LSU Health
NEW ORLEANS
School of Allied Health Professions

A Presentation for the Annual Conference of the Louisiana Counseling Association

Current Treatments for Autism: A Systematic Review of Best Practices

George W. Hebert, Ph.D., Laura Rohm, Elizabeth Turansky, and Mazie Martisius

Presentation Objectives (or The Porpoise of the Presentation)

- Historical Overview of Autism
- Review of Diagnostic Considerations
  - Diagnostic and Statistical Manual for Mental Disorders (All 5 editions)
  - Special Education Categories
- Overview of the Treatments for Autism
- Systematic Review of the Evidence
- Applications to the Educational and Clinical Setting

Historical Overview of Autism

- The word "autism" (which has been in use for about 100 years) comes from the Greek word "autos," meaning "self".

- The term describes conditions in which a person is removed from social interaction
  - Therefore “an isolated self”.

(much timeline information adopted from http://www.webmd.com/brain/autism/history-of-autism#1

Origins of the Term “Autism”

- Eugen Bleuler,
  - Swiss psychiatrist, was credited as the first person to use the term along with schizophrenia and schizoid.
  - He started using it around 1911 to refer to one group of symptoms of schizophrenia.

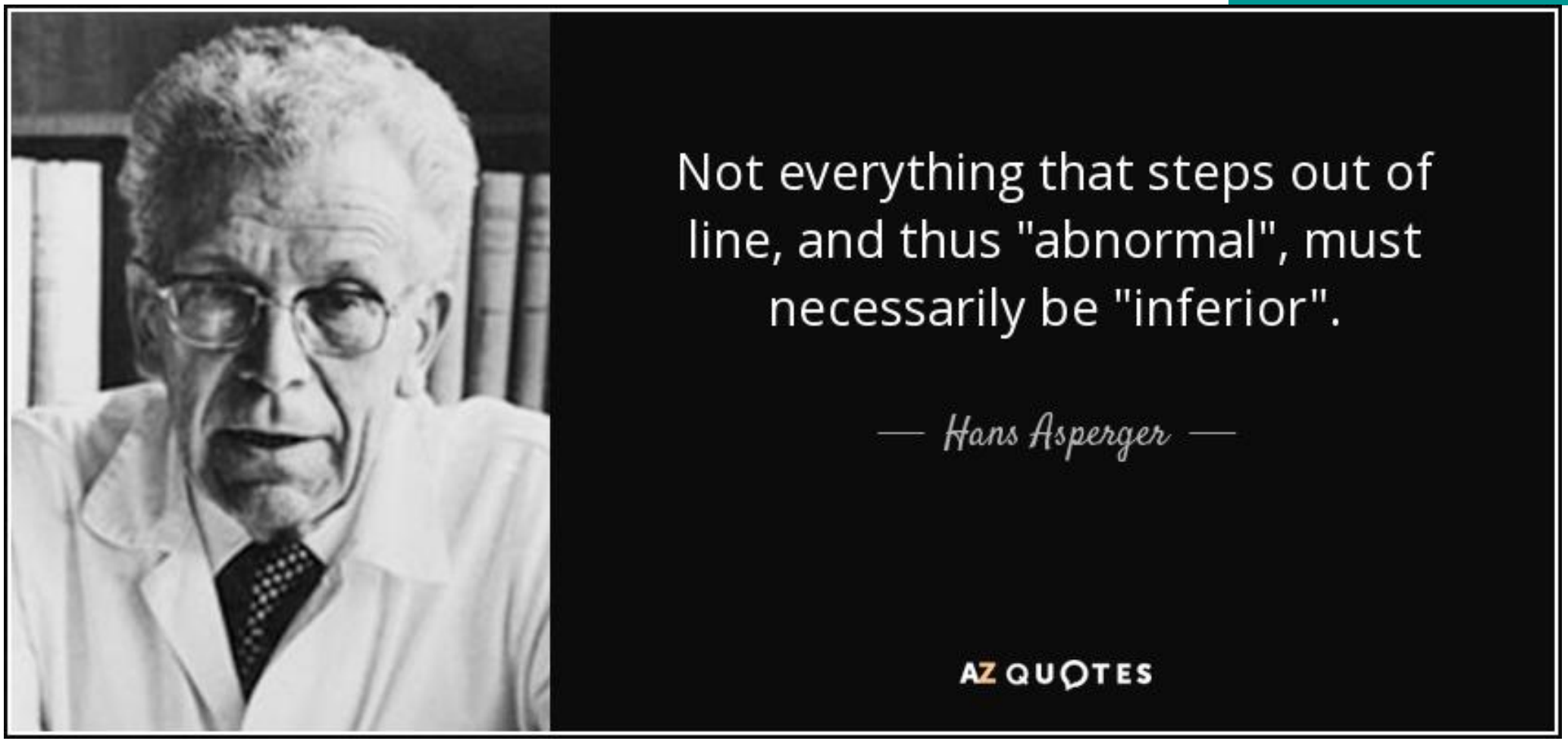
- During the 1940s, researchers in the United States began to use the term "autism" to describe children with emotional or social problems.

People Associated. . .

- Leo Kanner,
  - Psychiatrist and Scientist from Johns Hopkins University,
  - Used it to describe the withdrawn behavior of several children he studied.

- Hans Asperger,
  - Scientist in Germany, identified a similar condition that's now called Asperger's syndrome.

Words for the Wise. . .



A Timeline Perspective

- From the 1960s through the 1970s, research into treatments for autism focused on medications such as
  - LSD,
  - Electric shock, and
  - Behavioral change techniques
    - Relied on pain and punishment

A Timeline Perspective

- During the 1980s and 1990s
  - behavioral therapy and the use of highly controlled learning environments emerged as the primary treatments for many forms of autism and related conditions.
- Currently, the cornerstones of autism therapy are behavioral therapy and language therapy.
- Other treatments are added as needed.

What Are the Symptoms of Autism?

- Common to all types of autism:
  - Difficulty with communication and interactions with others.
- Many have difficulty. .
  - interpreting non-verbal communication, or
  - holding a conversation.

So Let's Review Actual Timelines. . .

- **1908:**
  - The word *autism* is used to describe a subset of schizophrenic patients who were especially withdrawn and self-absorbed.
- **1943:**
  - Leo Kanner, M.D., publishes a paper describing 11 children who were highly intelligent but displayed. . .
    - "a powerful desire for aloneness" and
    - "an obsessive insistence on persistent sameness."
    - He later names their condition "early infantile autism."

