
- Mighteor
- NeuroPlus
- Activate
- For source research Contact me with a share request  
[https://docs.google.com/document/d/1nP2EWh02Hjp\\_uJ7pxMlzhaV7VrPmwD7xi1cyelXi-2Q/edit#heading=h.vfbfp7bsvrkp](https://docs.google.com/document/d/1nP2EWh02Hjp_uJ7pxMlzhaV7VrPmwD7xi1cyelXi-2Q/edit#heading=h.vfbfp7bsvrkp)

# Cogmed Working Memory Training



# Cogmed Working Memory Training

- Interview with former provider
- Focus is on working memory
- Many studies with disorders other than ADHD
- Brain imaging studies show structural changes after training
- Focuses on visual spatial working memory
- Uses coaches, primarily around program use and teaching about WM
- Expensive- at least in the past
- Games were engaging initially, but can become repetitive

# Play Attention



# Play Attention

- Conversation with Gwen Sorley-Began using initial program in classrooms 1996- featured a helmet DOS operating systems
- Currently in version 6
- Recognizes the need to be able to pay attention to lower levels of stimulation akin to a classroom teacher
- Uses arm band that has 3 sensors, measuring brain activity indicative of attention (primarily theta waves)
- Players receive constant feedback on whether they are paying attention
- Control screen characters with the power of their mind
- Core skills addressed: Attention stamina, visual tracking, task initiation, short term memory, discriminatory processing
- Secondary skills: Social skills, WM, auditory processing



# CogniFit for Professionals



# CogniFit

- Uses a variety of evaluation tasks where they have developed an extensive online neuropsychological testing measure
- Recommendations are derived from the testing
- Training has most support in areas of attention and cognitive skills in the elderly
- Looks at the broader issues of cognitive health - provides tips on sleep, physical activity, managing stress
- Conducting studies on impact for kids with Learning Disabilities at Carroll School in Boston

# Project Evo AKL-T01 Akilli

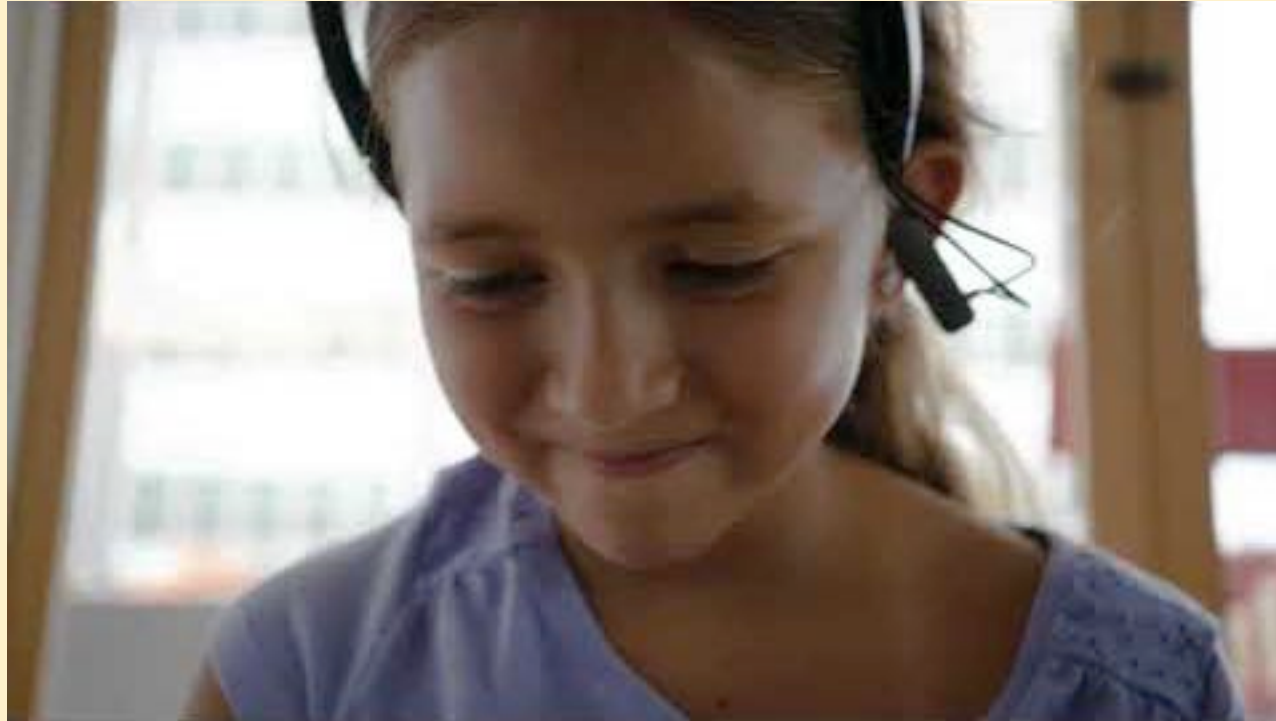
- Careful about releasing research as they are working towards FDA approval
- A digital medicine
- Develops perceptual discrimination, visuomotor tracking
- Emphasis on improving cognitive control- I'd describe as the cognitive components of Efs
- Goal is to help with flexibility and adaptive problem solving
- New study being presented at this conference

