

# Social Media and Other Technology Use in Autistic Youth

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# DISCLOSURE

Dr. Sidhu writes continuing medical education questions for the American Psychiatric Association's journal, *FOCUS*, for which he receives a royalties

# Objectives

At the end of this presentation, participants will be able to:

1. Screen autistic youth according to the DSM-5 diagnostic criteria for Autism Spectrum Disorders.
2. Identify social media factors and situations that contribute to ASD in youth.
3. Integrate appropriate use of media to help ASD youth with their social skills development.

# OUTLINE

- I) Media Use in Neurotypical Youth
- II) Why Autistic Youth May Be Especially At Risk
- III) Ways Media Can Be Used to Help Autistic Youth

# Multiple Choice Question 1

What is the average amount of screen time that the American Academy of Pediatrics recommends for youth ages 6-18?

- A) None
- B) 1-2 hours
- C) 3-4 hours
- D) 5-6 hours
- E) No limit so long as child is functioning well

# Multiple Choice Question 2

After how much screen time would you expect to see a decline in grades on average?

- A) 1-30 minutes
- B) 31-60 minutes
- C) 1-2 hours
- D) 2-4 hours
- E) > 4 hours

# AAP Recommendations

For children younger than 18 months, avoid use of screen media other than video-chatting. Parents of children 18 to 24 months of age who want to introduce digital media should choose high-quality programming, and watch it with their children to help them understand what they're seeing.

For children ages 2 to 5 years, limit screen use to 1 hour per day of high-quality programs. Parents should co-view media with children to help them understand what they are seeing and apply it to the world around them.

For children ages 6 and older, place consistent limits on the time spent using media, and the types of media, and make sure media does not take the place of adequate sleep, physical activity and other behaviors essential to health.

Designate media-free times together, such as dinner or driving, as well as media-free locations at home, such as bedrooms.

Have ongoing communication about online citizenship and safety, including treating others with respect online and offline.

# Multiple Choice Question 3

Which of the following is suppressed following 2 hours of exposure to video screens?

- A) Cortisol
- B) Melatonin
- C) Blood Sugar
- D) Blood Pressure
- E) Adrenaline/Epinephrine



## CHAIRS:

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## CO-PRESENTERS:

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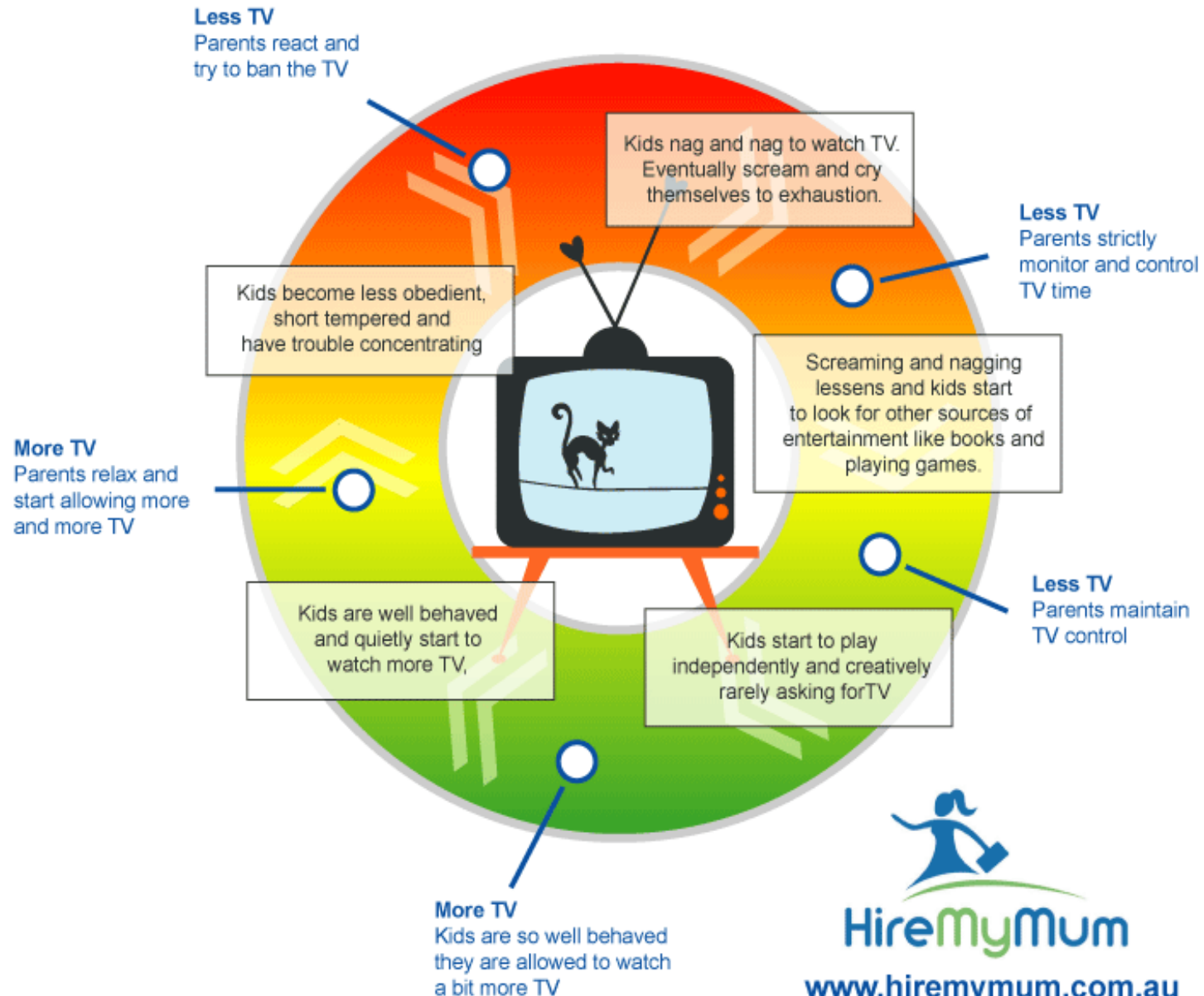
Christina Whalen, Ph.D.

## DISCUSSANT:

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# The TV cycle



**HireMyMum**

[www.hiremymum.com.au](http://www.hiremymum.com.au)

What Is the Average Number of  
Hours Teens Spend on Screen Time?

# Duration of Use

## Children (American Academy of Pediatrics)

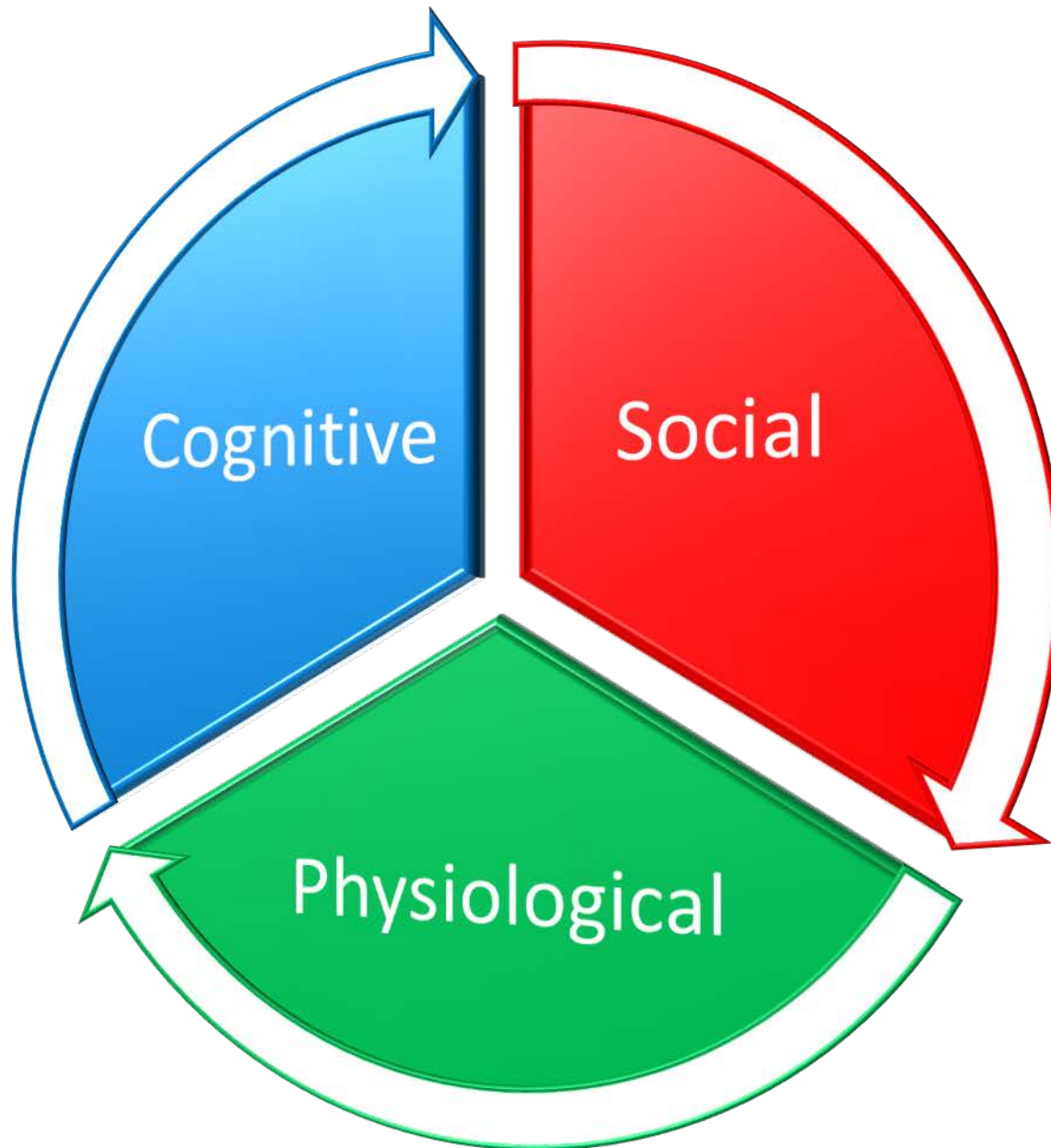
Spend an average of 7 hours per day on entertainment media, while 2 hours is the official recommended amount