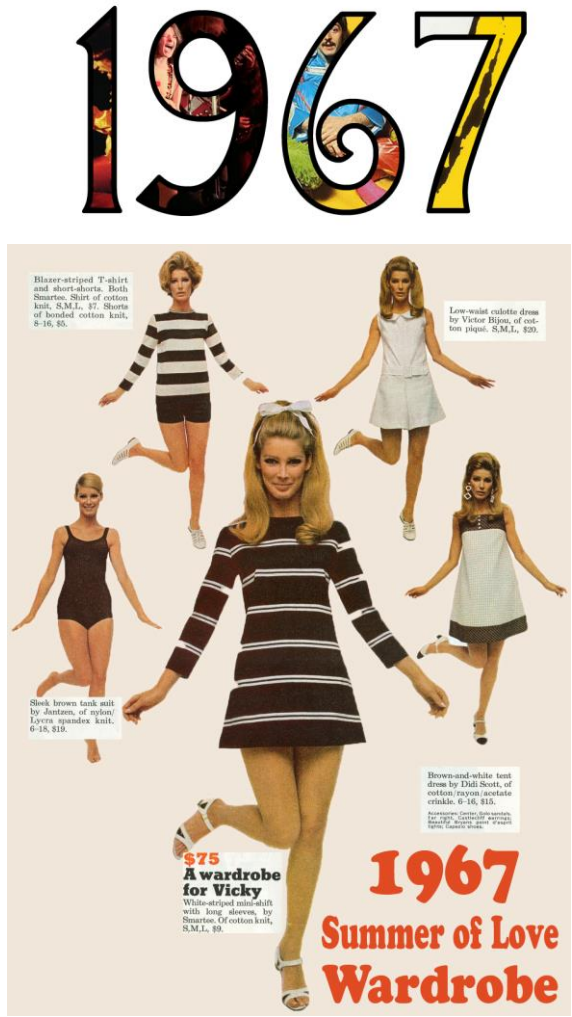
http://www.parents.com/health/autism/history-of-autism/

Actual Timelines. . .

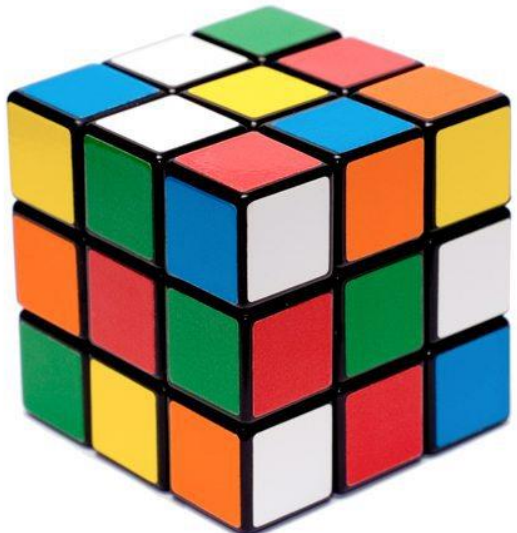
- **1944:**
  - Hans Asperger describes a "milder" form of autism now known as Asperger's Syndrome.
  - The cases he reported were all boys who were highly intelligent but had trouble with social interactions and specific obsessive interests.

Actual Timelines. . .

- **1967:**
  - Psychologist Bruno Bettelheim popularizes the theory that "refrigerator mothers," as he termed them, caused autism by not loving their children enough.
    - (Spoiler alert: This is completely false.)
  - "They didn't consider the role of biology or genetics
    - We now understand biology to be the main cause
  - Autism is also classified under schizophrenia in the *International Statistical Classification of Diseases and Related Health Problems*,



Actual Timelines. . .

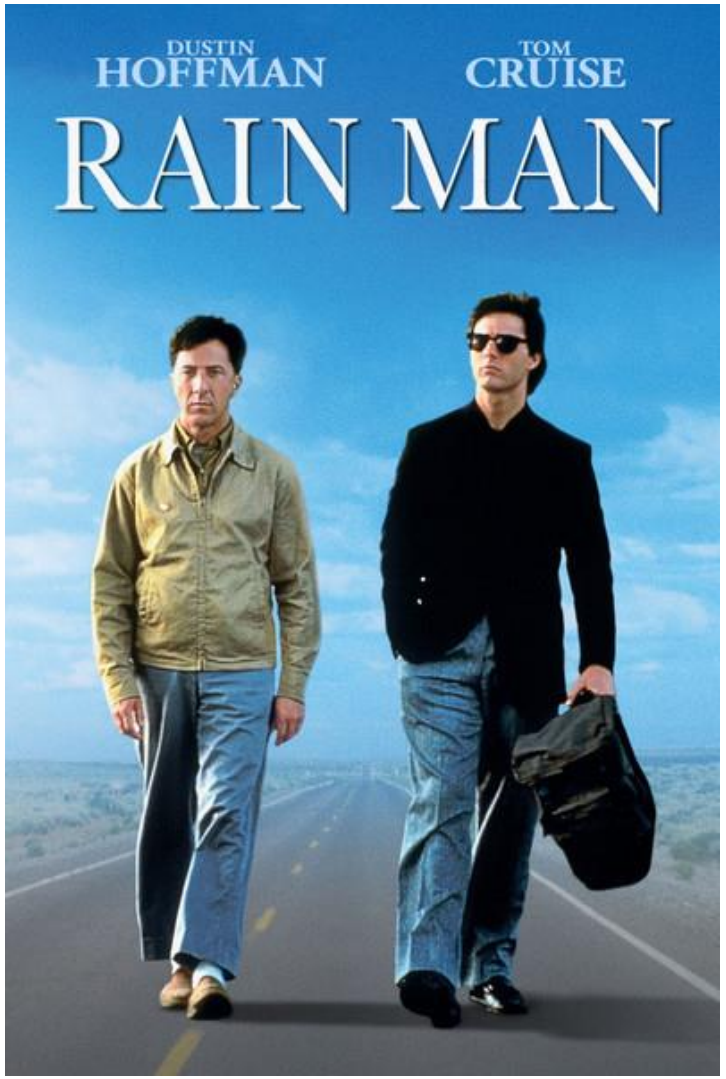


- **1977:**
  - Research on twins finds that autism is largely caused by genetics and biological differences in brain development.
- **1980:**
  - "Infantile autism" is listed in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) for the first time
  - The condition is also officially separated from childhood schizophrenia.

Actual Timelines. . .

- **1987:**
  - The DSM replaces "infantile autism" with a more expansive definition of "autism disorder," and includes a checklist of diagnostic criteria.
  - UCLA psychologist Ivar Lovaas, Ph.D., publishes the first study showing how intensive behavior therapy can help children with autism--thus giving new hope to parents.

