

# Attention Deficit and Auditory Processing Disorders

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# Attention Deficit Hyperactivity Disorder (ADHD) Looks Like

- Central Auditory Processing Disorders
- Oppositional Defiant/Conduct Disorders
- Learning Disorders

# Situational Factors Affecting Symptomatology

- One-to-one situation vs. group setting
- Fathers vs. mothers presence (cultural)
- Novelty vs. familiarity with tasks/settings/people
- Frequent vs. infrequent feedback for performance
- Supervised vs. unsupervised work performance



# Co-Morbidity of (C)APD/ADHD

- 50-80% exhibit both ADHD and (C)APD
- Most manifest the Tolerance-Fading Memory (TFM) and Organization types of (C)APD



# Behavioral Overlap with ADHD/(C)APD

- Does not understand directions
- Requires repetition of directions
- Inconsistent academic performance
- Inattentive
- Hypo-hyperactive

# Behavioral Overlap with ADHD/(C)APD

- Easily distracted
- Improved performance in structured environment
- Language disorders
- Weak-short term memory
- Difficulty listening selectively in background noise
- Exhibits reversals



# ADHD Core Symptoms

- Poor sustained Attention/Vigilance
- Poor Delay of Gratification
- Distractibility
- Hyperactivity (75-85%)
- Poorly regulated activity
- Variability (VD Disorder)
- Impulsivity



# Developmental Features

- Early onset < 6 years
- Chronic over time > 6 months
- Pervasive Across Situations
- Identified often at onset of school
- Predominantly inattentive type may be present at adolescence
- Symptoms must be deviant from mental age

# ADHD Epidemiology

- Approximately 5-9% of pediatric population, 50% if you ask parents
- Sex ratio Males: Females, 2:1 in children
- 30-40% of referrals to outpatient mental health services
- Cross cultural and socioeconomic classes



# Academic Performance

- Academic underachievement (90%)
- Variability of performance
- Specific Learning Disorders (40-60%)
- Disorganization
- Difficulty Following Directions
- Motor restlessness
- Excessive Talking



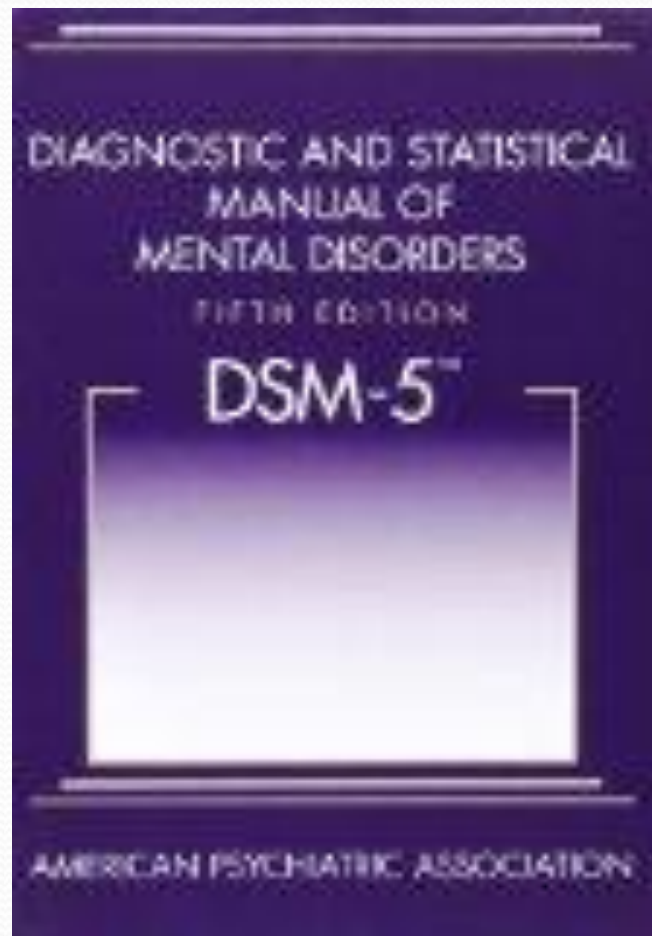
# Social Skills

- Self-Centered
- Peer rejection
- Inability to benefit from social consequences
- Noncompliance with commands (70% noncompliant)
- Weak social problem solving skills