# Akilli's Project Evo

- Known as AKL-To1



# NeuroPlus



# NeuroPlus

- Targets bio physiological feedback - neurofeedback with a wireless headset that measures brainwaves, biofeedback by measuring fidgeting and facial tension
- Tracks EEG and also movement
- Game helps to focus, sit still, and relax facial muscles
- Games developed internally, with an effort to make them fun
- Games controlled by brainwaves associated with focus and attention
- For kids and adults
- Games use cognitive training as well for WM and processing speed
- Uses coaches who help with game play and skills development

# BrainHQ

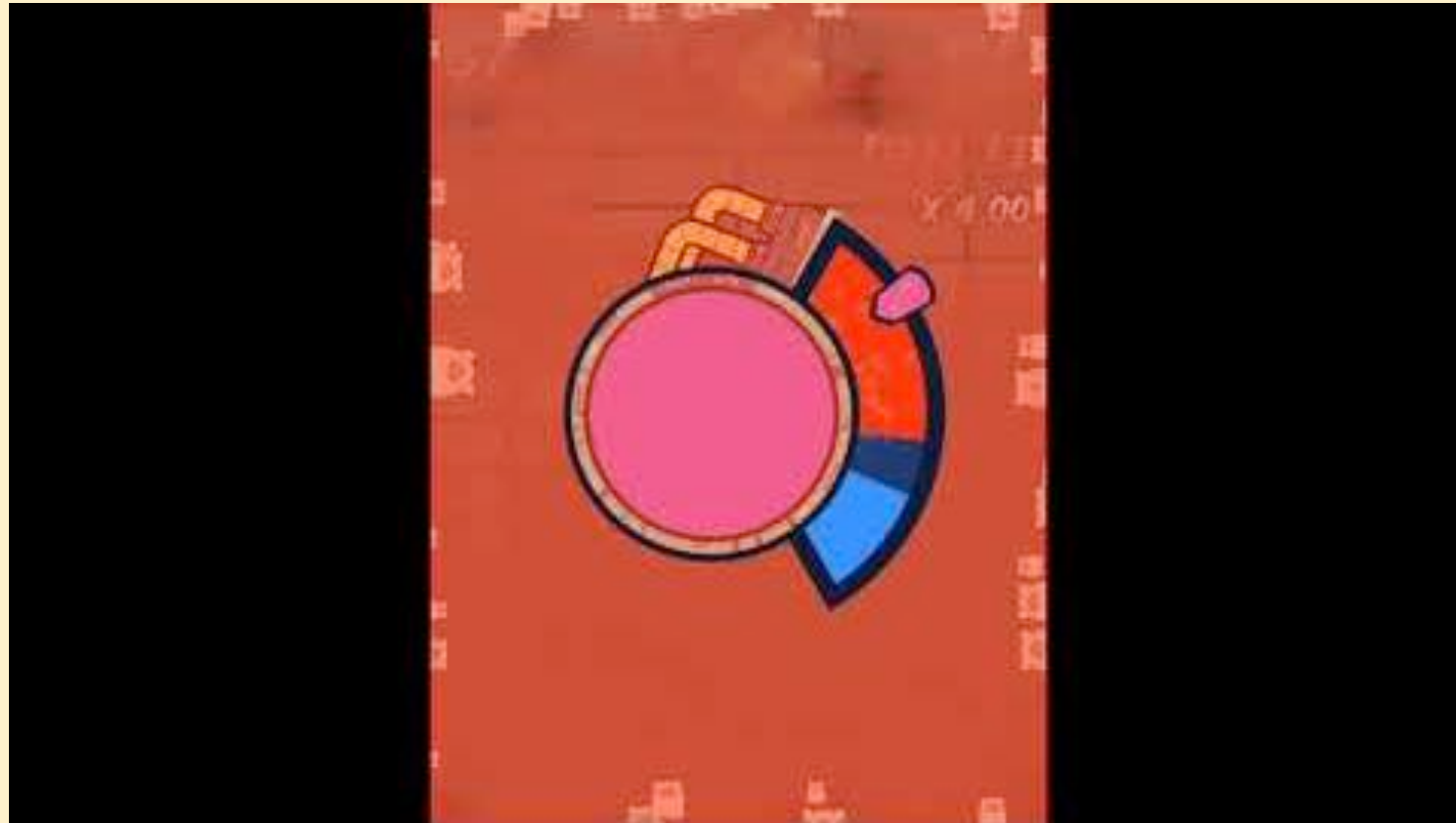


# Posit Science- BrainHQ

- Discussion with Jeff Zimman, Chairman of Posit Science
- 140 published studies
- 200 studies now in progress
- Generalization seen in less onset of depressive symptoms
- Improvement in Activities of Daily Living (ADLs) for elderly include: processing speed, everyday cognition, driving skills
- Describes the controversy of near vs. far transfer – perspective as to what is near and far
- Processing speed improvements appear to have long term lasting impact
- Focus is on improving perceptual speed and attention (This is similar to what is seen in the Green and Bavelier studies)



# Mightier



# Mightier - Bioresponsive games

- Conversations with Jason Kahn and Andy Freedman
- Uses biofeedback to bring heart rates down
- Playing fun video games - they start with games that will be fun for kids and adapt them to their training
- Build game mechanic (how you move, progress, and succeed at the game) around the child's emotional state
- Not just for kids with ADHD, but for kids struggling with “big” emotions
- Uses coaches to help with generalization and other strategies
- Teaches breathing skills within some of the games

# Lumosity



# Lumosity

- Best known of the brain training programs
- Very clear step by step process to determine needs and training
- Uses a variety of “neuropsych” tests as tools for training
- Fined \$2 million due to claims it could “reduce cognitive impairment associated with age and other serious health conditions”
- Wide range of skills
- New website has more information about how to transfer these skills to the real world
- Games are not particularly fun - how persistent are players with their games?