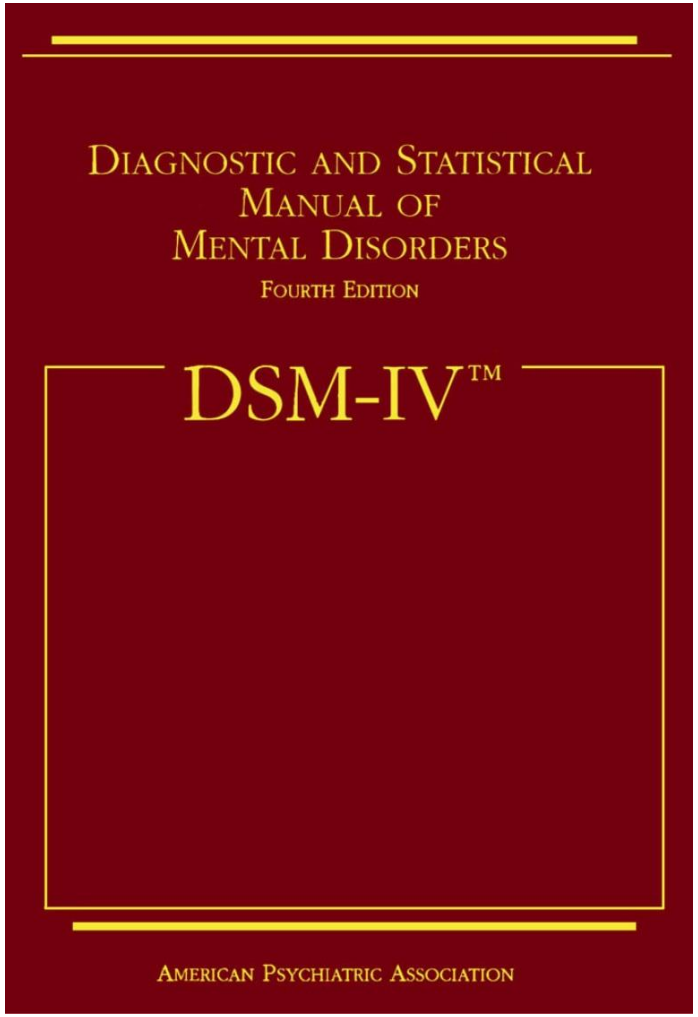
Actual Timelines. . .



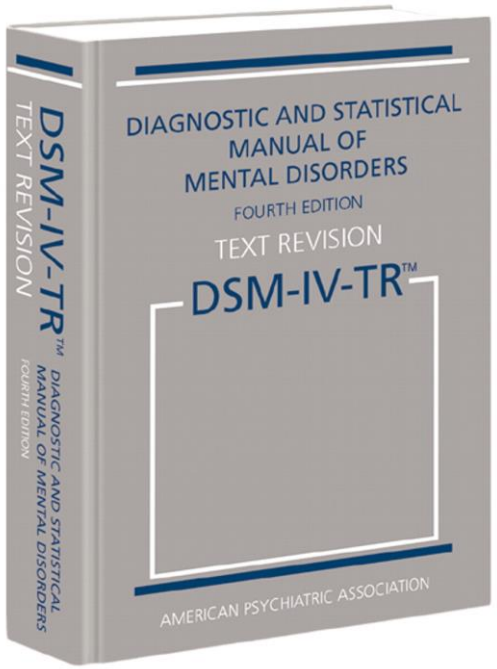
- **1988:**
  - The movie *Rain Man* is released.
    - This was important for raising public awareness of the disorder
    - Note: These kinds of skills are extremely rare.
- **1991:**
  - The federal government makes autism a special education category.
  - Local Education Authorities (LEAs) begin identifying children on the spectrum and offering them special services.

Actual Timelines. . .

- **1994**
  - Asperger's Syndrome is added to the DSM-IV, expanding the autism spectrum to include milder cases in which individuals tend to be more highly functioning.



Actual Timelines. . .



- **1998:**
  - A study published in *The Lancet* suggests that the measles-mumps-rubella (MMR) vaccine causes autism.
  - This finding was eventually **debunked**.

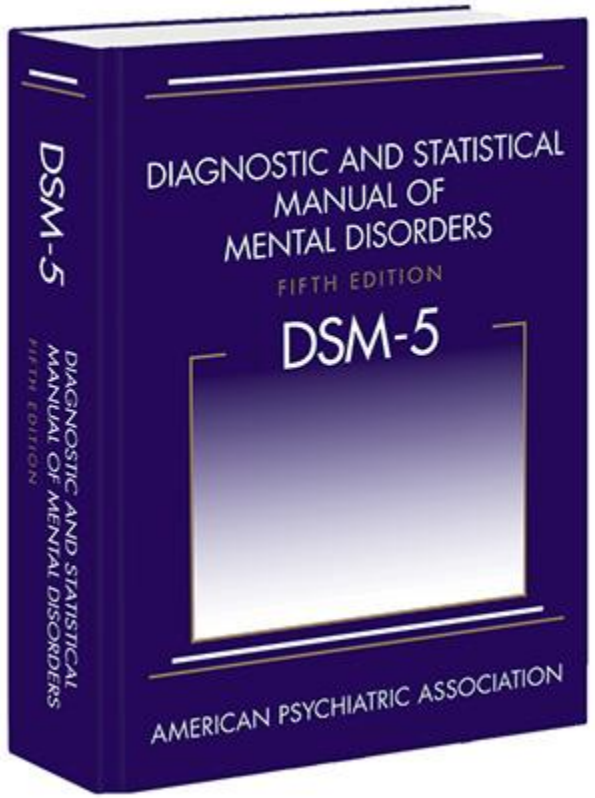
2000:

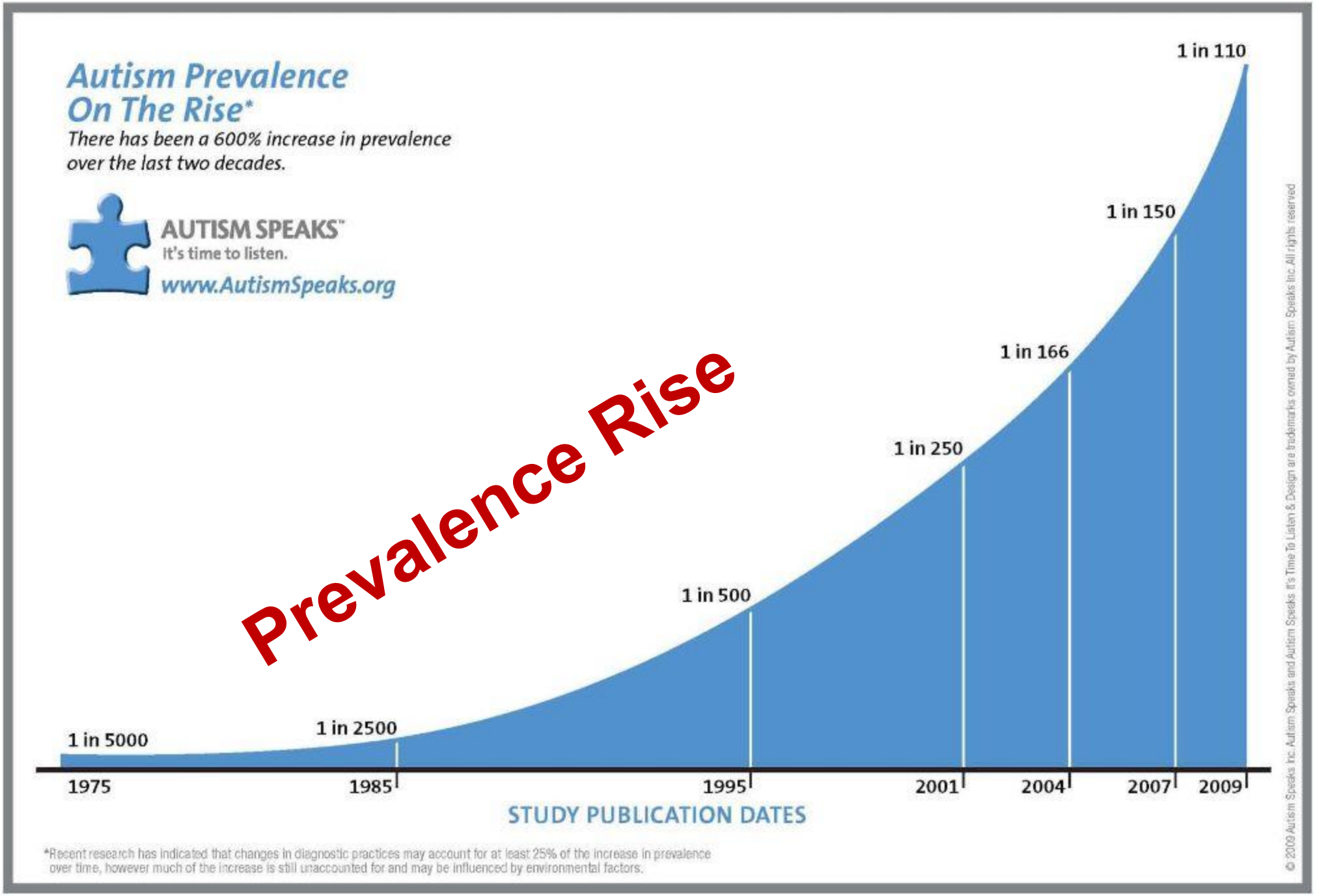
- Vaccine manufacturers remove thimerosal (a mercury-based preservative) from all routinely given childhood vaccines due to public fears about its role in autism.