## Teens (American Heart Association):

60% average 2.9 hours per day (20 hrs/wk)

33% average 5.7 hours per day (40 hrs/wk)

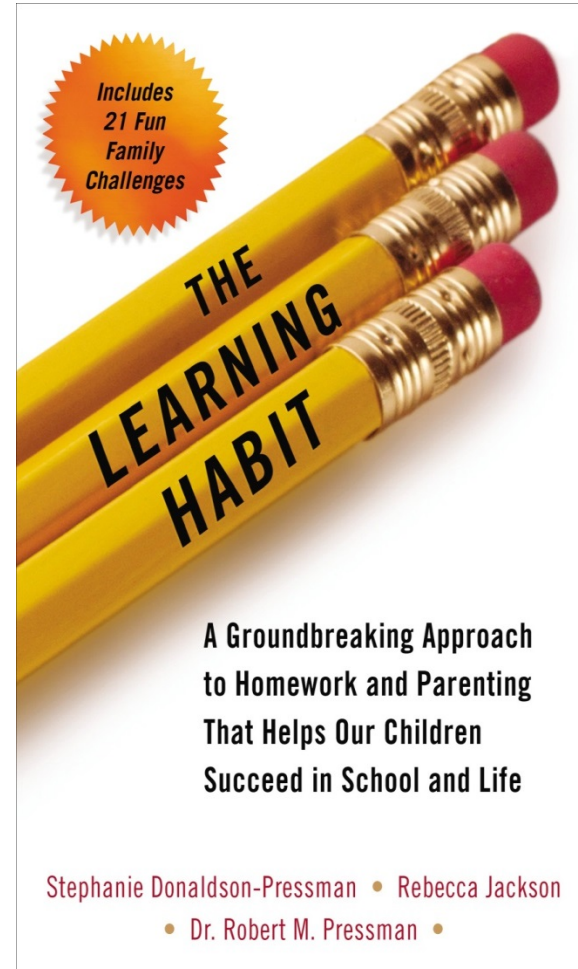
7% greater than 7.1 hours per day (50 hrs/wk)





# What Are the Negative Effects of Increased Screen Time?

Pressman RM, Owens JA, Evans AS, et al.  
“Examining the Interface of Family and Personal Traits, Media, and Academic Imperatives Using the Learning Habit Study.”  
*The American Journal of Family Therapy*.  
2014 Oct. 42(5):347-363.



# Study

Data collected via online survey for 60 days.

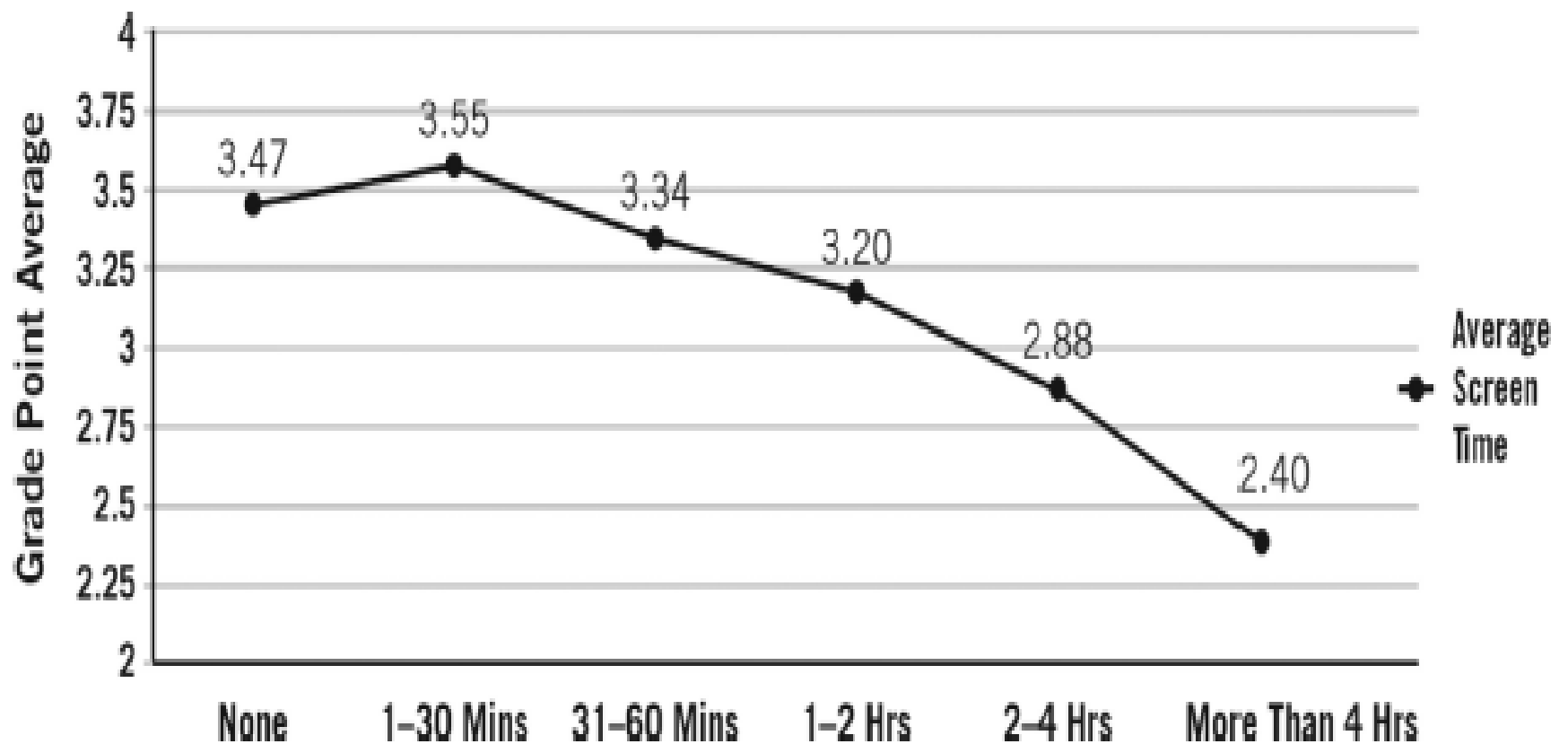
N = 21,145

Even gender split

46.5% elementary, 28.5% middle school, 25% in high school

Parents asked to estimate time per day spent by their child on video games, television, and texting

Data reported in half hour increments, starting at zero and ending at “more than 4 hours”



**FIGURE 1** Grade point averages by screen time per day for children in secondary school.



# Impact of Increased Screen Time

Increased Screen Time Correlated With Increased:

Time Spent on Homework ( $\neq$   $\uparrow$  GPA)

Inattention, Impulsivity, and Off-Task Behavior

Social Isolation and Difficulty Making Friends

Decreased Activities

Social-Emotional/Mood Volatility

Sleep Onset Latency

# Impact of Increased Screen Time

Negatively associated with family time

Negatively associated with “Empowerment Parenting Styles”