# Does Brain Training Work?

- Implication - Train the brain and you will be improved across many areas
- Helping the trained skill - but not others - What are we measuring?
- Recognize that transfer doesn't occur in most settings
- Transferable - learning should not be rote, local, or inert



# Brain Training Does Not Generalize

- Studies and reports on the lack of far transfer
- Open letter from Stanford Center on Longevity
- Claims are exaggerated for improved intelligence, prevent or reverse Alzheimer's disease
- Does time spent in brain training impact opportunity costs for other brain training activities - e.g. exercise, gardening, socializing
- According to the letter - Existing studies “produce statistically significant improvement in practiced skills that sometimes extends to improvement on other cognitive tasks administered in the lab. In some studies, such gains endure, while other reports document dissipation over time”
- The authors acknowledge that playing commercially available computer-based games can produce neural changes that support new skills-increase number of synapses, neurons, supporting cells, and strengthen connections
- Existing studies are not conclusive in promoting brain health
- Meta analysis (Simons, et al, 2016) helps trained tasks, some on closely related tasks, little on distant tasks or overall cognitive functions

# Brain Training is Ineffective - Sources

- <http://longevity3.stanford.edu/blog/2014/10/15/the-consensus-on-the-brain-training-industry-from-the-scientific-community-2/>
- <https://www.theatlantic.com/science/archive/2016/10/the-weak-evidence-behind-brain-training-games/502559/>

## **Original Research Articles**

- Melby-Lervåg, M., & Hulme, C. (2013). Is working memory training effective? A meta-analytic review. *Developmental Psychology*, 49, 270-291.
- Noack, H., Lövdén, M., & Schmiedek, F. (2014). On the validity and generality of transfer effects in cognitive training research. *Psychological Research*. Advance online publication. DOI: 10.1007/s00426-014-0564-6
- Redick, T. S., Shipstead, Z., Harrison, T. L., Hicks, K. L., Fried, D. E., Hambrick, D. Z., . . . Engle, R. W. (2013). No evidence of intelligence improvement after working memory training: A randomized, placebo-controlled study. *Journal of Experimental Psychology: General*, 142(2), 359-379.