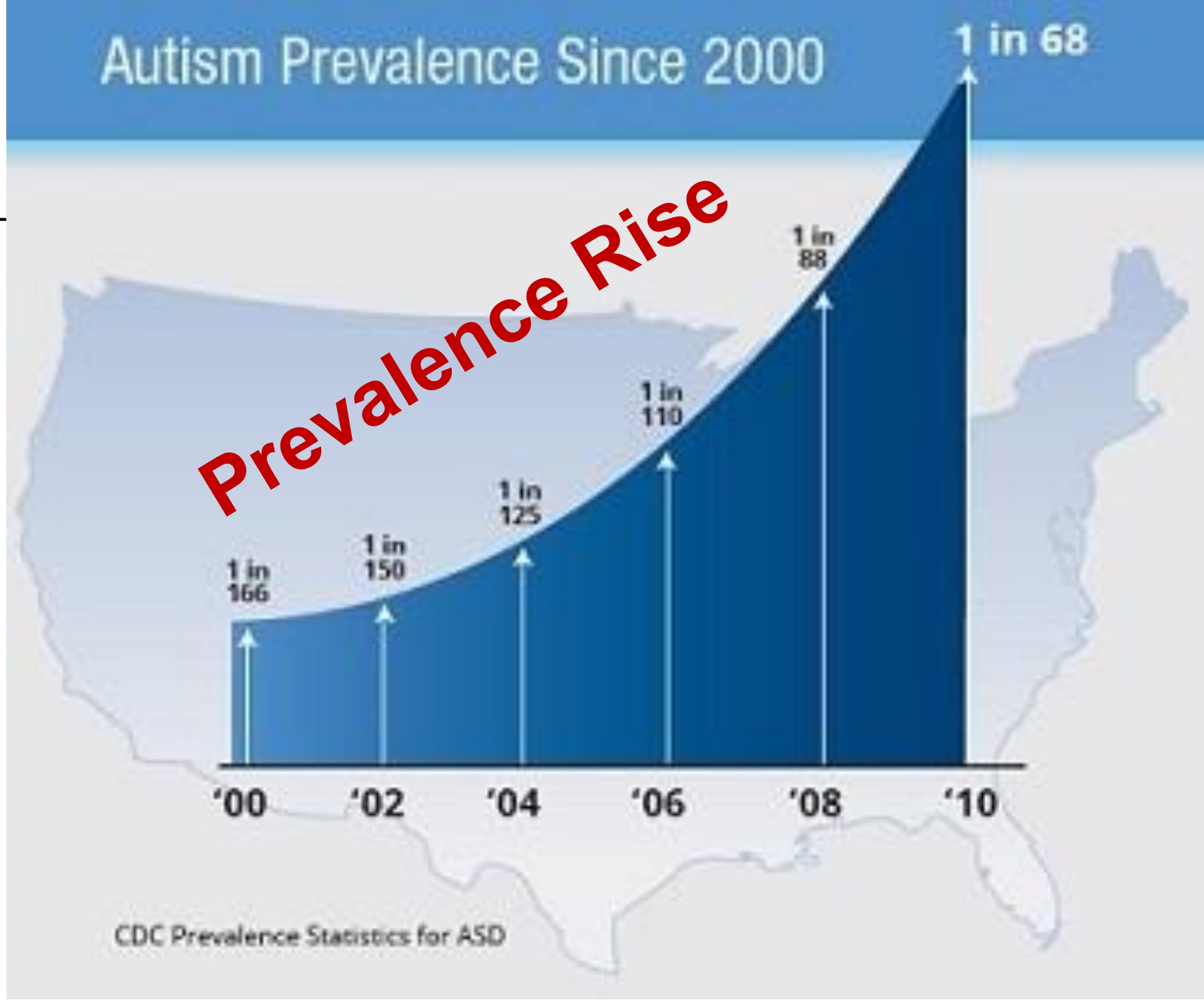
Note: even though, again, the vaccine-autism link has been debunked.

Actual Timelines. . .

- **2013:**
  - The DSM-5 folds all subcategories of the condition into one umbrella diagnosis of autism spectrum disorder (ASD).
  - Asperger's Syndrome is no longer considered a separate condition.
  - ASD is defined by two major criteria:
    - 1) Impaired social communication and/or interaction.
    - 2) Restricted and/or repetitive behaviors.




Autism Prevalence
On The Rise*
There has been a 600% increase in prevalence
over the last two decades.
AUTISM SPEAKS™
It's time to listen.
www.AutismSpeaks.org
Prevalence Rise
1 in 5000
1 in 2500
1 in 500
1 in 250
1 in 166
1 in 150
1 in 110
1975
1985
1995
2001
2004
2007
2009
STUDY PUBLICATION DATES
*Recent research has indicated that changes in diagnostic practices may account for at least 25% of the increase in prevalence over time, however much of the increase is still unaccounted for and may be influenced by environmental factors.
© 2009 Autism Speaks Inc. Autism Speaks and Autism Speaks It's Time To Listen & Design are trademarks owned by Autism Speaks Inc. All rights reserved


Autism Prevalence Since 2000
1 in 68
Prevalence Rise
1 in 166
1 in 150
1 in 125
1 in 110
1 in 88
'00
'02
'04
'06
'08
'10
CDC Prevalence Statistics for ASD

And Now. . .