# DSM IV Diagnostic Statistical Manual of Mental Disorders 4<sup>th</sup> Edition (APA) 2004

- ADHD – I (Inattention)
  - ADHD-HI (Hyperactive-Impulsive)
  - ADHD – C (Combined)
  - No ADHD
- 
- Specific amount of symptoms required







# DSM V

- Diagnostic Statistical Manual of Mental Disorders 5<sup>th</sup> Edition (APA) 2013
- **Six or more symptoms of inattention for children up to age 16, or five or more for adolescents 17 and older and adults; symptoms of inattention have been present for at least 6 months, and they are inappropriate for developmental level.**

# Can we diagnose

- ADHD vs CAPD?
- Yes – if you have a reliable psychological evaluation and a reliable audiological evaluation
- This clinician treats everyone as if there is an attentive issue.... an anxiety issue.... (PPS with adult)



# SSW TEST RESULTS

RNC	RC	LC	LNC	
2	18	3	3	Decoding
20	20	20	20	Organic Issue
6	7	20	5	TFM/INT





# Reliable (C)APD testing with the Population of ADHD

- Evaluate in the morning to control for fatigue and attention
- Provide breaks and consistent reinforcement
- Replay test tapes when the client interrupts stimuli



# Continued

- Evaluate while receiving prescribed medication for attention deficit



# ADHD Treatments

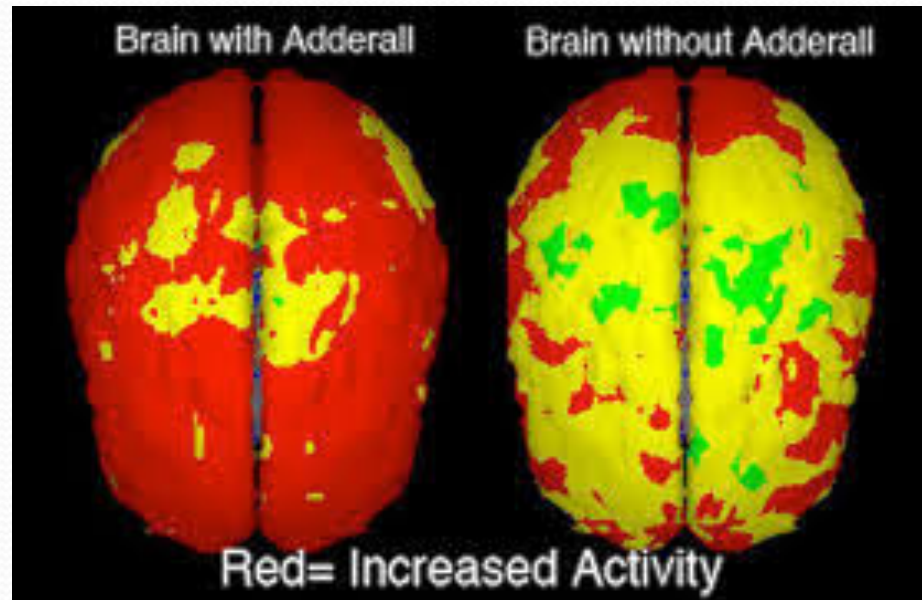
- Cognitive Therapy
- Tutorial
- Counseling
- Medication



