## An Introduction to Autism and the Autism Spectrum

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## Overview

- **What is autism?**
- **Treatment and outcome**
- **Legal issues**
  - Getting services
  - Legal system involvement
- **Research**

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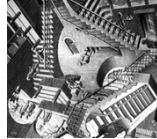
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## What is autism?

- **Autism is first and foremost a**
  - SOCIAL LEARNING DISABILITY
- **It shares many features with other disabilities**
  - In general people don't 'outgrow' it
  - It can be tremendously helped (often)
    - With appropriate supports and realization of what needs and vulnerabilities are
- **It differs from other disabilities given its early onset and pervasive effects**

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## The Changing Face of Autism

- **Autism is a moving target!**
  - Autism then and now
    - Once thought rare, now common
  - Early confusion about what it was
  - First cases probably 'feral' or 'wild' children
  - First described in 1943
    - Not officially recognized until 1980
  - Outcome changing due to
    - Mandates for service in US
    - Earlier diagnosis
    - Earlier 'better intervetnion

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## Leo Kanner (1943): Early Infantile Autism

Reported 11 cases
Two  Essential Features
- Autism
- Resistance to change

Congenital in nature
Developmental Issues
False leads:
    SES
    IQ
    Schizophrenia

Leo Kanner, 1894-1981

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## Asperger - 1944

- **Series of cases - all male**
- **Marked social problems**
- **Good cognitive/language**
- **Motor problems**
- **Circumscribed interests**
- **+ Family Hx (esp.  fathers)**
- **"Autistic Psychopathy"/ Autistic personality disorder**

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## Normative social development

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## Can you find the neurotypical?
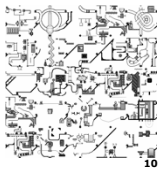
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## Implications:
### If you have a social 'frame'

- You first and foremost are a 'people person'
- You take your lead from looking at others
  - What are they looking at, what are they feeling (face), how are they responding, how should you respond?
  - You become very good at 'multi-tasking' – ie organization skills are good since you must integrated visual, auditory (verbal and nonverbal vocal) input given context, people involved etc. etc. etc.
  - As a result – by the time you are a year or so of age you are very adapt in the social game and 'playing' in it constantly

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## If you DON'T have the social frame – everything matters!

- **Interest in nonsocial world**
- **Failure in social orientation**
  - Meaning sought thru environment
  - Consistency and stability and
  - Contingency!
  - Sensory responsiveness
  - Gestalt learning style
  - Difficulties in multitasking
- **What are some of the**
- **Specific processes**

## Changes in understanding I

- **1950's to 1970's**
  - Parents blamed, psychotherapy used
- **1970's**
  - Strong BRAIN connection
  - Strong GENETIC connection
  - Structured teaching better than unstructured psychotherapy
  - First schools/programs started
- **PL 94-142 passed**
  - Children had right to free and appropriate education

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## Changes in understanding II

- **1980**
  - Official recognition, research increased,
  - Model treatment program
- **1990s**
  - Research & programs increased
  - Explosion of research
    - Practice guidelines
    - Focus on evidence based treatments with 2001 National Research Council Report

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## Changes in understanding III

- **2000 to present (cont'd)**
  - More active advocacy
  - Parent support groups, foundations
  - Increased public awareness
- **Increasing body of work on evidence based interventions**
- **Some integration of research into practice (several practice guidelines)**
- **Emphasis on screening**
  - But tendency to overlook research in older children, adolescents, and adults

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## Autism Interventions

- **Intervention 1950-1980**
  - psychodynamic models – AKA blame the parents
  - Only a minority (maybe 20%) of children went to school, most 'written off'
- **PL 94-142 (1975)**
  - Mandate for school as a right
  - Beginning of a shift in treatment
- **Importance of planned, intensive intervention to cope with social difficulties➔**

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## Model Programs

- **Background**
- **NRC report**
  - Structured intensive intervention
  - Commonalities (and differences) in programs
  - NOT every child gets better
  - As a group improved/improving outcomes
  - Early intervention
- **Some interesting issues**
  - University based/affiliated
  - Intensive
    - Average about 25 hours a week

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## Model programs
note: evidence base varies!

- **ABA – based on learning research**
  - Many papers (case studies)
- **Develop[mental Models**
  - Rogers – Denver/Early Start model
  - Greenspan – Floor time
- **Pivotal Response –**
  - Koegel – hybrid methods
- **Eclectic models**
  - TEACCH
- **Many similarities and some differences**

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## Contributions from/to Development

Autism

Development

Autism has an impact on development
Development has an impact on Autism

## Developmental issues in treatment

Autism

Development

Minimize the impact of autism
Maximize developmental gains

## Outcome – two snapshots

First studies

Next wave!

Data adapted from Howlin, 2005
Good: independent, Fair: Semi-independent
Poor: 24/7 care

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## Legal issues

- **Arise in numerous ways**
  - School entitlements & Accommodations
  - Legal system involvement
    - Victims
    - Perpetrators
    - Bystanders
  - Bullying
  - Sometimes disorder not recognized!