- Open flow of communication among parents and children

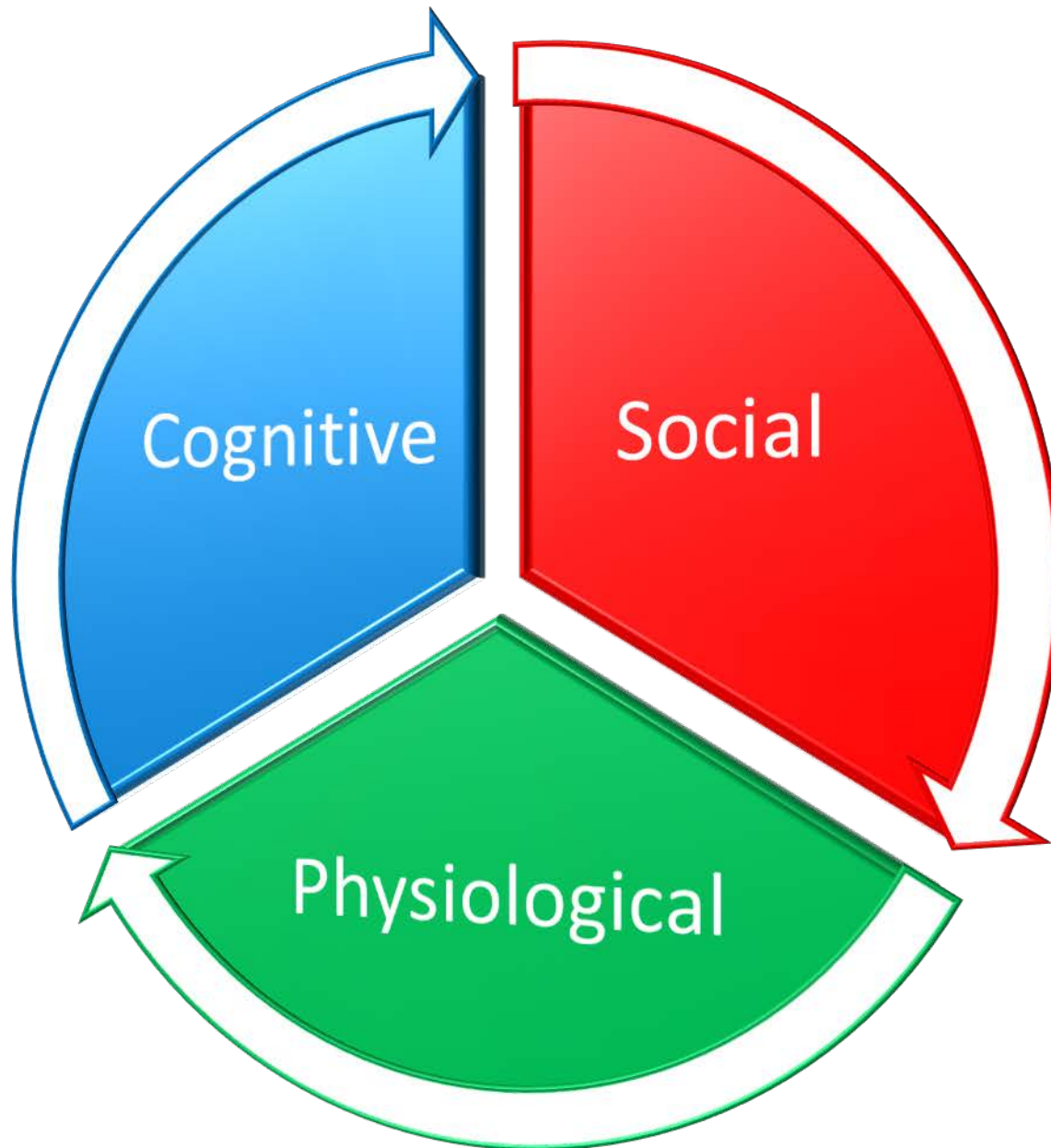
- Confidence in child’s capacity to make good choices

Positively associated with “Traditional Parenting Styles”

- Coercion, spanking and yelling

- Expectation: child “should now better”

- Oscillating between exacerbated and reduced communication



# Physiological Impact of Extended Media Time

**2 hours** of tablet exposure prior to bed resulted in significantly **decreased melatonin levels** in teens and young adults (Wood 2013); however, a significant confound for stimulation effect in phones

↓ melatonin → ↓ sleep → HPA abnormalities → ↑ cortisol

HPA abnormalities ↔ hippocampal toxicity  
(PTSD/depression) through suppression of BDNF1 (Suri 2013)

# Extremely Extended Media Time: Internet Addiction/Internet Gaming Addiction

Internet Addiction (DSM-V “Condition Warranting More Clinical Research and Experience”)

Compulsive-impulsive and excessive internet ***use to the point of serious impairment in functioning, associated with loss of sense of time and/or neglecting basic drives***

As in other addictions, includes withdrawal/tolerance and negative impact in multiple domains

# Associations Between Internet Addiction and Brain Structure/Functioning

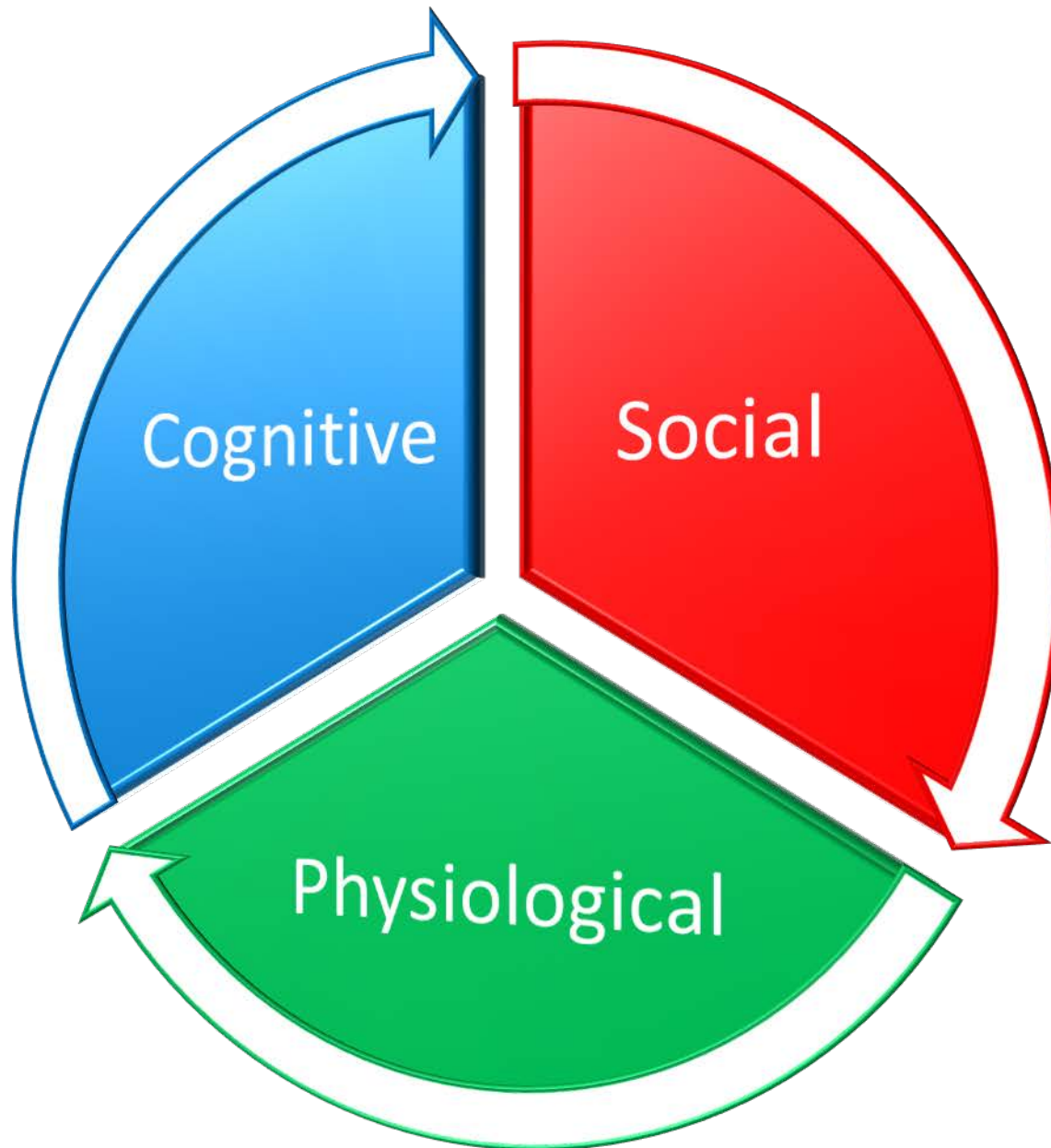
Gray Matter Atrophy -DLPFC, ACC, OFC (4 studies)