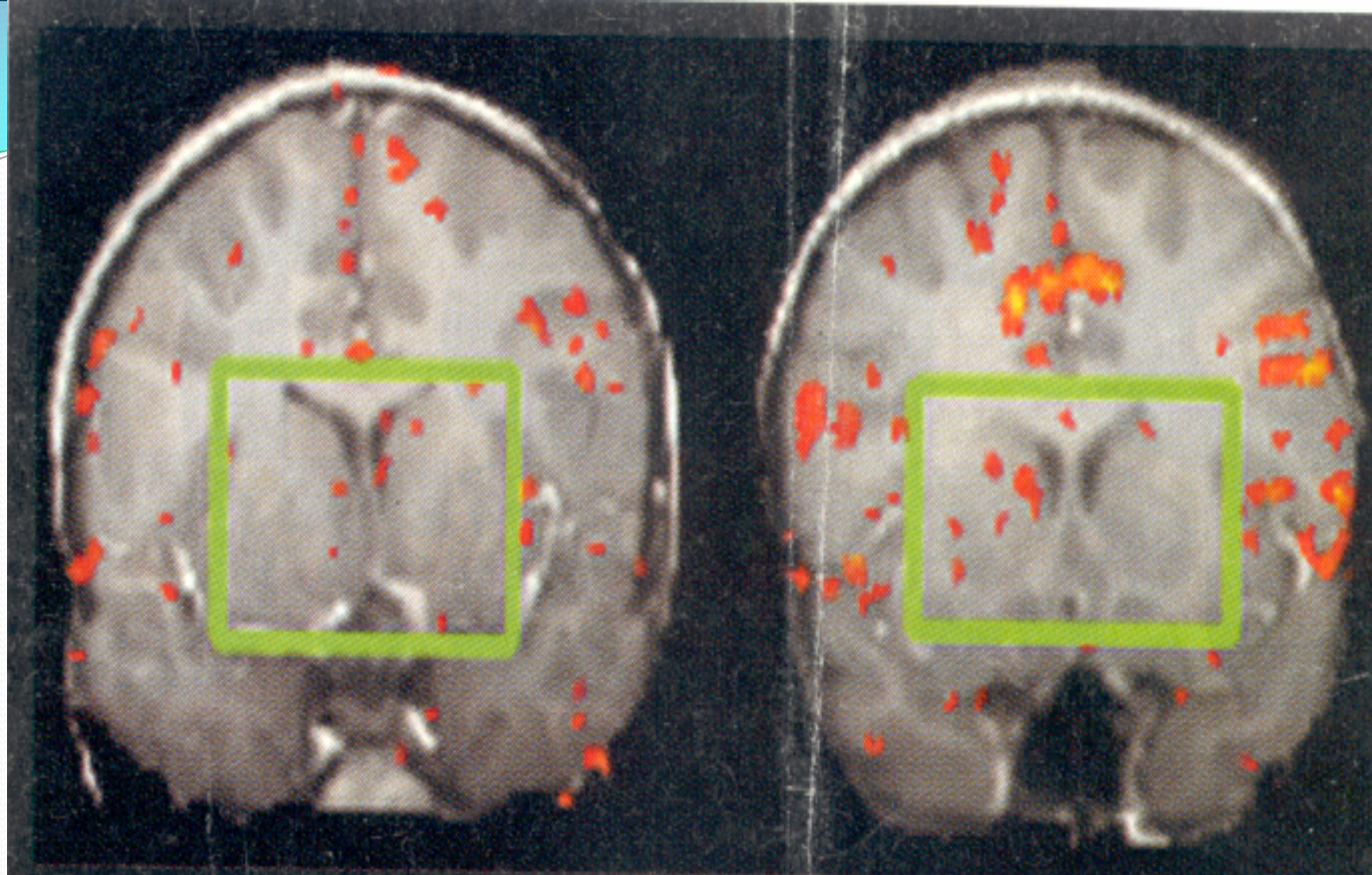


# Did you know

- There were over 2000 studies in the 1970s to 1980s showing the significant effect of Ritalin medication – hyperactivity and impulsivity?
- In the 1990s there were no placebos manufactured from the pharmacy companies!







1<sup>st</sup>  
grade

Ned fast run can

-A-e-a-n-t-u-k-fā-

sand in Ted is the

-t-e-d-i-s-i-n-t-h-e-

rat The cat a has

The cat has a rat.

-t-h-e-c-a-t-h-a-s-a-tā-

pig in mud A is the

-A-pig-i-n-t-h-e-mud-



Name Gregg

4/4/89 100

1

Age

Spelling words to study.

1. tub

5. bus

2. cup

6. dump

3. mug

7. bug

4. duck

8. buck

# Reliable (C)APD testing with the Population of ADHD

- Control for hyperactive behaviors
  - (i.e., medication (Tillery, Katz, Keller, 2000), positive reinforcement, novel situation)

Does CNS stimulant medication enhance CAPD? ADHD?



