AUTISM

Triad of Impairments (Primary Symptoms)

- Social interaction deficits
- Communication deficits
- Restricted, repetitive, stereotyped behaviors and interests

- Impairments in all 3 areas must be present (total 6+ DSM symptoms, with at least 1 in each category)
- Onset before age 3

Triad of Impairments

- Social Interaction Deficits
  - Deficits in joint attention behavior
    - Gestures (e.g., pointing and eye contact) that center the child’s and caregiver’s attention on an object, in order to share an experience
    - Less imitating of actions of others
  - Abnormal processing of social stimuli
    - Impaired facial recognition, matching emotions to facial expressions, and memorizing faces
    - Lack of social reciprocity
    - Lack understanding of social cues

- Communication Deficits (verbal and nonverbal)
  - Mutism (30% never develop spoken language)
  - Delayed and abnormal language development
    - Babbling and verbalizations may be abnormal in tone, pitch, & rhythm
  - Echolalia
    - Pronoun reversals
      - Child refers to self as He, she, them, you
      - Child refers to others as I or me
  - Poor pragmatics (social use of language)
    - Irrelevant details, inappropriate topic shifts,
    - Disregard of reciprocity in conversation
  - Hyperlexia (extraordinary single-word reading but poor reading comprehension)

- Restricted behavior and interests
  - Stereotyped behaviors
    - Rocking, walking on toes, whirling, and arm/hand/finger flapping (more frequent and severe vs. TDC)
    - More common in younger children with autism
  - Unusual preoccupations/obsessions with aspects of the environment
    - Obsession with particular object, numbers, etc.
    - More common in older children/adolescents with autism
  - Inflexible adherence to routines/rituals
    - Minor changes are very upsetting

Associated (Secondary) Impairments

- Sensory/perceptual
  - Oversensitivity to stimuli (may be more common)
    - Fail to respond to sounds, verbal communication, sight of others, etc.
  - Undersensitivity
    - "Stuck" on particular stimulus while ignoring competing stimuli
    - e.g., obsessive attention paid to a particular toy, piece of paper, etc.

- Intellectual problems
  - 70% to 75% show MR
  - Higher IQ (>70) associated with better prognosis
    - Less severe autistic symptoms, improved educational outcomes, increased likelihood of functioning within normal limits in later life
  - Deficits in abstract and conceptual thinking, language, and social understanding
  - Strengths in rote learning, rote memory, and visual-spatial skills

- Small minority:
  - Splinter skills
  - Savant skills
  - No known explanation
Associated (Secondary) Impairments

- Adaptive behavior deficits
  - Self-help and daily living skills → Within normal limits
  - Communication skills → somewhat impaired
  - Social skills → far below normal levels

- Other features (none pathognomonic to autism)
  - Motor problems
    - Poor balance, uncoordinated gait, motor awkwardness in adolescence
    - But, gracefulness and bodily agility also reported
  - Behavioral problems
    - Tantrums, aggression, hyperactivity, SIB
  - Related to frustration and inability to communicate through language?
  - Affective symptoms (adolescence)
    - Shifting in mood, fear and anxiety, and depression

Developmental Course

- Average age of diagnosis 5.5 years of age
- Developmental course quite variable
  - Subgroups:
    - Always seem different (qualitative vs quantitative)
    - Develop normally for awhile then fail to meet developmental milestones
    - Normal development until 1.5, then regressed and displayed qualitatively different development
    - Stopped: gazing at others, orienting to their names, spontaneously imitating others, and using meaningful words

- Better prognosis with higher IQ (>70), better verbal skills and early intervention
- Poor prognosis for IQ<50 or no communicative language by age 5-6
- 15% achieve independence

Underlying Cognitive Deficits in Autism

- Theory of mind
  - We understand that mental states exist – that humans have desires, intentions, beliefs, and so forth – and that these mental states are connected to action
  - ToM: the ability to infer mental states in others and in oneself
    - “I have a brain, you have a brain, and they’re different”
    - Typical development:
      - First-order abilities by age 3-4
      - Second-order abilities by age 6 (can think about another person’s thinking about a 3rd person)
  - Sally-Anne task
  - Faux pas test

Underlying Cognitive Deficits in Autism

- Weak central coherence
  - Central coherence – use of context to weave together bits of information to make a whole (give global meaning)
  - Ability varies from strong to weak in general population
  - Children with autism: “see the trees rather than the forest” (tend to focus on parts of stimuli rather than on integrating information into wholes)
  - Strength on block design tasks vs. TDC

- Executive dysfunction

Underlying Cognitive Deficits in Autism

- Executive dysfunction
  - Executive functions: planning, cognitive flexibility, abstract thinking, rule acquisition, initiating appropriate actions, inhibiting inappropriate actions, and selecting relevant sensory information
  - Children, adolescents, & adults perform worse vs. control groups, BUT
  - Deficits do not exist in late preschool aged children, THEREFORE
  - EDs not likely to be primary deficits in autism
  - Develop secondarily

Neurobiological Abnormalities

- Large brain size in toddlers (+5%-10%)
  - Not present at birth
  - Atypical growth spurt occurs soon afterward and then levels off
  - Brain reaches maximum size by age 4-5 (much earlier than usual)
  - Unguided growth → excessive brain connections → inefficient processing?