- Common Treatments for Autism

Overview of the Treatments for Autism

- Applied Behavior Analysis Therapy
- Sensory Integration Therapy
- Physical Activity
- Psychopharmacology

Applied Behavior Analysis Therapy

- Cooper, Heron, and Heward (2007) define applied behavior analysis (ABA) as “the science in which tactics derived from the principles of behavior are applied to improve socially significant behavior and experimentation is used to identify the variables responsible for the improvement of behavior”

Applied Behavior Analysis Therapy (cont'd)

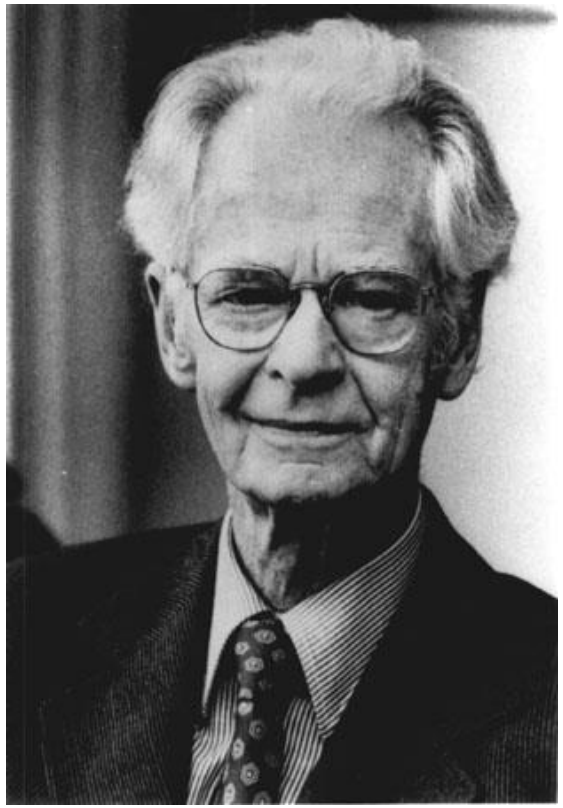
- Endorsed as the gold standard of treatment of children with ASD in North America
- Most commonly implemented and empirically supported interventions for individuals with ASD

Examples of socially significant behaviors

- Communication (talking, singing, asking for what you want, responding to questions)
- Social Skills (reciprocal play skills, initiating greeting, turn taking during games, asking peers to play)
- Pre-academic skills (letter identification, attending)
- Adaptive living skills (toileting, dressing, cleaning up after self)
- Replacement behaviors to aberrant behaviors (functional communication skills, transitioning between activities, on task behavior, taking breaks)

History of ABA

- Developed from behaviorism (philosophy of the science of behavior)
  - Key researchers: John Watson and B.F. Skinner
- The beginning of ABA can be traced back to 1959, with the publication of “The Psychiatric Nurse as a Behavioral Engineer”



Left: B.F. Skinner

Below: John Watson

Journal of Applied Behavioral Analysis

- First issue, entitled “Some Current Dimensions of Applied Behavior Analysis” was published in 1968
- Introduced seven dimensions of ABA that are used to guide effective treatments:
  1) Effective
  2) Technological
  3) Conceptually systematic
  4) Generality
  5) Analytic
  6) Applied
  7) Behavioral

Seven Dimensions of Treatment

- 1) Effective: Techniques should produce a large enough effect that have an impact on the person's life
- 2) Technological: Provides written detail of procedures to allow for replication of techniques in other settings
- 3) Conceptually systematic: Techniques are tied to the basic principles of behavior
- 4) Generality: Attempts to identify techniques that can be successful with other individuals, with other behavior problems, and in other situations

Seven Dimensions of Treatment (cont.)

- 5) Analytic: Scientifically based experimental designs are used to assess the effectiveness of the interventions under study
- 6) Applied: Focuses on behavior with social significance
- 7) Behavioral: Behavior is the focus, and not some hypothetical entity (targets measurable and observable behaviors)

Sensory Integration Therapy

- Sensory integration therapy (SIT) is based on the understanding that interferences in neurological processing and integration of sensory information disrupt the construction of purposeful behaviors
- Treatment is designed to provide controlled sensory experiences so that an adaptive motor response is elicited

History of SIT

- SIT is based on a theory by that originated in 1972 and was further elaborated in the late 1980s by Anna Jean Ayres.
- In her work, Ayres primarily addresses the individual's "ability to organize sensory information for use" (Ayres,1972; 2), specifically the "sensations from one's body and from the environment [that] makes it possible to use the body effectively in the environment" (Ayres, 1989; 22).

Sensory Integration Therapy

- Ayres theorized that "individually designed sensory-motor activities will facilitate greater modulation, organization and integration of sensory information; these in turn will allow the sensory information to be used in more appropriate and adaptive ways."
  - Her theory presumes that appropriate and specific doses of sensory stimulation will directly affect the nervous system, resulting in improved attention, behavior and learning

Sensory Integration Therapy

- Sensory-based therapies are progressively more used by therapists in the management of children with developmental and behavioral disorders

Physical Activity

- When compared to individuals without ASD, individuals with ASD are more likely to have difficulties with balance, postural stability, gait, joint flexibility, and movement speed.
- Also more likely to have health problems related to a sedentary lifestyle including cardiovascular disease, insulin resistance syndrome, and obesity

Physical Activity (cont.)

- Some reported positive effects of physical activity can be broadly classified into physical health, behavioral, cognitive and psychosocial health or functioning
- A variety of exercise modalities can be used including:
  - Jogging/walking
  - Cycling
  - Weight training
  - Horseback riding
  - Aquatics

Physical Activity (cont.)

- 2 essential aspects of an exercise intervention:
  - The structure of the exercise environment
  - The nature of the clinician's interaction (including instructions, feedback, and reinforcement)
- Currently, there are no current exercise norms for ASD

Psychopharmacology

- There is no standard medicine for the treatment of Autism
- The American Academy of Pediatrics (AAP) suggests targeting the main one or two problem behaviors when considering medicines

Psychopharmacology

- Today, most medicines prescribed to ease Autism's disabling symptoms are used "off-label"
  - Their FDA approval is for other conditions such as attention deficit hyperactivity disorder or depression
- Selective serotonin reuptake inhibitors (SSRIs) and antipsychotic medicines are the most common treatments

Most Common SSRIs for Autism

- Fluoxetine (Prozac, Seromex, Seronil, Sarafem)
- Fluvoxamine (Luvox, Faverin)
- Sertraline (Zoloft, Lustral, Serlain),
- Paroxetine (Paxil, Seroxat, Aropax, Deroxat, Paroxat)
- Citalopram (Celexa, Cipramil, Emocal, Sepram, Seropram)
- Escitalopram (Lexapro, Cipralex, Esertia)

Most Common Atypical Antipsychotics for Autism

- Risperidone (Risperdal)
- Clozapine (Clozaril)
- Olanzapine (Zyprexa)
- Quetiapine (Seroquel)
- Ziprasidone (Geodon)

The Question Being Asked. . .

- Which of these treatments show the best evidence for the treatment of autism with considerations to cost and effort?

Systematic Review of the Evidence

- Databases Used:
  - EBSCOhost, PsychINFO, and Academic Search Complete
- Key terms
  - “autism spectrum disorder”, “treatment”, “effectiveness”, ‘‘sensory integration’’, “applied behavior analysis”, “ABA”, “exercise”, “physical activity”, “pharmacological”, “psychopharmacological”
- Search connectors ‘‘AND’’ and ‘‘OR’’
- Results limited to: English only, linked full text, peer-reviewed journals, 2000-2016

Criteria for Systematic Review

- Cost
- Duration: *Amount of time clients must maintain treatment in order to experience therapeutic effects*
- Evidence-based: *Using techniques that are based in science and research*
- Decrease aggressive behavior: *Behavior that results in injury towards others or to property (i.e. kicking, pinching, grabbing & pulling hair)*

Criteria for Systematic Review (cont.)