Compromised White Matter Integrity (4 studies)

Reduced Cortical Thickness - OFC (2 studies)

Impaired Cognitive Functioning (2 studies)

Cravings and Impaired Dopamine Function (6 studies)



# Social Impact of Extended Media Time

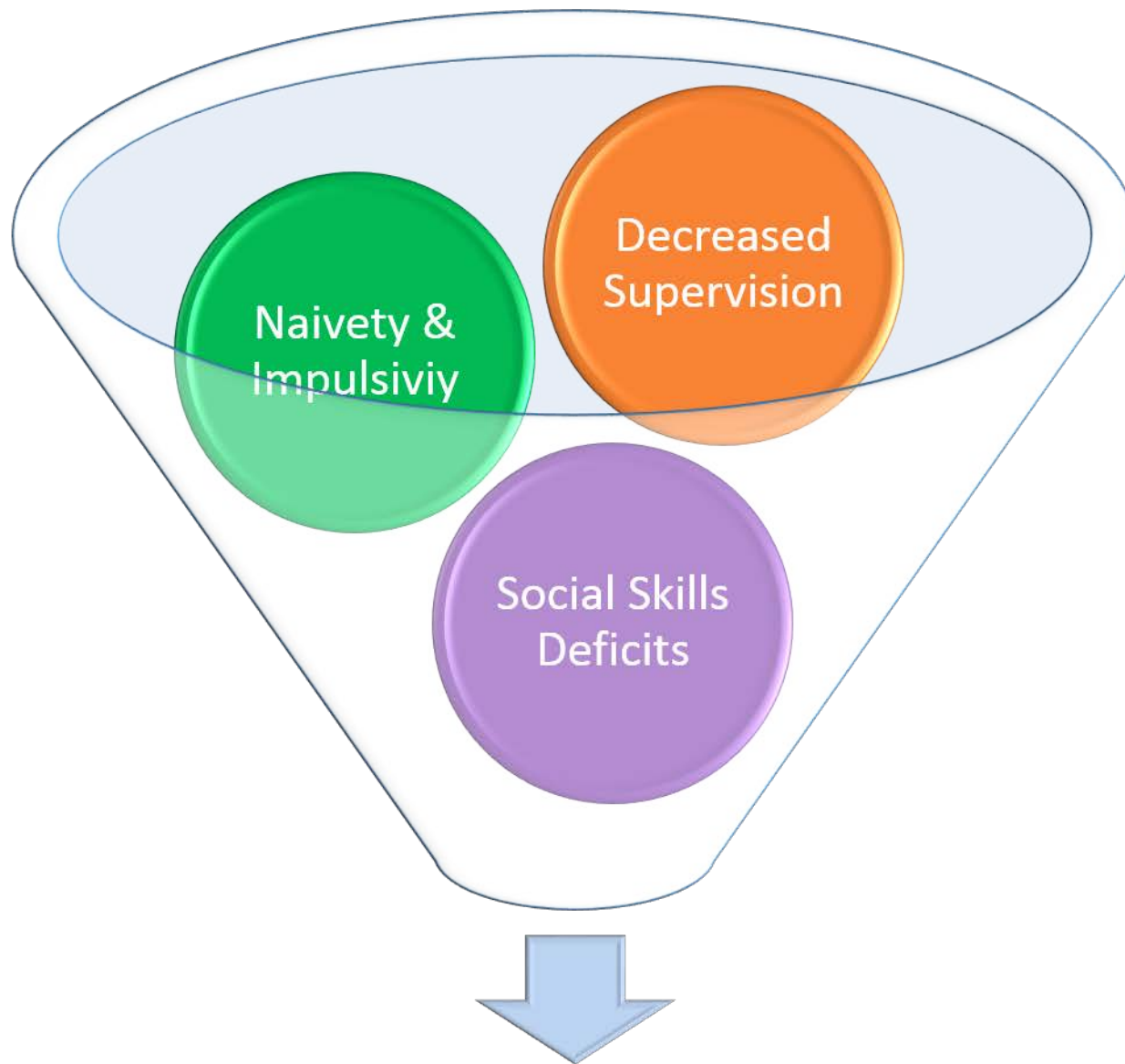
“Five Days at Outdoor Education Camp Without Screens Improves Preteen Skills with Nonverbal Emotion Cues” (Uhls 2014)

Preteens spent 5 days in a nature camp without access to screens and were compared to teens who were allowed to use media as usual

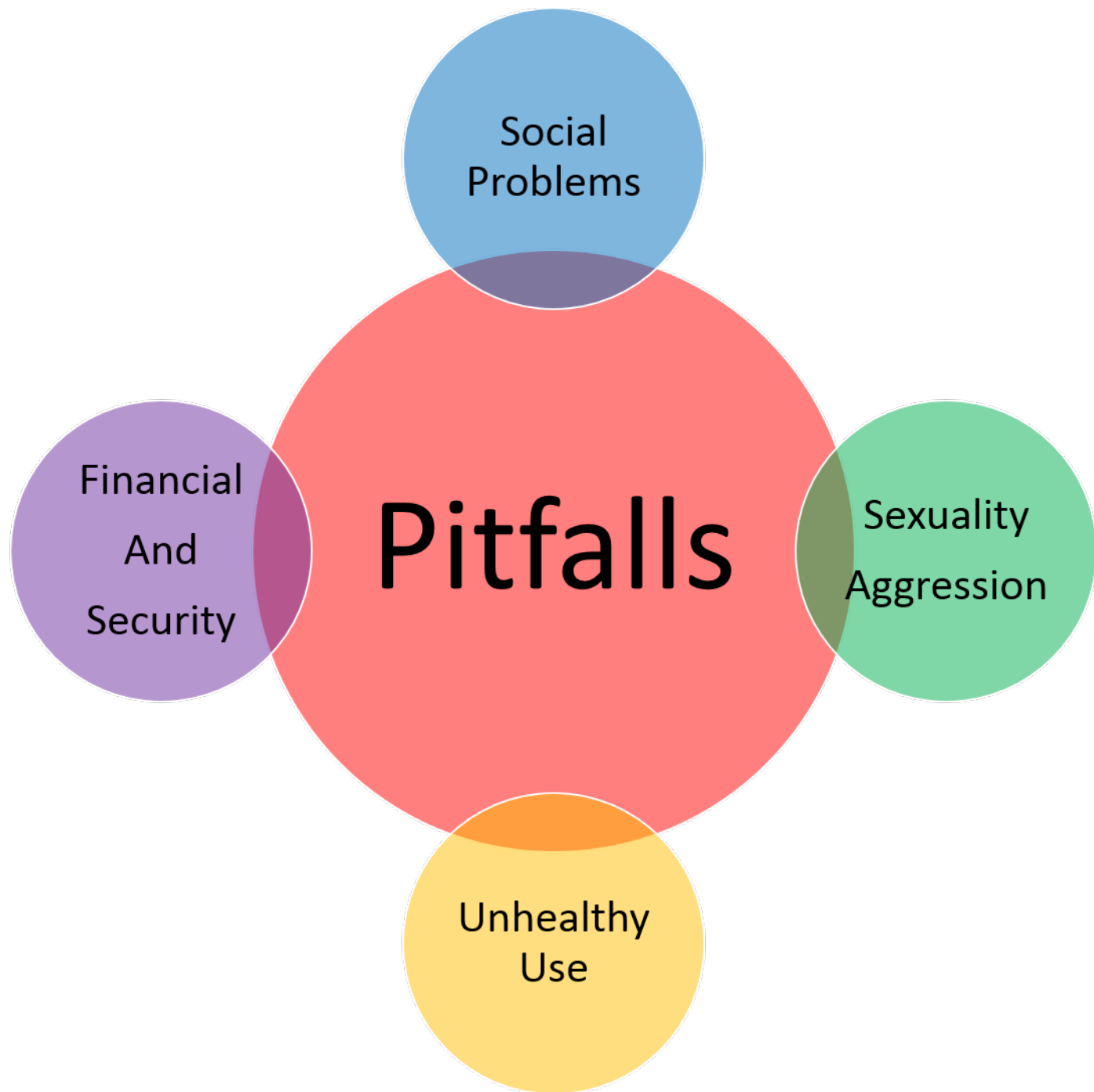
Camp attendees performed significantly higher than controls at reading facial expressions and interpreting non-verbal cues as measured by the DANVA2 – Faces subset and Child Adolescent Social Perception Measure (CASP)