# 1986-1992

- Research studies investigated CAPD and medication affect – without:
  - 1) True ADHD diagnosis
  - 2) Placebo controls
  - 3) Controlling for learning affects

# AND

- Psychologists referred to audiologists to use APD tests to evaluate attention



# ASHA Consensus Meeting 1994

- A panel member stressed that CAPD and ADHD are the same disorder.
- Why should we evaluate while on a CNS medication?

- Tillery, Katz, Keller (2000)

*Journal of Speech, Language and Hearing Research*

Children diagnosed (N=36)

with ADHD and CAPD

medicated from 6 months – 7 years

ages 7-14 years

Received two test sessions

16 medicated for 1<sup>st</sup> test session

16 placebo for 1<sup>st</sup> test session

Double-blind, placebo controlled



- All participants received:

Three CAP tests and the ACPT

# Auditory Continuous Performance Test (Keith, 1994) (ACPT)

Compares the 1<sup>st</sup> set of stimuli to the 6<sup>th</sup> set of stimuli

Each set of stimuli: 90 words (one syllable words) x 6 sets = 540 words (a 20 minute test)

The target word is 'dog'



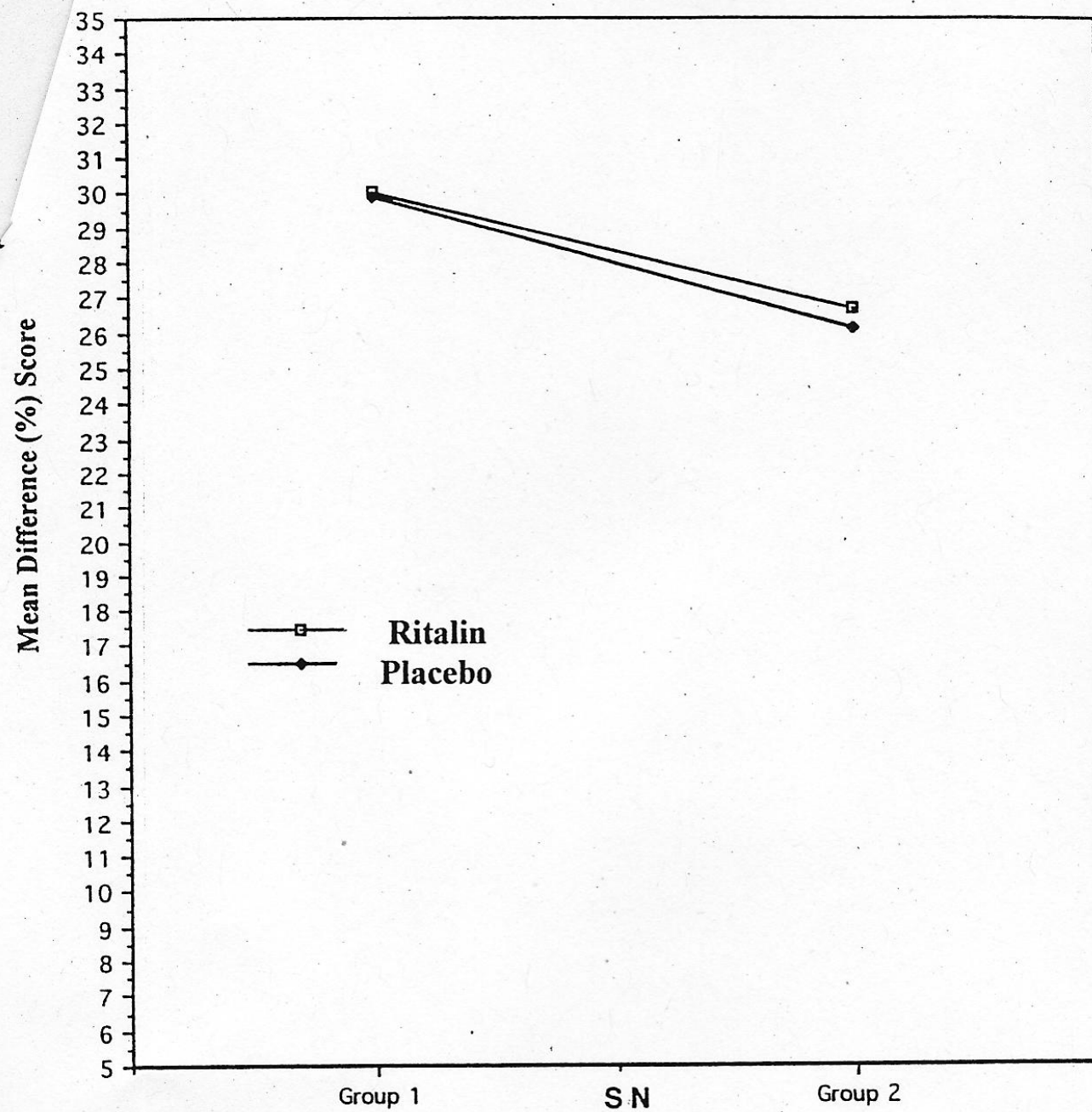
# ACPT

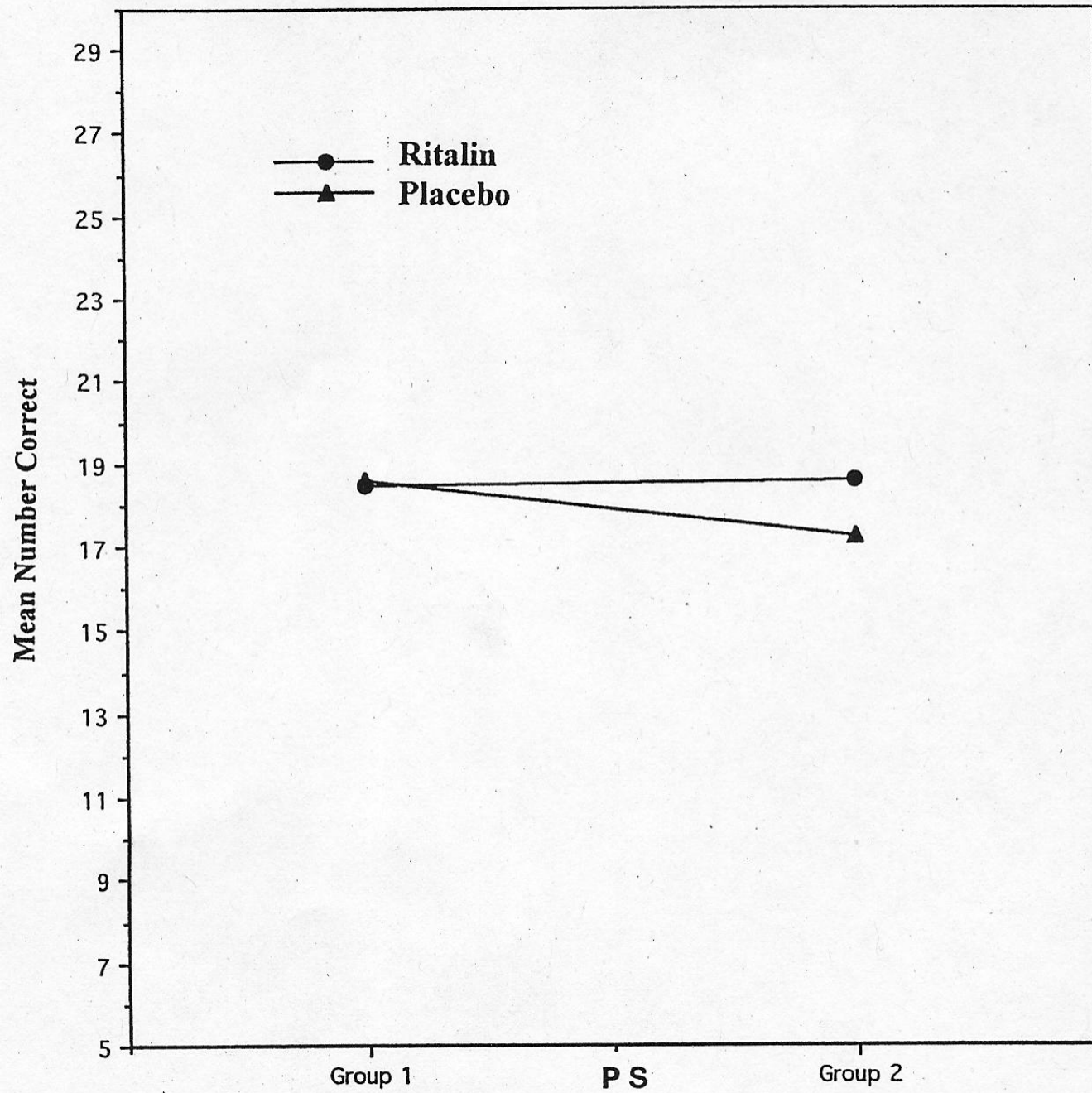
- Raise your thumb to the target word
  - Should we change the response mode?
  - Should we enlarge the evaluation form for recoding accuracy?
- Measures auditory attention vs auditory impulsivity
- Can this test be included in the APD test battery?