- Decrease self-injurious behavior*: Behavior that results in or has the potential to result in physical harm i.e. head-banging, hand-biting, and excessive self-rubbing and scratching*
- Increase in social engagement: *The extent to which an individual participates in a broad range of social roles and relationships*

Rating the Evidence: Us of Modified Goal Attainment Scaling

- Goal Attainment Scaling (GAS) is an option that can be used as a means of measuring outcome data from different contexts set out on a 5 point scale of -2 to +2.

Level of Expected OUTCOME	Rating	Behavioral Statement of EXPECTED OUTCOMES: - GOAL 1	Behavioral Statement of EXPECTED OUTCOMES: - GOAL 2
MUCH *MORE* Than EXPECTED	+2		
MORE than EXPECTED	+1		
EXPECTED Outcome	0		
LESS than EXPECTED	-1		
MUCH *LESS* Than EXPECTED	-2		

Sharp (2006)

ABA

- **Cost:** -2
  - Average cost is between $33,000 - $100,000 a year
- **Duration:** -2
  - Early intervention can be very cost-effective in the long run
  - Can range from 5-40 hours per week
- **Evidence-based:** +2
  - Significant empirical evidence

ABA

- **Decrease aggressive behavior:** +1
- **Decrease self-injurious behavior (SIB):** +1
  - Increase in manding skills leads to decrease in SIB
- **Increase in social engagement:** +1
  - Increases communication which provides ability to socialize

Sensory Integration

- **Cost:** -1
  - Two hours of therapy per week averages up to $16,500 per year
- **Duration:** N/A
  - Insufficient evidence
- **Evidence-based:** -1
- **Decrease in aggressive behavior:** +1
- **Decrease in SIB:** +1
- **Increase in social engagement:** +1
  - Noted increase in independence and decrease in socially inappropriate self-stimulatory behaviors leads to more opportunities for social interaction with peers

Physical Activity

- **Cost:** +1
  - Varies; exercise as simple as jogging has been shown to reduce frequency of aggressive and self-injurious behaviors
  - Choice of exercise modality depends on motor/social impairments of child
- **Duration:** -2
  - Effects diminish following cessation
- **Evidence-based:** +1
  - Limited evidence available specifically regarding relief off ASD symptoms

Physical Activity (cont.)

- **Decrease in aggressive behavior:** +2
- **Decrease in SIB:** +2
  - Vigorous exercise is associated with a decrease in both aggressive behavior and SIB
- **Increase in social engagement:** +1
  - Provides greater opportunities to socialize with peers and better attentional focus

Psychopharmacology

- **Cost:** -2
  - Require prescriptions by physician
- **Duration: -1**
  - Termination of SSRIs and atypical antipsychotics will cease relief of Autism-related symptoms, but long-term use correlates with higher risk of diabetes/heart disease and tardive dyskinesia, respectively

Psychopharmacology (cont.)

- **Evidence-based:** +1
  - High desire for affective treatments, leading to premature enthusiasm for agents that appear promising early on but later do not stand as evidence-based research methods
  - Evidence exists for treatment of individual targeted symptom domains in atypical antipsychotics

Psychopharmacology (cont.)

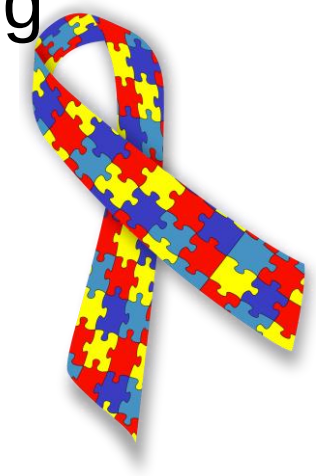
- **Decrease in aggressive behavior:** +1
  - SSRIs, atypical antipsychotics, beta-blockers, and buspirone
- **Decrease in self-injurious behavior:** +1
  - SSRIs and atypical antipsychotics
- **Increase in social engagement:** N/A
  - Mixed results; depends on the medication
  - Positive: clonidine, clozapine, olanzapine, divalproex sodium, beta-blockers, fluoxetine
  - Negative: Methylphenidate

	Cost	Duration	Evidence-Based	Decrease Aggressive Behavior	Decrease SIB	Increase Social Engagement
ABA	-2	-2	+2	+1	+1	+1
Sensory Integration	-1	N/A	-1	+1	+1	+1
Physical Activity	+1	-2	+1	+2	+2	+1
Psychopharmacology	-2	-1	+1	+1	+1	N/A

How does it all apply to education?

Services for Autism in Schools

- **Prior to the 1960's:** Children with autism and other disabilities were often neglected and completely excluded from the public school system
- **1960's:** Disabilities were more widely excepted in the public school system, however, few children with disabilities were enrolled in schools
- **1971:** A law called Education for All was passed permitting children with disabilities to obtain free public schooling, however, children were often still treated as outcasts



Services for Autism in Schools

- **1975:** PL 94-142 was approved, stating that all local public schools must provide free education for all students with disabilities. Education for All was used as the blueprint.
- **1990:** PL 94-142 is renamed The Individuals with Disabilities Education Act (IDEA) The federal government made autism a category of special education. Public schools began offering special services for students with autism.
- **2004:** IDEA was reauthorized as the Individuals with Disabilities Education Improvement Act of 2004, which secured the appropriate placement, supports and accommodations for students with autism.

Early interventions

- IDEA provides free and appropriate education for all children with disabilities
  - Child is entitled to an education that is appropriate for his or her own specific needs
    - Getting the appropriate education for a child is a collaborative process
  - Children are entitled to experience least restrict environment through IDEA
    - Schools are required to educate students with disabilities in regular classrooms with non-disabled peers

Services for Autism in Schools

- If a child is under the age of three and has developmental delays, or a physical or mental condition caused by developmental delay, they are eligible for early intervention services
  - Services should cater to the child's specific needs
    - The Individual Family Service Program (IFSP) spells out the child's needs based on a comprehensive evaluation

Early Intervention Services (under the age of three)

- Speech and language instruction
- Occupational therapy
- Physical therapy
- Applied Behavioral Analysis (ABA)
- Psychological evaluation