# Brain Training is Ineffective – Sources (Continued)

## Original Research Articles (Continued)

- Roig, M., Nordbrandt, S., Geertsen, S. S., & Nielsen, J. B. (2013). The effects of cardiovascular exercise on human memory: A review with meta-analysis. *Neuroscience and Biobehavioral Reviews*, 37, 1645–1666.
- Shipstead, Z., Redick, T. S., & Engle, R. W. (2012). Is working memory training effective? *Psychological Bulletin*, 138, 628-654.
- Smith, P. J., Blumenthal, J. A., Hoffman, B. M., Cooper, H., Strauman, T. A., Welsh-Bohmer, K., . . . & Sherwood, A. (2010). Aerobic exercise and neurocognitive performance: a meta-analytic review of randomized controlled trials. *Psychosomatic Medicine*, 72(3), 239-252.
- Voss, M., Vivar, C., Kramer, A. F., & van Praag, H. (2013). Bridging animal and human models of exercise-induced brain plasticity. *Trends in Cognitive Sciences*, 17(10), 525-544.
- Simons, D. J., Boot, W. R., Charness, N., Gathercole, S. E., Chabris, C. F., Hambrick, D. Z., & L., E. A. (2016). Do “Brain-Training” Programs Work? *Psychological Science in the Public Interest*, 17(3), 103–186.



# Brain Training that Does Transfer

- Cognitive Training Response Letter - signed by 133, views brain training as a tools that can help cognitive and everyday activities
- Many Cogmed (100+) studies demonstrated ongoing improvement
- Posit Science research on driving skills and processing speed
- Mixed data on neurofeedback - does it work better for specific groups of kids?
- Does this lead to considering how other tools such as Mightier and Project Evo, which use bioresponsive techniques, might work?
- Very careful approach being taken by Akilli - they are seeking FDA approval

# Brain Training is Effective – Sources

- <https://www.cognitivetrainingdata.org/studies-cognitive-training-benefits/> (Listing of hundreds of studies)
- Cogmed studies <https://www.cogmed.com/published-research>
- Posit Science studies <https://www.brainhq.com/world-class-science/published-research>
- CogniFit Studies <https://www.cognifit.com/neuroscience>
- Does Brain Training Work? <https://learningworksforkids.com/2016/05/brain-training-work/>

## Original Research Articles

- Blacker, K., Negoita, S., Ewen, J.B., & Courtney, S.M. (2017). N-back versus complex span working memory training. *Journal of Cognitive Enhancement* 1(14), 434-454.
- Baniqued, P.L., Kranz, M.B., Voss, M.W., Lee, H., Cosman, J.D., Severson, J., & Kramer, A.F. (2014). Cognitive training with causal video games: Points to consider. *Front Psychol*, 4, 1010. doi:10.3389/fpsyg.2013.01010

# The Reality of Far and Near Transfer

- Is there really such a thing as far transfer?
- Is this a legitimate standard to hold brain training to?
- Consider studies of generalization of skills from the classroom - can someone apply math skills?
- How well do psychotherapy skills, e.g. social skills, training generalize? (without a lot of external practice)
- Consider athletics - we don't just focus on 1 muscle - cross training is the norm - though to get better at a sport we need to practice it
- Brain Training is not enough

# What are the First Steps to Improving Brain Training?

- Does the training fit the weakness
- Is the training addressing a specific brain-based skill
- Does the trained skill apply to the real world
- Problems with Generalization and Transfer
- Keeping the brain in shape -  
Maintenance of brain - based skills

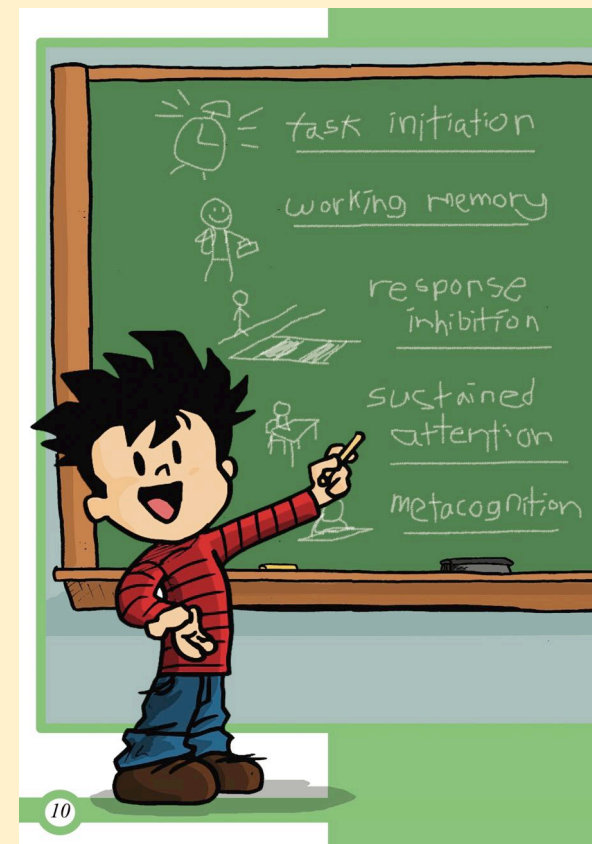


# How Can We Do it Better? Transferring Brain-Trained Skills

- Neuroscience which provides brain-based feedback and information
- Practice across many settings and challenges
- Model transfer, get subject to generate examples and analogies of where it occurs
- Making skills automatic - allowing cognitive resources to be reallocated