# HYPOTHESES

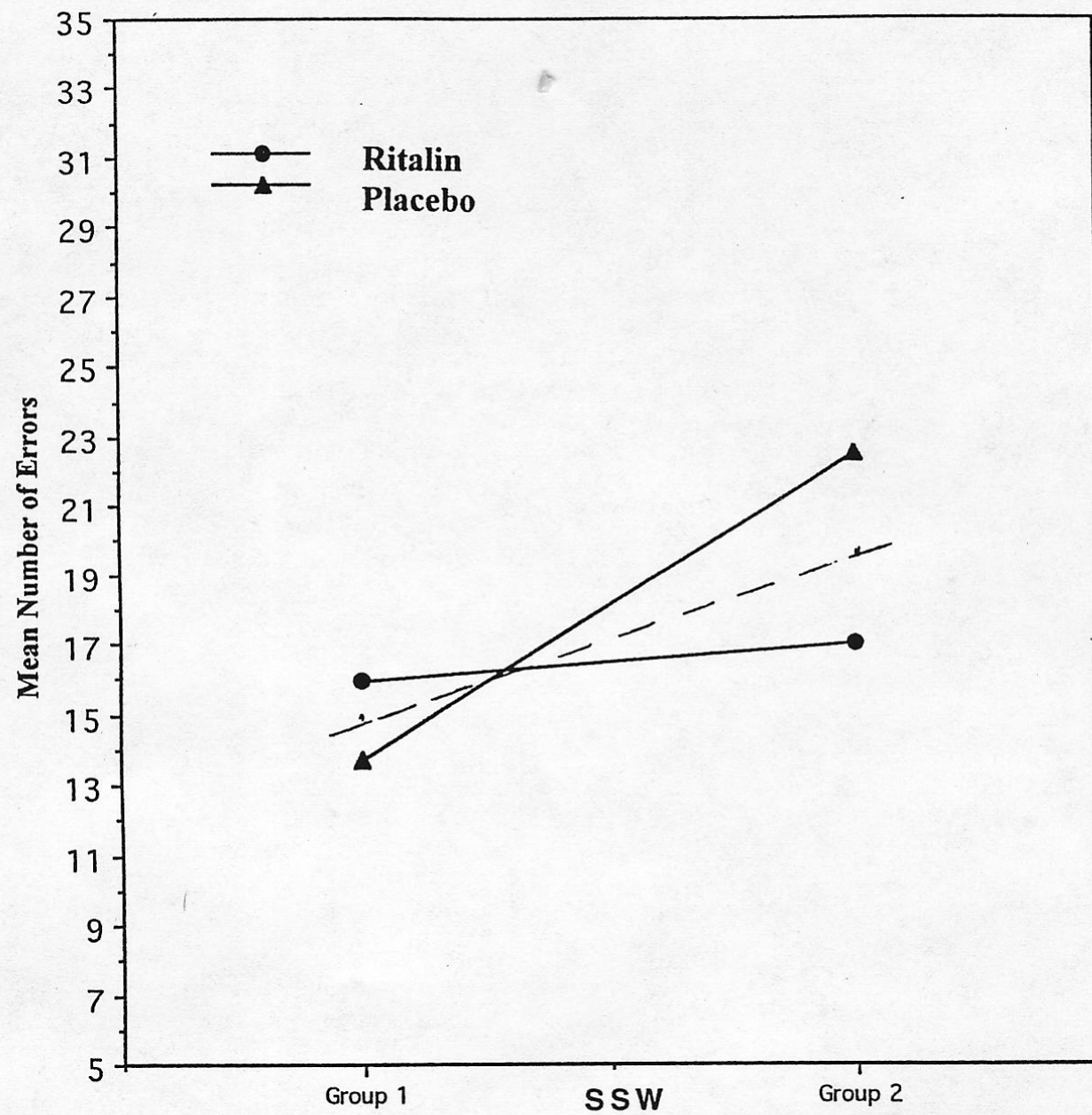
- If Ritalin improves the test performance on all administered tests, then ADHD and CAPD are one entity.
- If Ritalin improves only ACPT performance, then CAPD and ADHD are two separate entities.