Techniques for Integrating Children with ASD into the Classroom

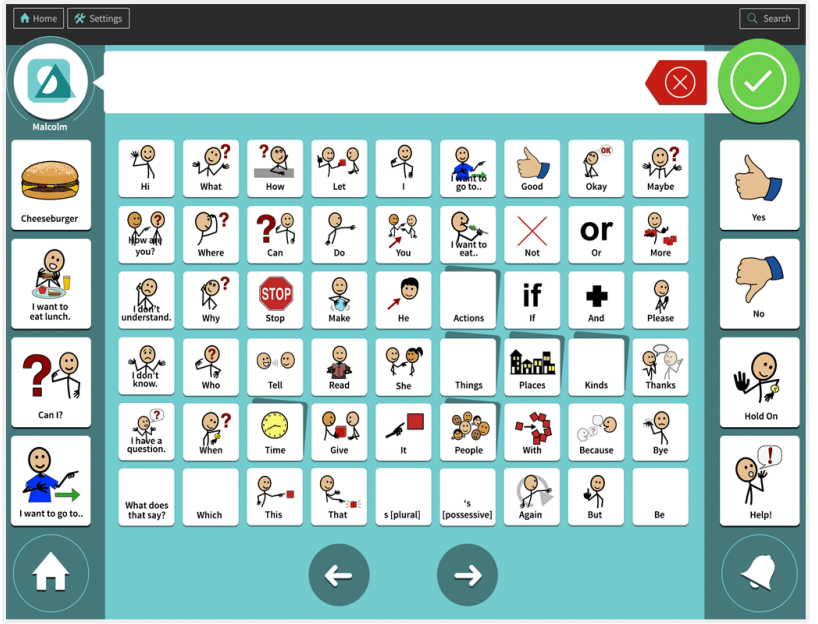
- Applied Behavioral Analysis
- Communication Focused Therapy
  - Apps for Communication
  - Video Modeling
- Peer-Delivered Social Interaction
- Milieu Teaching
- Structured Recess
- Cognitive Behavioral Therapy

Applied Behavioral Analysis

- ABA is one of the most popular known comprehensive treatment and intervention models
- ABA based strategies are used to either increase skills or decrease certain behaviors in the classroom
  - It can be used as a teaching tool, a preventative tool, or a maintenance tool
- ABA shadows are present in class with students in order to use differential forms of reinforcement. assistance. and data collection

Communication Focused Therapy

- Parents can participate in preliminary work with their children in which parents use video aids
  - PACT therapy aims to increase “parental sensitivity and responsiveness to child communication using video feedback methods” (Byford, 2015; 2).
- Many children with ASD learn better by processing visual information (Simmons, 2013; 79).
  - Assistive technology is utilized to promote communication



Communication & Assistive Technology

- The Picture Exchange Communication System (PECS) uses tactile symbols along with words to promote communication
  - The system uses photos, drawings, and pictures of objects for students to associate with something in his or her environment
- Mobile devices have gained popularity in schools because they are “cool”
  - Apps can be downloaded on cell phones and iPads for practical communication solutions
    - Apps can be expensive, and price does not always mean quality

Apps that Aid in Communication

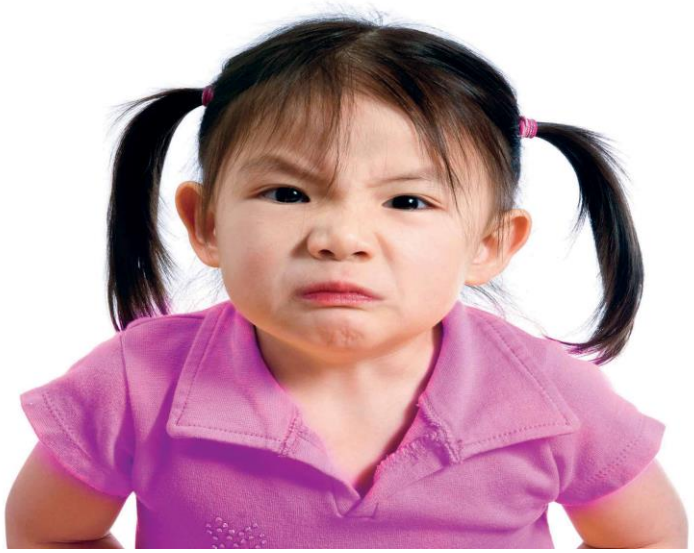
- Appitic is a website that is used as a directory for finding the most beneficial apps for the student
- MyVoice is an app that uses photos and icons to help students who have language difficulties communicate with teachers, classmates, and family members
- Autismate uses visual scenes and video modeling to improve communication and life skills
  - Video modeling can be used for teaching and modifying behavior
    - Students can watch the videos several times and pick up on the techniques

Peer Delivered Social Interaction

- Students with autism rarely interact with general education students unless it is a part of their program (Hughes, 2013;1).
- General education students can participate in buddy systems in which they support classmates with autism and other disabilities to increase their social interaction
- Peers provide behavioral support and communicative interaction with other students, along with assistance without a teacher supervising

Prelinguistic Milieu Teaching

- Children with autism often do not develop appropriate communication skills and often communicate by hand flapping or other challenging behaviors
- PTM is designed to increase the child's use of prelinguistic communication skills
  - Adults make natural prompts and encourage the child to respond through nonverbal means (Franco, 2013;489).



- Communication is something that is learned over time; when parents engage in natural social interaction with their child, the child will learn to respond more accurately
- Nonverbal behaviors that parents should look for are eye gazes, slight vocalizations, and gestures
- PMT can be utilized in play routines

Structured Recess & CBT

- School recess is generally thought of as an unstructured time for children to play, however, it can be made into a structured learning experience for children who have ASD
- Children with ASD are less likely to interact with other students, and more likely to stay close to teachers (Lang, 2011; 1297).
- CBT is well-suited for higher functioning students with autism
  - Rewarding children for participating in non preferred social activities

Lagniappe: If Time Permits. . .

IDEIA 2004

- IDEIA requires individualized education program (IEP) teams to implement positive behavioral interventions and supports whenever behaviors impede their learning or the learning of others.

IDEIA 2004

- A FBA should be conducted whenever a student's behavior significantly interferes with his/her learning or the learning of others to develop an effective IEP that addresses a student's behavioral needs using positive behavioral interventions and supports.

IDEIA 2004 and Louisiana

- In Louisiana, Bulletins 1508 (Pupil Appraisal Handbook) and 1706 (Regulations for Implementation of the Exceptional Children's Act) are to reflect compliance with the amended law.

We know that. . .

- Research clearly demonstrates proactive approaches to addressing behavior are more effective than exclusionary discipline
- Punishment **does not de-escalate behavior**.
  - It is not aligned with the functions of behavior,
  - does not serve to calm the student, and
  - does not teach replacement behaviors.
- To effectively address challenging behaviors in school, we should teach students positive behaviors.

Defining Characteristics of Behavor

- Topography – the “form” the behavior takes
  - E.g., punching, kicking, biting, and throwing objects at someone are all different topographies of aggression

- Function – the “purpose” the behavior serves
- Note: different topographies may all have the same impact on the environment

F(x)= . . .

- There are two basic functions of behavior:
  - Behaviors to get something (such as attention, acceptance, or sensory stimulation); *and*
  - Behaviors to get away from something (such as task avoidance, overstimulation, or escaping from a stressful situation).

Prevention is Key. . .

- Prevention is one of the most important interventions we can employ in addressing student behaviors.

- Focusing on the antecedents allows us the opportunity to shape the behavior before it occurs.

The A. . .

- Antecedents (A): These are the factors which precede and are likely to trigger the target behavior.
  - May include external factors (such as directions, tasks, teacher behavior, peer behavior, or noise level) or
  - internal factors (such as stress or energy level, moods, or mental state).

The B. . .