# How Can We Do it Better? (Continued)

- Situate training in a meaningful context and teaching abstraction/bridging
- Using our brains strategically for understanding, identification, reflection, and connection
- Make application part of brain training
- Coach for metacognition
- Use prompts, quizzes, “what if” scenarios



# Effective Game-Based Learning

- Embedded teaching in games
- Metacognition - Making the connection between game play and world problem solving
- 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 modeling outside of the game
- Parent, teacher, peer mediators to use games as teaching tools



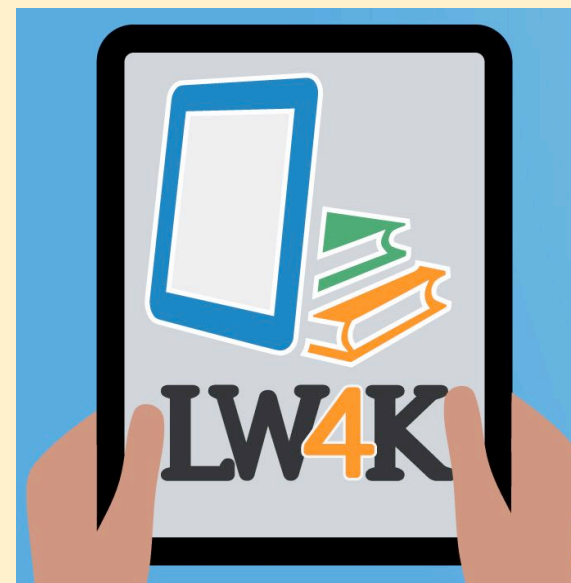
# How to Make Game Based Learning (GBL) into Real World Learning (RWL)

- The Sharp Brains model for brain training
  1. Train a specific brain-based skill
  2. Target area of weakness with specific tools/techniques
  3. Make games/tools adaptive
  4. Insure intensity and duration
  5. Have long-term maintenance training
  6. Include generalization training



# The LW4K Model

- Integrate strategic teaching principles
- Explicit goals, partnerships with child, previewing, engagement, individualization, teachable moments
- Detect, Reflect, Connect
- LearningWorks Live-Mediators
- Using games as teaching tools
- Going beyond the game



# Why Use Brain Training Tools and Video Games for Children With ADHD?

- *The interventions that work best for kids with ADHD share many characteristics with video games and brain training tools including:*
  - 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
  - ADHD kids are drawn to technology
  - ADHD kids pay more attention to technology than to people
- *However, they are often missing other strategies including:*
  - Strategic teaching principles including previewing, setting explicit goals, partnering, metacognition, and generalization strategies

# 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 & 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)

# 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

# Percentage of Parents Who Believe Video Games Can Help Children 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

# Why Would Kids with ADHD Rather Play Minecraft (or Use Other Digital Media) Than Anything Else?

- Excitement, cognitive engagement, “Engagement” - They like how it feels to pay attention
- Multimodal, immediate feedback, cognitively and physically interactive
- Negative feedback is private and teaches skills
- Share experiences with peers
- They need a break from school
- Kids feel as if they are learning, creating, and improving Executive Functions
- Games create a “dopamine rush”

# Why Use Video Games and Digital Brain Training to Help Kids with ADHD?

<b>Kids with ADHD or Attention Difficulties</b>	<b>Video Games and Digital Media</b>
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 and brain training 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 brain training can be 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 and brain training tools 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 brain training occurs privately. This causes less embarrassment and frustration, while teaching the player how to handle these emotions.



# Difficulties For Kids With ADHD and Technology Use

Difficulties	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 digital play time. By making them put-off these fun activities until after their work is done, they 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 <a href="http://TabTimer.com">TabTimer.com</a> 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.



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For resources and information, go to:  
[www.learningworksforkids.com](http://www.learningworksforkids.com)

Randy Kulman, Ph.D.  
[Learningworksforkids.com](http://Learningworksforkids.com)  
[randy@learningworksforkids.com](mailto:randy@learningworksforkids.com)  
[www.facebook.com/LearningWorksForKids](http://www.facebook.com/LearningWorksForKids)  
Twitter- @lw4k @rkulman  
Pinterest.com/lw4k  
401-515-2006

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