- Most consistently implicated: Temporal lobe-limbic system, frontal lobes, & cerebellum
  - Decreased number and size of cells, high cell density, less dendritic branching, & abnormal cell migration
  - Decreased inhibition of brain activity → widespread behavioral and cognitive problems
  - May develop prenatally
  - Reduced activity in frontal lobes, limbic system, amygdala
Epidemiology

- Prevalence rate increasing
  - 1966-1991: 4.4 per 10,000
  - 1992-2001: 12.7 per 10,000
- Factors
  - True increase in prevalence? Vaccines?
  - Broader criteria
  - Earlier diagnosis
    - Due to understanding of disorder and better screening/diagnostic tests
    - Better identification → increased awareness (parents and physicians)
  - May be related to IDEA and SSD
- Incentive to acquire diagnosis
  - Previously may have instead MR or LD diagnosis
- More prevalent in males (4:1 boys:girls)
- Autism without MR – 6:1 boys:girls
- Unrelated to social class
  - Previously thought to affect upper class more often (non-representative samples)

Etiology

- Parenting causes autism? (no)
  - Refrigerator mother - debunked
- Birth complications
- Medical conditions
  - 10% of cases: cerebral palsy, infections such as meningitis, hearing impairment
  - 25% have seizure disorders (disproportionately early childhood and adolescent onset)
- Genetic conditions
  - Fragile X
  - Tuberculous sclerosis
    - Caused by inherited or new gene mutations
    - Growth of tumors in the brain and other organs
  - Viment, effects, inc. developmental delays, behavior problems, autism
- Exposure to toxins/infections in the womb (2nd trimester in particular)
- Vaccines
  - Research has not supported a causal role of vaccines in autism
    - e.g., prevalence rates continued to increase after mercury discontinued as preservative

<table>
<thead>
<tr>
<th>Feature</th>
<th>Autism</th>
<th>Asperger's Disorder</th>
<th>Childhood Disintegrative Disorder</th>
<th>PDD NOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at recognition (mo.)</td>
<td>0-36</td>
<td>Usually &gt; 36</td>
<td>5-30</td>
<td>&gt; 24</td>
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<tr>
<td>Prevalence</td>
<td>1,000</td>
<td>Unknown</td>
<td>1,100,000 - 22,000</td>
<td>Unknown</td>
</tr>
<tr>
<td>Gender</td>
<td>M:F</td>
<td>M:F</td>
<td>Female (M?)</td>
<td>M:F</td>
</tr>
<tr>
<td>Loss of skills</td>
<td>Variable</td>
<td>No</td>
<td>Marked</td>
<td>Usually not</td>
</tr>
<tr>
<td>Social skills</td>
<td>Poor</td>
<td>Poor</td>
<td>Marked</td>
<td>Variable</td>
</tr>
<tr>
<td>Comm. skills</td>
<td>Usually poor</td>
<td>Fair</td>
<td>Very poor</td>
<td>Poor to fair</td>
</tr>
<tr>
<td>Circumscribed interests</td>
<td>Variable</td>
<td>Marked</td>
<td>N/A</td>
<td>Variable</td>
</tr>
<tr>
<td>Family history</td>
<td>Sometimes</td>
<td>Unusually</td>
<td>Not usually</td>
<td>No</td>
</tr>
<tr>
<td>Seizure D/O</td>
<td>Common</td>
<td>Uncommon</td>
<td>Frequent</td>
<td>Uncommon</td>
</tr>
<tr>
<td>Head growth decelerates</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>IQ range</td>
<td>Severe MR</td>
<td>Mild-MR to normal</td>
<td>Severe MR</td>
<td>Severe MR to normal</td>
</tr>
<tr>
<td>Outcome</td>
<td>Poor to fair</td>
<td>Fair to good</td>
<td>Very poor</td>
<td>Poor to fair</td>
</tr>
</tbody>
</table>

Other Pervasive Developmental Disorders

- Asperger’s Disorder
  - Deficits in social interaction
  - Some interest in others; marked loneliness
  - Stereotyped behavior
  - Obsessive and restrictive interests (facts)
  - No language delays
  - No cognitive delays
  - May have behavioral problems (noncompliance, negativism, & aggression)
  - Prognosis more favorable than other PDD
  - Distinguishing from high functioning autism has been difficult ⇒ “autism spectrum disorders”