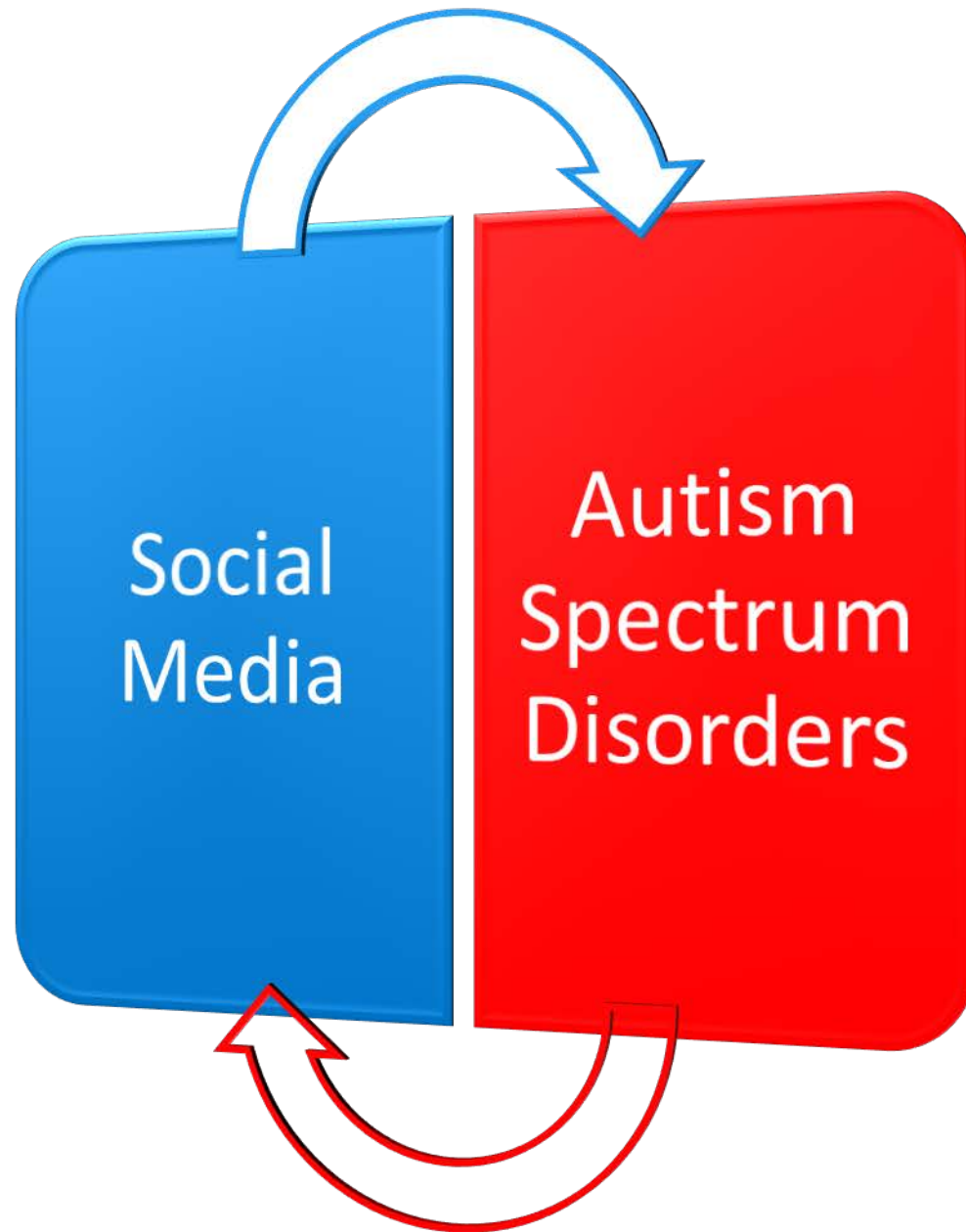
Could this explain the lack of empathy seen clinically that teens can at times display in social media?





**Social Media Disasters**





What About Use in Autistic Youth?

# Physiological Impact of Extended Media Time

↑ screen time → ↓ activity → ↑ obesity (DM, sleep apnea, etc.)

ASD youth have been found to **watch significantly more television** and are **more likely to be overweight or obese** than peers (Healy 2016).

Parents of ASD youth report significantly **increased barriers to physical activity**, with barriers being positively correlated to screen time (Must 2015)

\*Preliminary studies are being conducted using smartphone technology to fight obesity and increase fitness (Lubans 2016)

# ASD & Media Use Trends

Children with  
ASD...

41% spend most of their free time on screens vs. 18% Typical  
Development

Play VG 2.1 hrs/day vs typically developing children  
1.2 hrs/day<sup>1</sup>

~1 hr more in front of a screen (total 4.5 hrs/day)<sup>2</sup>

~2 hrs less on non-screen/non-media  
activities

Watch half as much TV and play twice as  
much VG<sup>3</sup>

Half never played with a  
friend,

Only 15% play with a friend on a  
weekly basis<sup>2</sup>

<sup>1</sup>Mazurek, *J Autism Dev Disord* 2012; <sup>2</sup>Mazurek, *Autism*  
2013; <sup>3</sup>Kuo *Autism* 2014

**Table 3** PVGT item mean scores among children ASD versus typically developing siblings

	Male				Female			
	ASD ( <i>n</i> = 159) <i>M</i> (SD)	TD ( <i>n</i> = 85) <i>M</i> (SD)	<i>F</i>	<i>p</i>	ASD ( <i>n</i> = 27) <i>M</i> (SD)	TD ( <i>n</i> = 75) <i>M</i> (SD)	<i>F</i>	<i>p</i>
Question								
1. Does your child spend more time playing video games than playing with other children?	2.99 (1.0)	1.78 (0.8)	95.7 <sup>a</sup>	<.001	3.15 (0.9)	1.44 (0.8)	85.3	<.001
2. Does your child snap, yell or get angry if someone interrupts him/her while playing video games?	2.14 (0.9)	1.74 (0.9)	11.2	.001	1.81 (0.7)	1.52 (0.7)	3.5	.06
3. Does your child seem to think life would be boring without video games?	2.56 (1.1)	2.18 (0.9)	8.6 <sup>a</sup>	.004	1.96 (0.8)	1.47 (0.8)	7.0	.009
4. Does your child think about video games even when not playing them?	2.41 (0.9)	1.82 (0.7)	29.8 <sup>a</sup>	<.001	1.81 (0.8)	1.40 (0.6)	6.8	.01
5. Does your child seem to play video games to get his/her mind off other things?	2.07 (0.8)	1.82 (0.8)	12.7	<.001	1.89 (0.7)	1.59 (0.7)	3.3	.07
6. Does your child play video games when he/she should be doing chores?	1.82 (.08)	1.81 (0.7)	.003 <sup>a</sup>	.95	1.48 (0.6)	1.67 (0.6)	1.7	.19
7. Does your child lose sleep or stay up late because of playing video games?	1.52 (0.7)	1.45 (0.7)	0.48	.49	1.15 (0.4)	1.31 (0.5)	2.8 <sup>a</sup>	.10
8. Does your child feel upset when he/she is not able to play video games?	2.25 (0.9)	1.67 (0.8)	24.8	<.001	1.89 (0.7)	1.29 (0.6)		<.001
9. Does your child play video games longer than he/she intended to?	2.30 (0.9)	2.02 (0.6)	7.3 <sup>a</sup>	.007	1.85 (0.8)	1.60 (0.7)	2.3	.13
10. Does your child try to hide how much time he/she spends playing video games?	1.48 (0.8)	1.42 (0.7)	0.32	.57	1.19 (0.5)	1.09 (.03)	1.2	.28
11. Does your child play video games instead of doing homework?	1.53 (0.8)	1.52 (0.7)	0.01	.91	1.19 (0.4)	1.29 (0.5)	1.2 <sup>a</sup>	.27
12. Are your child's grades worse because of the time he/she spends on video games?	1.26 (0.5)	1.24 (0.6)	0.14	.70	1.04 (0.2)	1.05 (0.3)	0.08	.78
13. Does your child lie about how much time he/she spends playing video games?	1.30 (0.6)	1.32 (0.6)	0.03	.85	1.0 (< .001)	1.07 (0.2)	1.9	.17
14. Does your child look forward to the next time he/she will be able to play video games?	2.83 (0.9)	2.25 (0.8)	23.2	<.001	2.41 (0.9)	1.63 (0.7)	22.4	<.001
15. Does your child play video games before doing something else he/she needs to do?	2.05 (0.8)	1.93 (0.7)	1.2	.27	1.78 (0.5)	1.61 (0.6)	1.9 <sup>a</sup>	.18
16. Does your child have a hard time stopping him/herself from playing video games?	2.26 (0.9)	1.80 (0.8)	14.0	<.001	1.70 (0.8)	1.37 (0.6)	5.0	.027
17. Do you think your child plays video games too much?	2.26 (0.9)	2.02 (0.8)	4.2 <sup>a</sup>	0.4	1.81 (0.8)	1.37 (0.7)	7.5	.007
18. Does your child ever say "just a few more minutes" when asked to stop playing video games?	2.55 (1.1)	2.26 (0.8)	5.1 <sup>a</sup>	.02	2.04 (1.0)	1.83 (0.7)	1.2	.28
19. Does your child play video games instead of spending time with family?	2.30 (0.9)	1.76 (0.8)	20.1	<.001	2.07 (0.6)	1.37 (0.5)	31.0	<.001

<sup>a</sup> The adjusted Welch *F* ratio is reported due to unequal variance

*Children with ASD have more problems disengaging from electronic media*

# Media Use in ASD Youth

Autistic youth appear **more sensitive to sleep disturbances** secondary to media use

Less sleep also means less memory consolidation

Increased media use correlated with

- Lower friendship trust
- Disrupted Communication
- Increased Peer Conflict
- Subjective Feeling of Alienation



Do Autistic Youth Typically Use Media  
to Develop Social Skills?