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## Sources of Legal involvement

- **Victim, occasionally criminal, witness**
- **Risks**
  - Socially vulnerable/suggestive
  - Can be overly focused/rigid with RULES!
    - Paradoxically you have to make exceptions all the time!
  - Minor problem→ trouble
    - Over talking, inappropriate behavior, preoccupations, curiosity
    - Desire for relationships

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## School entitlements & accommodations

- **For children - IDEA**
  - <3 years – birth to 3
  - >3 free and appropriate education
  - Connecticut has a wide range of resources
    - Public schools, special schools
    - Tremendous Variability!
- **For adolescents and adults**
  - Transition planning in high school
  - With adulthood a new law applies – ADA

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## Legal system involvement

- **Note limitations of literature**
  - Mostly relies on case reports
  - Some evidence for 7 X increase risk
    - What leads to problems
      - Rigidities, sensitivities, unusual interests combined with social processing problems
      - Often limited awareness of police and emergency personnel
      - Students can also be victims of crimes
      - Overtrusting and want engagement→ easily misled and tricked

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## Other legal issues

- **Transitions in the law in US (school→ post secondary)  (IDEA → ADA)**
- **Health insurance issues**
- **Issues in terms of who is responsible**
  - Variations between states
  - Importance of planning
  - Common mistakes/missteps
    - Assumptions about guardianship
    - Assumptions about role of siblings
    - Simply giving $ may not be so simple!

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## Bullying

- **Considerable variation world wide**
  - In US about 20% (bullied/bullier/both)
  - With ASD that risk is probably at least doubled (to 40%)
  - With ASD and another problem – 70%
  - What leads to bullying
    - Social isolation, special interests, lack of social intuition and rigidity
    - Importance of school and medical involvement

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## Case example

- **Please take a guess as to what the next page of equations is about!**

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## Can you guess this man's special interest?



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## Slide 29

### Can you guess this man's special interest?
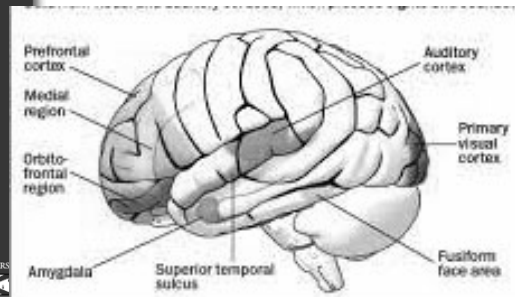
## Slide 30

### Integrating research on social development with autism treatment

- **Growing body of work on social brain**
  - Over past decade and a half
  - Using different methods
    - EEG, eye tracking, fMRI
    - Appreciation of developmental factors
- **Development of models for understanding how early social difficulties lead to the host of difficulties seen in autism**

## Slide 31

### Typical Early Social Development

- **Probably starts in utero**
  - Babies listen to mother's voice
- **At time of birth babies are VERY social**
  - The parents' face and voice are the most interesting things in the world and babies will look more at face like things!
  - They become interested in what people are doing, feeling, and communicating
  - All this comes without formal training and sets stage for language development and further learning

## Slide 32

### Circuitry of the Social Brain
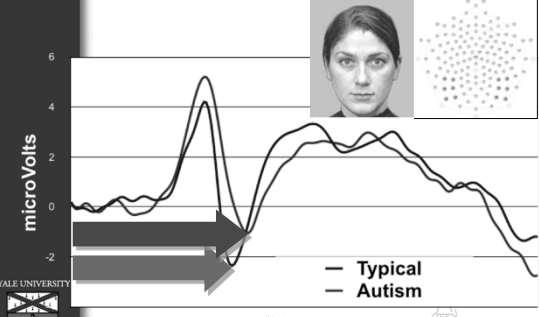
## Event-related potentials (ERPs)

Electric neural activity (EEG) recorded at scalp, **time-locked** to perceptual events to reveal evoked brain response

- **Appropriate for range of cognitive and developmental levels**
- *Millisecond* temporal resolution
  - Efficiency
  - Stages of processing
- **Economical**
- **Scalable**
- **Yields indices of social perception across lifespan**

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## ERPs and faces: Autism



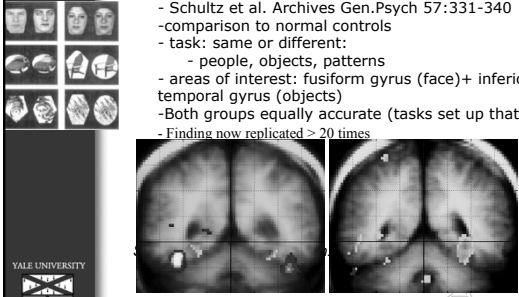Typical negative 'dip' at 170 milliseconds
But delayed and less deep in autism

— Typical
— Autism

*McPartland, Dawson, Webb, Panagiotides & Carver, 2004*

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## Face Discrimination

fMRI study
- Schultz et al. Archives Gen.Psych 57:331-340
- comparison to normal controls
- task: same or different:
  - people, objects, patterns
- areas of interest: fusiform gyrus (face)+ inferior temporal gyrus (objects)
- Both groups equally accurate (tasks set up that way)
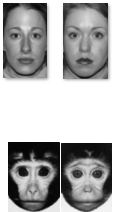- Finding now replicated > 20 times