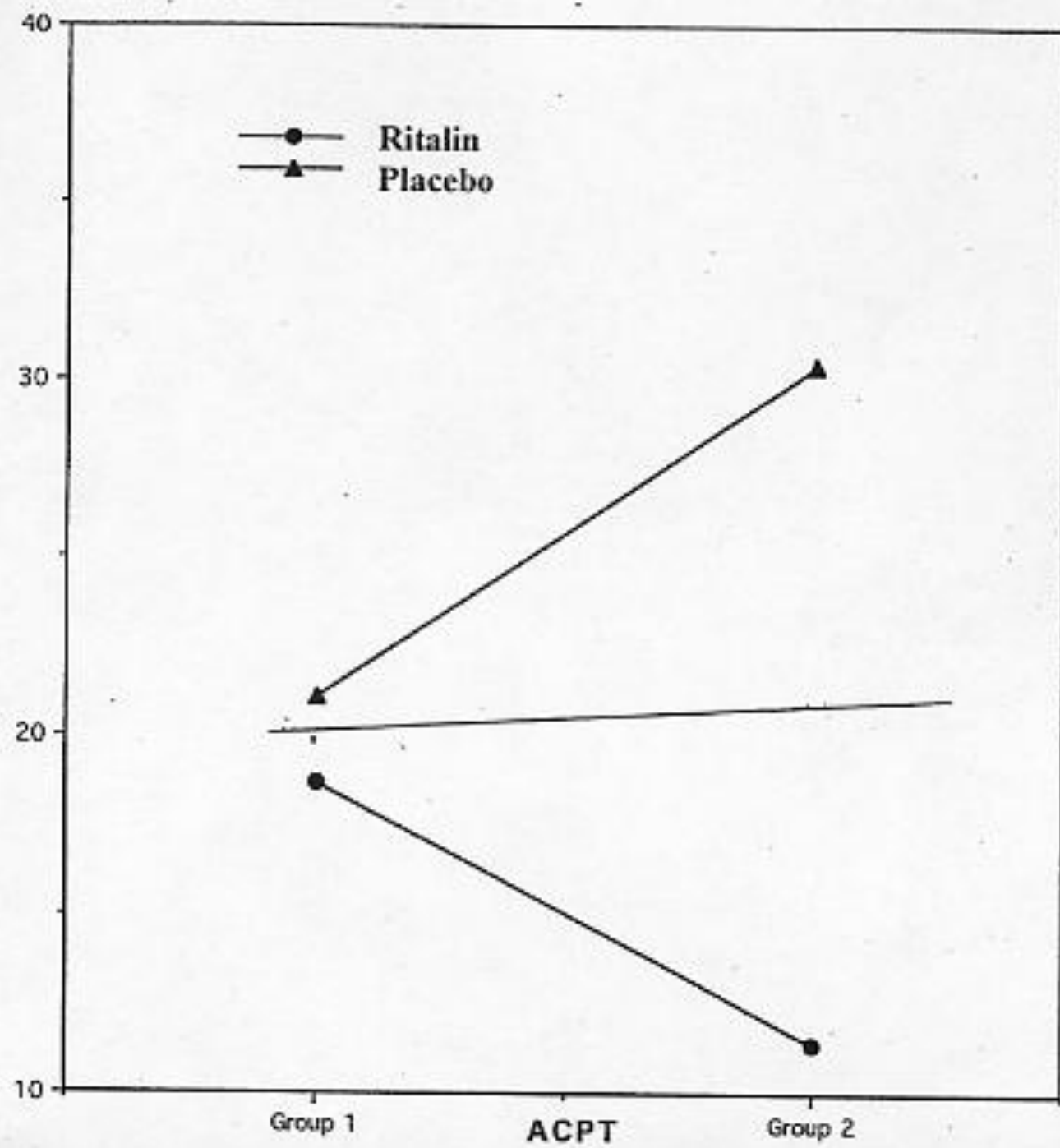














## Tillery, Katz, Keller (2000)

- A significant treatment difference was found between groups ( $p < .0004$ ); signifying that the ACPT performance significantly improved when the participants were under the influence of Ritalin medication.

## Tillery et al., 2000 Conclusions

- ADHD and CAPD are two separate disorders
- Individuals with ADHD should receive their Ritalin medication when receiving a CAP test battery
- Note: As of 2014 this study has not been replicated per literature search.



# ADHD and (C)APD Management

## Keller and Tillery (2002)

- There are no efficacy reports for (C)APD management when the child has both (C)APD and ADHD.
- We need research in this area.
- Chart showing strategies commonly used for those with CAPD, ADHD or both.

## Contrasting Management Strategies For ADHD, ADHD/APD, and APD

Strategy	ADHD	ADHD/APD	APD
Medication	X	X	NO
Novelty	X	?	?
Immediate Feedback	X	?	?
Highly Salient Rewards and Punishments	X	?	?
Parent Training	X	?	?
Low Level Background Stimulation	X	?	?
Psychotherapy	X	?	?
Daily Report Cards	X	?	?
Social Skills Training	X	?	?
Decreased Work Load	X	X	X
Self-Advocacy	X	X	X
Educate Parents / Families	X	X	X
Flexibility in Teaching Style	X	X	X
Pre-tutoring	X	X	X
Preferential Seating	X	X	X
Repetition of Directions	X	X	X
Environmental Modifications	X	X	X
Organization Skills	X	X	X
Auditory Processing Therapy	NA	?	X
Metacognitive Approaches	?	?	X
Auditory Trainer	?	?	X
Redundancy	?	?	X
Highly Structured Teachers	?	?	X
Counseling	?	?	X