64% of ASD youth use media in a non-social way

Most often site playing video games alone or with strangers online

More than 50% had never played a video game socially

Majority do not use e-mail/IM/chat room features of video games

Only 13% report using media for social purposes

- Females with ASD
- Hispanic youth
- Youth with higher cognitive skills

# ASD & Media Use

Many parents of ASD children find management of electronic media is a **source of distress** in the family<sup>1</sup>

Repeated attempts at limiting or supervising media use meets **resistance**<sup>2</sup>

Many parents tend to manage on a situation by situation basis, without a long term strategy<sup>1</sup>

<sup>1</sup>Nally *Autism* 2000; <sup>2</sup>Engelhardt *Autism* 2013;

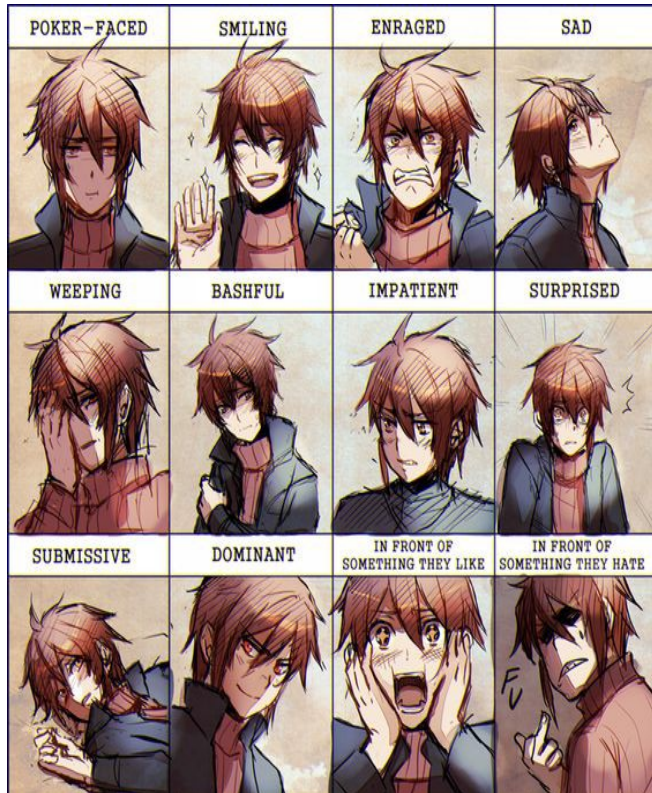
# ASD & Media Use

Of children with ASD, **only half have rules** on media use, most of which is ineffective

Rules on day of the week of electronic media access, and rules on media content have little or no effect on how much time the child spends on electronic media, **unless** there is a specific limit on the **amount of media use** and **location of that media**

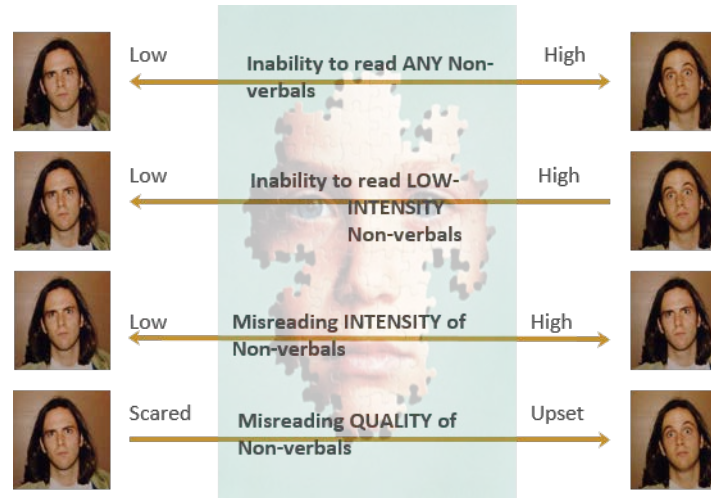
# How Might Social Media or Other Technology Use Actually Be Helpful for ASD Youth

# Empathy with Avatars



## Levels of Impairments in ASD

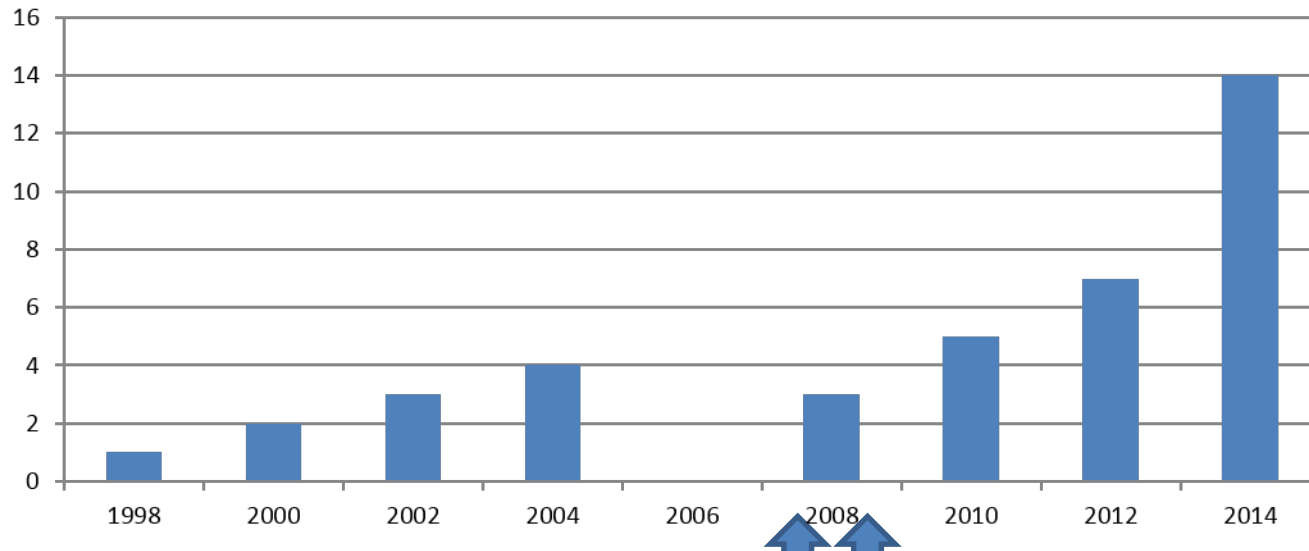
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# Motivation

## Technology-Aided Intervention

**Publications on TAI for ASD by Year**



Holli

**Holli**

**A Social Skills Training App  
for Children with  
Autism Spectrum Disorder**





# Method



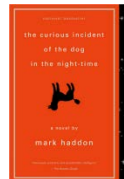
## Project Rex Clinical Program

13 participants recruited and randomized

facebook

Facebook intervention (6)

Book Club Intervention (7)



Dropped Out (1)