Rett’s Disorder

- Normal development for first months of life
- Distinctive regression (loss of previous developmental gains)
  - Head growth decelerates
  - Hand skills lost → subsequent stereotyped hand movements
  - Poorly coordinated gait
  - Social engagement lost
  - Language severely impaired
  - Severe/profound retardation develops
  - More common in females
  - Linked to specific area on X chromosome that regulates other genes
  - More negative outcome than autism
    - Interest in social interaction may increase somewhat during childhood and adolescence
    - Communicative and behavioral problems remain relatively stable
    - Progressive loss of skills

Childhood Disintegrative Disorder

- Normal development for at least 2 years
- Deterioration begins before age 10 (onset usually between ages 3-4)
- Significant loss in at least 2 areas: language, social skills, bowel/bladder control, play, or motor skills
- Usually associated with severe MR
- Abnormal brain waves common
- More severe than autism
  - Mutation more likely
  - Loss of self-help skills
  - IQ < 40
  - Lowest functioning of PDDs
Other Pervasive Developmental Disorders

PDD NOS
Child fails to meet criteria for other disorders but has problems with social interaction and either impaired communication or stereotyped behavior
Some believe these disorders may be better understood as a spectrum rather than distinct categories - hence the term autism spectrum disorders

Identification and Prevention
• “Universal prevention”
  • Prenatal care
  • Environmental quality
• Early identification is key to prognosis
  • American Academy of Pediatrics: "wait and see" approach is to be avoided
  • Significant improvement/normalization likely if intensive treatment begun before age 4

Autism treatment: well-established facts (Schreibman, 2000)
• Intensive treatments can be extremely effective
  - Lovaas: 40 hrs/wk for 3 yrs beginning before age 4
  - >90% approach normal functioning; indistinguishable from TDC to blind observers in classroom
  - IQ 30 points, higher educational placement vs. 10 hrs/wk and no treatment
  - No differences between 10 hrs/wk treatment and no treatment conditions
• Intervention when children are very young → significant gains
  - Before age 4
• Effective treatments are associated with carefully controlled learning situations
• Must use techniques to promote generalization and maintenance of acquired learning (e.g., parent training, naturalistic teaching)
• Children are more likely to generalize and maintain their learning when parents are trained to be major treatment providers
• A great deal of variation exists in outcome – different children may benefit from different approaches

DTT & Incidental Teaching
• Discrete trial training
  • Clinician selects task to be learned and provides clear directives, prompts, and consequences for appropriate behavior
• Incidental teaching
  • Informal; less structured
  • More likely to be initiated by the child, amidst everyday contexts
  • e.g., child’s request for a toy used as an opportunity for teaching

Intervention
Pharmacological treatment
• Atypical antipsychotics used to improve behavior
  • Side effects
    • Stimulant medication, can help, higher likelihood of side effects in this population
Behavioral interventions
• Pivotal Response Training (target core, pivotal behaviors that when improved may improve other behaviors as well)
• Lovaas-Young Autism Project ***
• TEACCH (psychoeducational)
Programs should:
  • Be intensive, start early, be carefully controlled/systematic, promote generalization, involve parents, be flexible

<table>
<thead>
<tr>
<th>Stage</th>
<th>Length</th>
<th>Teaching methods</th>
<th>Goals (Examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishing a teaching relationship</td>
<td>~ 2-4 weeks</td>
<td>Discrete trial training</td>
<td>Following directions such as “sit” or “come here”, reducing interfering behaviors such as tantrums</td>
</tr>
<tr>
<td>Teaching foundational skills</td>
<td>~ 1-4 months</td>
<td>Discrete trial training</td>
<td>Imitating gross motor actions, identifying objects, dressing, beginning play with toys</td>
</tr>
<tr>
<td>Beginning communication</td>
<td>&gt; 6+ months</td>
<td>Discrete trial training</td>
<td>Imitating speech sounds, expressively labeling objects, receptively identifying actions and pictures, expanding self-help and play skills</td>
</tr>
<tr>
<td>Expanding communication, beginning peer interactions</td>
<td>~ 12 months</td>
<td>Discrete trial training, incidental teaching</td>
<td>Labeling colors and shapes, beginning language concepts such as big/little and yes/no, beginning sentencess such as “I see –”, beginning pretend play and peer interaction</td>
</tr>
<tr>
<td>Advanced communication, adjusting to school</td>
<td>~ 12 months</td>
<td>Discrete trial training, incidental teaching, Small group, regular education preschool</td>
<td>Conversing with others, describing objects and events, comprehending stories, understanding perspective of others, working independently, helping with chores</td>
</tr>
</tbody>
</table>