NA = Not Applicable, ? = Unknown

Keller, W.D. and Tillery, K.L. (2002) Reliable Differential Diagnosis and Effective Management of Auditory Processing and Attention Deficit Hyperactivity Disorders. *Seminars in Hearing*, 23:4, 337-347



# Changes in Trends

- School districts and Psychologists
  - Administer Screening Measures for CAPD and Attention

SCAN (Keith, 2009)

Auditory Continuous Performance Test (ACPT)  
(Keith, 2004)

- Screening Tools for ages 3 to 59

# Auditory processing solutions for ages 3-50

ASA  
Auditory Skills Assessment



**SCAN-3**  
for Children  
TESTS FOR AUDITORY PROCESSING DISORDERS



**SCAN-3**  
for ADOLESCENTS & ADULTS  
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# Psychologists in WNY

- Administer ACPT after taking pill A for two weeks – and again after taking pill B for two weeks.
- Include the SCAN in their evaluation.
- Some administer SCAN twice: once on Pill A and once on Pill B.

# Sharing a Case

- John, 8 years of age, is in a private school setting.
- Verbal IQ 134
- His teacher is about to retire and she is a coworker with John's parents.
- Psychologist: Mild ADHD and refer for CAPD evaluation.
- CAPD: Mild TFM
- How important is it to know this information?



- 
- Are you asked that question by professionals?
  - John is juggling three balls!
  - Our clients' success in life – depends on us knowing what we are doing and in working together!



Look how far we've come...

in understanding diagnosis and management of  
CAPD

LANGUAGE

C A P D

D

H

NVLD

and related disorders