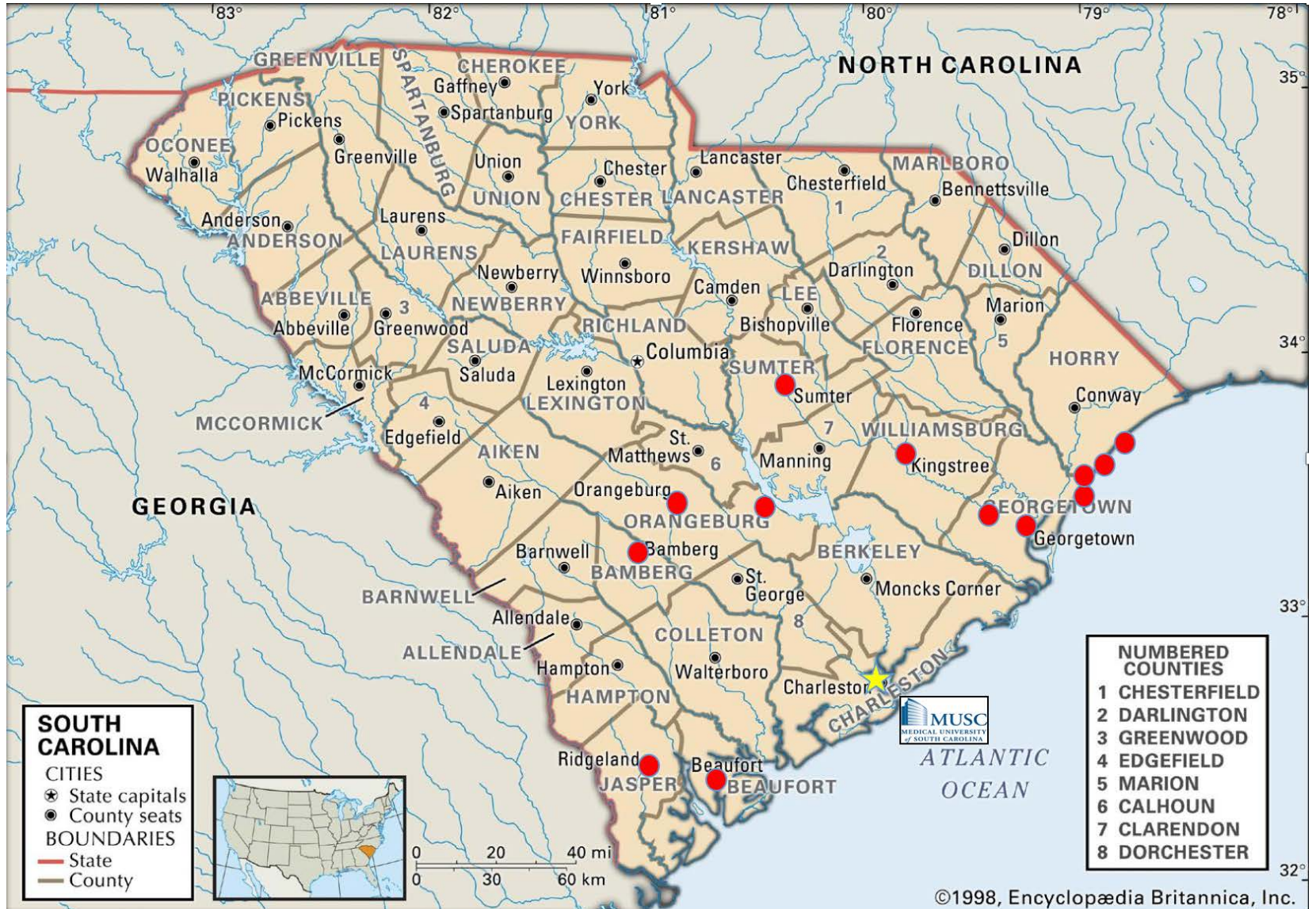
Facebook Completed (6)

Book Club Completed (6)

Total Completed (12)



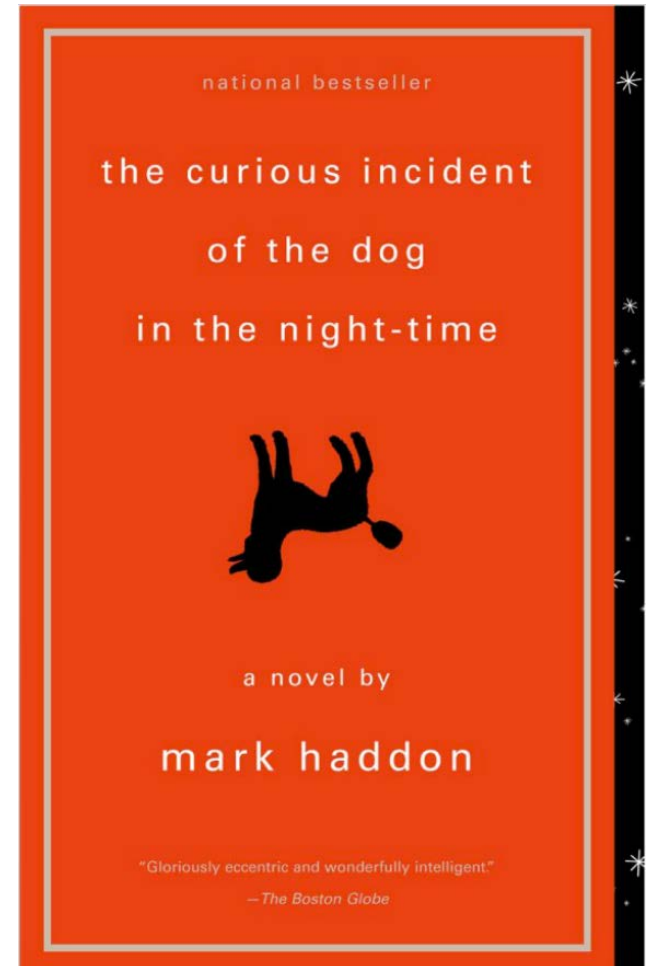
# Background



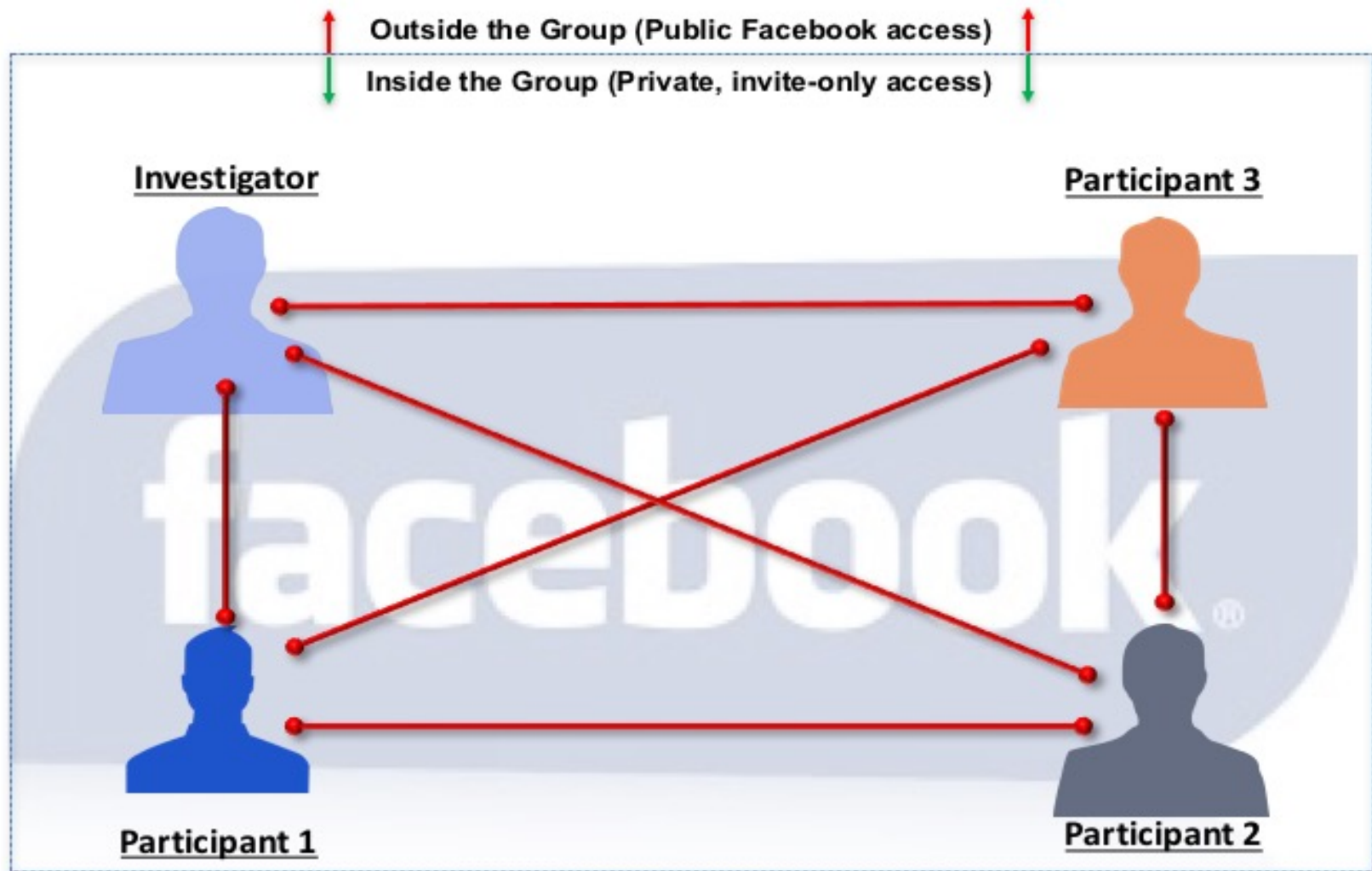


# Book Club Intervention



- Participants read "The Curious Incident of the Dog in the Nighttime."
- Participants met at week 8 to discuss the book and its main character, who has Autism Spectrum Disorder



# Method



**Figure 2: Overview of closed, private Facebook group utilized in this study**

-  Communication pathway between group members
-  Boundary between private, invite-only group and the publicly accessible area of Facebook

# Results

1. No adverse events reported (!)
2. No statistically significant differences were observed
3. Teachers (blinded) noted deterioration in both groups with regard to social skills, problem behaviors and academics.
4. The Facebook technology was not inherently motivating for the participants, i.e. ...