- Behavior (B): The student's behavior must be identified in clear, observable, and measurable terms.
  - Everyone involved in supporting the student must be able to know what the behavior looks like, feels like, and sounds like, as well as what it doesn't.

The C. . .

- Consequences (C): The consequences are the outcomes following the behavior which hypothetically influences whether the behavior is either more or less likely to occur again in the future.

Conducting a Functional Behavioral Assessment (FBA): Step 1

- The team identifies and defines the problem behavior.
  - Usually first described in vague or nebulous way
  - Team members must agree on a targeted behavior that is. . .
    - Overt
    - Positive
    - Specific
  - Team must agree whether it is a problem with
    - Frequency
    - Intensity
    - Duration
  - Team must decide whether to take baseline data or to estimate

FBA: Step 2

- The team reviews information from various methods . . .
  - Questionnaires
  - Interviews with student, teachers, and others
  - Observations of student in various settings

- Antecedent → Behavior → Consequence

FBA: Step 3

- What is the function?
  - The team carefully examines what they have learned about the behavior and its context in order to determine its function.

- Remember topography is second to function

FBA: Step 4

- The team works to develop a probable explanation of what is maintaining the problematic behavior and what is needed to maintain the desired behavior.
- Develop a behavior intervention plan (BIP) accordingly with collection of data.
- Develop a plan for integrity/fidelity checks

Important Notes at this Step

- Antecedent Focus is Key
  - Setting
  - Setting Events
    - Behaviors of Others (e.g., verbal commands)

- Time In has to be “better” than Time Out

- Consequences are important for study, but need to be minimalized for manipulation

FBA: Step 5

- Collect data and assess the successfulness of the intervention.
- If the intervention is not successful, the team needs to return to an earlier step
- If the intervention is successful, then the team needs to begin problem solving on how to reduce the created supports and allow natural supports to maintain the desired behavior.

Closing Thoughts

- Behavior change is hard. . .
- The proper selection of a behavior can be challenging.
- Keep the process scientific and objective – never personal
- Success of intervention can be subjective.
  - Working Great
  - Not working at all
  - Some Improvement - may need some different problem solving
- None of us are 100%.


time for questions


That's all Folks!

Citations

- Baer, D.M., Wolf, M.M, & Risley, T.R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, I*, 91-97.
- Bowers, K., Lin, P. I., & Erickson, C. (2015). Pharmacogenomic Medicine in Autism: Challenges and Opportunities. *Pediatric Drugs*, *17*(2), 115-124.
- Collingwood, J. (2016). Coping with Atypical Antipsychotic Side Effects. *Psych Central*.
- Cooper, J.O., Heron, T.E., & Heward, W.L. (2007). Applied behavior analysis (2 ed.). Columbus, Oh: Pearson Educational Inc
- Cornelius Habarad, S. M. (2015). The power of the mand: Utilizing the mand repertoire to decrease problem behavior. *Behavioral Development Bulletin*, *20*(2), 158.
- Kaplan, G., & McCracken, J. T. (2012). Psychopharmacology of autism spectrum disorders. *Pediatric Clinics of North America*, *59*(1), 175-187.
- Karim, A. E. A., & Mohammed, A. H. (2015). Effectiveness of sensory integration program in motor skills in children with autism. *Egyptian Journal of Medical Human Genetics*, *16*(4), 375-380.

Citations (cont.)

- Lang, R., Koegel, L. K., Ashbaugh, K., Regester, A., Ence, W., & Smith, W. (2010). Physical exercise and individuals with autism spectrum disorders: A systematic review. *Research in Autism Spectrum Disorders*, *4*(4), 565-576.
- Lang, R., O'Reilly, M., Healy, O., Rispoli, M., Lydon, H., Streusand, W., ... & Didden, R. (2012). Sensory integration therapy for autism spectrum disorders: A systematic review. *Research in Autism Spectrum Disorders*, *6*(3), 1004-1018.
- Leskovec, T. J., Rowles, B. M., & Findling, R. L. (2008). Pharmacological treatment options for autism spectrum disorders in children and adolescents. *Harvard review of psychiatry*, *16*(2), 97-112.
- McPhilemy, C., & Dillenburger, K. (2013). Parents' experiences of applied behaviour analysis (ABA)-based interventions for children diagnosed with autistic spectrum disorder. *British Journal of Special Education*, *40*(4), 154-161.
- Pelios, L., Morren, J., Tesch, D., & Axelrod, S. (1999). THE IMPACT OF FUNCTIONAL ANALYSIS METHODOLOGY ON TREATMENT CHOICE FOR SELF-INJURIOUS AND AGGRESSIVE BEHAVIOR. *Journal of Applied Behavior Analysis*, *32*(2), 185-195.
- Pfeiffer, B. A., Koenig, K., Kinnealey, M., Sheppard, M., & Henderson, L. (2011). Effectiveness of sensory integration interventions in children with autism spectrum disorders: A pilot study. *American Journal of Occupational Therapy*, *65*(1), 76-85.
- Place, M., Dickinson, K., & Reynolds, J. (2015). Do we need norms of fitness for children with autistic spectrum condition?. *British Journal of Special Education*, *42*(2), 199-216.

Citations (cont.)

- Politte, L. C., & McDougle, C. J. (2014). Atypical antipsychotics in the treatment of children and adolescents with pervasive developmental disorders. *Psychopharmacology*, *231*(6), 1023-1036.
- Preis, J., & McKenna, M. (2014). The effects of sensory integration therapy on verbal expression and engagement in children with autism. *International Journal of Therapy & Rehabilitation*, *21*(10).
- Srinivasan, S. M., Pescatello, L. S., & Bhat, A. N. (2014). Current perspectives on physical activity and exercise recommendations for children and adolescents with autism spectrum disorders. *Physical therapy*.
- Tan, B. W., Pooley, J. A., & Speelman, C. P. (2016). A Meta-Analytic Review of the Efficacy of Physical Exercise Interventions on Cognition in Individuals with Autism Spectrum Disorder and ADHD. *Journal of Autism and Developmental Disorders*, *46*(9), 3126-3143.
- Wood, J.J., Fujii, C., Renno, P., & Van Dyke, M. (2014) Impact of cognitive behavioral therapy on observed autism symptom severity during school recess: a preliminary randomized, controlled trial. *Journal of Autism Dev Disorders, 44,* 2264-2276.
- Weiss, M. J., & Delmolino, L. (2006). The relationship between early learning rates and treatment outcome for children with autism receiving intensive home-based applied behavior analysis. *The Behavior Analyst Today*, *7*(1), 96.
- Wu, C., Gau, S. S., & Lai, M. (2014). Long-term antidepressant use and the risk of type 2 diabetes mellitus: A population-based, nested case-control study in Taiwan. *Journal Of Clinical Psychiatry*,*75*(1), 31-38.
- William R. Avison; Jane D. McLeod; Bernice A. Pescosolido (8 January 2007). *Mental Health, Social Mirror. Springer. p. 333. ISBN 978-0-387-36319-6. Retrieved16 September 2012.*
- Zane, T., Davis, C., & Rosswurm, M. (2008). The cost of fad treatments in autism. *Journal of Early and*