*The investigators had to prompt and redirect the participants in a manner similar to the live, in-person social skills groups.*

# How can gaming positively impact those with ASDs?

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## Individuals with ASD's

- Perform tasks better on the computer than using traditional materials (e.g. Wisconsin Card Sorting Task) (Ozonoff, 1995)
- Are more attentive and motivated using a computer (e.g. Whalen, et al., 2006)
- Learn better with visual tools (e.g. Rao & Gagne, 2006)
- Can learn social skills through video games (e.g. Piper, O'Brien, & Morris, 2006)
- Can reduce repetitive behavior using games and apps (Anderson-Hanley, et al., 2011)
- Can improve executive function skills (not just ASDs) (Griffiths, 2002)



# Getting “serious” about gaming

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Serious gaming = the development of video games with educational or therapeutic design

Noor, Shahbodin, & Pee (2012) classify serious games into the following types:

- \* Edutainment
- \* Games-Based Learning or “Game Learning”
- \* Simulation games
- \* Games for Health
- \* Exergaming
- \* Art Games
- \* Productivity gaming
- \* Advergames





# Gamification

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- \* Gamification = using game design elements in non-game contexts
- \* Increases motivation by taking advantage of intrinsically rewarding activities
- \* Improves engagement utilizing reinforcement schedules
- \* Shapes desired behaviors
- \* Increases independence through prompt fading
- \* Encourages users to do things they might not typically want to do
- \* Examples:
  - Fitness App's
  - Homework App's
  - Military Recruitment
  - Online Universities – Kaplan University



# Literature review: Computer-based instruction improves skills in children with ASD's

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\* Improves vocabulary acquisition (Moore & Calvert, 2000)

\* Improves motivation and reduces behavior problems (Chen & Bernard-Opitz, 1993)

# Evidence-Based Games Designed for Individuals with ASDs

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## Applied Behavior Analysis

- *Jacob's Lessons* (free online, requires parent/provider administration) (based on ABA but lack of published research)
- *Let's Play With...* (basic concepts such as color, shape, body position) (Alcade, Navarro, Marchena, & Ruiz, 1998)
- *DTTrainer* (based on evidence-based practices but lack of published research)
- *Camp Discovery* (CARD) (DTT game) (research soon to be published)
- *TeachTown* (more details on next slide)

## Social Skills

- *The Social Express* (no published research)
- *SIDES Tabletop Computer Game* (not commercially available) (Piper, O'Brien, Morris, & Winograd, 2006)
- *iMsocial* (video modeling – requires parent/provider administration) (based on science of video modeling but lack of published research)

## Other

- *BrainPro/Fast ForWord* (memory, attention, processing, social skills) (based on principles of neuroplasticity) (research is on developmental dyslexia) (e.g. Gaab, et al., 2007)
- *Vizzle* (based on research on visual learning but lack of published research) (large library of basic concepts such as money, colors, animals, etc. - primarily focused on vocabulary development)
- *Neuropath Learning* (cognitive learning activities to teach communication, language, reading, and focus) (no published research)

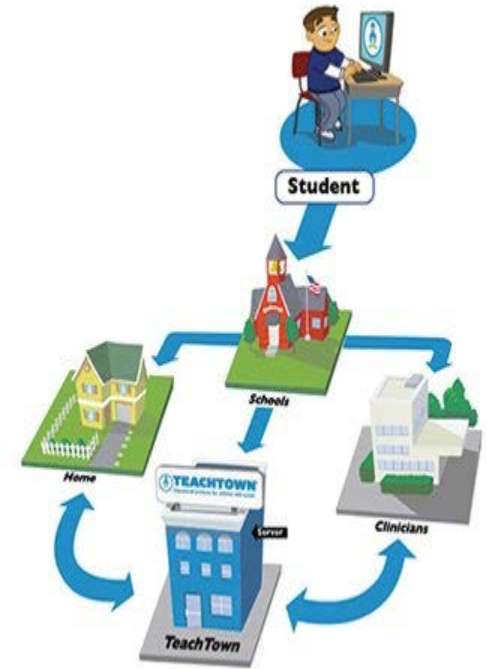
# TeachTown

## \* TeachTown: Basics

- Child-centered license (can be used in multiple environments with n data)
- Intersperses maintenance tasks
- Embedded generalization
- Automatic data-tracking and comprehensive reporting
- Engaging mini games and cartoons for reinforcers
- Includes off-computer, naturalistic, play activities to further enhance generalization

## \* TeachTown: Social Skills

- Cartoon episodes **focus on various social skills**
- **Classroom activities** to go with each episode (not technological)
- **Data tracking forms available for teachers** (not automated)



# TeachTown Research

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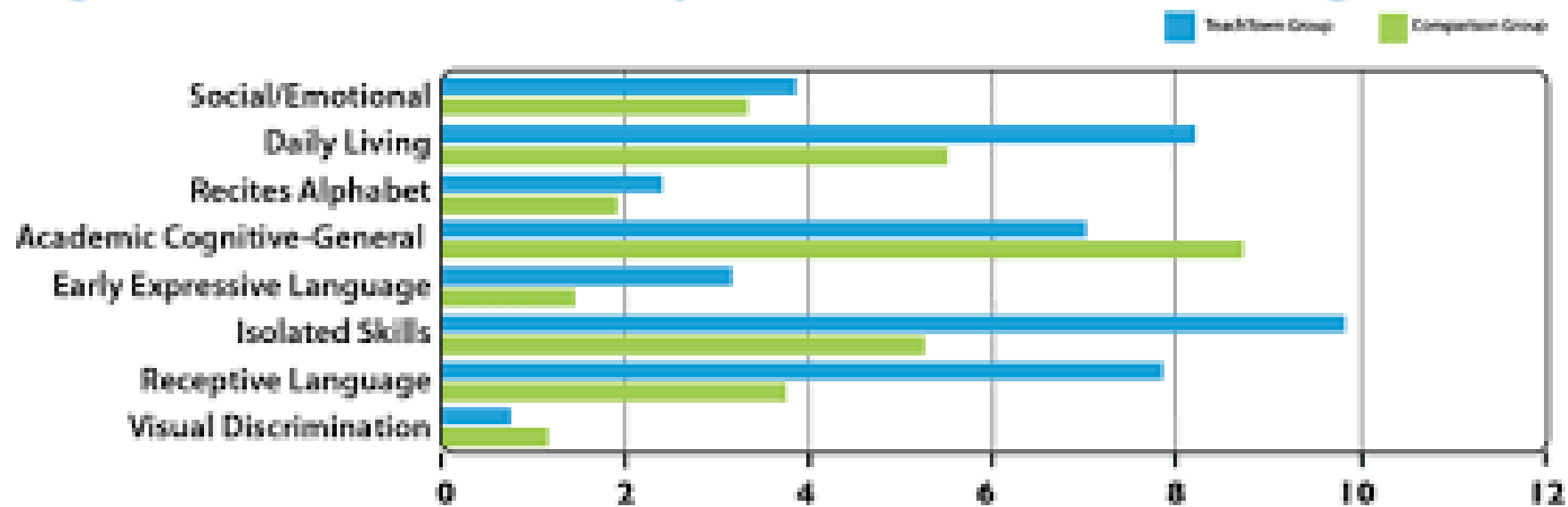


- \* **Decreased behavior problems and increased social-communication with parents** in small sample (n=8) (Whalen, et al., 2006)

- \* Cluster-randomized trial (n=47) in *LAUSD* with K-1 students – significant improvement on **Brigance Assessment** (Brigance, 2004) in Tx group (Whalen, et al., 2010)

- \* Conference papers demonstrating improved generalization, replication in Killeen, TX school (n=90) district with preschool children, **enhanced motivation and learning**, and a large analysis of improvements with 1,100 users (Whalen, et al., 2006-2012)

## Significant Gains in Developmental Months on the Brigance IED



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