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## Face Recognition: Normal Development

- **Birth: preferential interest in face/ voice, top ½ face,**
- **2-3 months: face recognition (internal features)**
- **6 months: inversion effect, gender discrimination**
- **9 months: strong stranger response, species effects**
- **Subsequent changes in strategies with greater expertise as children become older**

## Face Recognition in Autism

- **Large literature on different approaches used by individuals with autism**
  - Do not do well on normed facial recognition tasks
  - Do as well recognizing inverted faces as correctly oriented ones
  - Rely less on salient features of face for recognition (e.g., may focus on other characteristics)
- **Limitations: use of still faces**

## If you have a social 'frame'

  - You first and foremost are a 'people person'
  - You take your lead from looking at others
    - What are they looking at, what are they feeling (face), how are they responding, how should you respond?
    - You become very good at 'multi-tasking' – ie organized skills are good since you must integrated visual, auditory (verbal and nonverbal vocal) input given context, people involved etc. etc. etc.
    - As a results – by the time you are a year or so of age you are very adapt in the social work and 'playing' in it constantly

## Put another way!

- **If you come into the world (like most of us) with a social 'frame' to view it many things happen!**
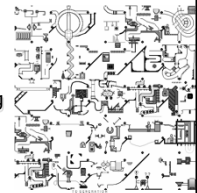  - People are the center!
  - Joint attention
  - Affective development
  - Desire to communicate
  - People become THE most important things in the world (starting with parents)!

## If you DON'T have the social frame – everything matters!

- **Interest in nonsocial world**
- **Failure in social orientation**
  - Meaning sought thru environment
    - Consistency, stability and contingency!
  - Gestalt learning style
  - Difficulties in multitasking
  - Lack joint attention
  - Limited incidental learning
  - Persisting odd sounds
  - `

## Slide 1 — Eye tracking research

**Eye tracking research**

- **Ecological validity**
  - Viewing the world with new eyes
  - 1st paper (Klin et al, Am J Psych 159:895-908
    - Typical viewer and individual with autism
  - 2nd paper groups (Klin et al., Arch J Psychiat59:809-816)
    - Effect size for eyes Cohen's d = 3.81

| | Autism Group | Normal Controls | t values |
|---|---|---|---|
| mouth | 41.21 (14.97) | 21.18 (12.12) | 4.026, p <.000 |
| eyes | 24.63 (6.07) | 65.44 (12.78) | -10.455, p <.000 |
| body | 24.57 (12.41) | 9.65 (5.74) | 4.226, p <.000 |
| object | 9.58 (6.46) | 3.71 (2.44) | 3.286, p <.003 |

values given as percent time **mean** (standard deviation)

Viewer with Autism
Typically Developing Viewer

## Slide 2 — Focus on mouths vs. focus on eyes

**Focus on mouths vs. focus on eyes ➔ lose about 90% relevant information**



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## Slide 3 — Brain changes with treatment

**Brain changes with treatment**
Voos et al. JADD 43:1-10

- Used Pivotal response treatment (PRT)
  - Evidence based treatment with developmental and behavioral emphasis
  - Studies two children with ASD (first in a larger series)
  - Used fMRI, eye tracking, EEG, developmental and dx measures
  - Baseline, 4 months
- **Larger Case series now published**
- Results
  - Significant gains:
    - communication,
    - behavior,
    - social interaction
  - Changes in biologically based measures – shift to
    - More typical fMRI in response to biological motion perception and in social brain regions
    - More typical EEG response to utilized by typically developing children.

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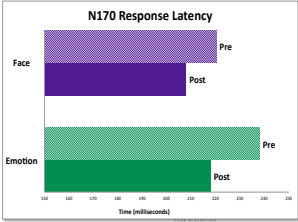46

## Slide 4 — Figure 1



**Figure 1.** PRT conducted by the PI in our Center.

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## Enhanced efficiency after PRT – EEG data n170

Pre vs. post-**treatment comparison shows** faster response to:
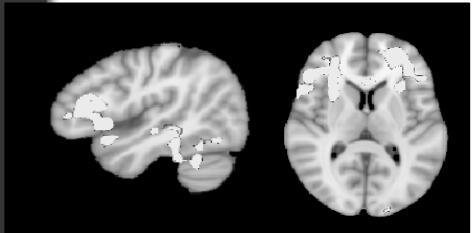
- Faces
- Emotional expressions

**N170 Response Latency**

neutral

fear

Face — Pre / Post
Emotion — Pre / Post

Time (milliseconds)

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## Brain Activity Pre vs. Post PRT

Whole brain analysis with 5 participants:
- LvlPFC (state), vmPFC (state), RpSTS (state), RFG (state/trait), LdlPFC (trait)

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## Social Policy issues:

- **Little work on the 50 state wide experiments!**
- **Translating results from research studies into practical applications**
- **Challenges of getting quality info to parents**
  - As of last week type autism into Google:
    - >25,000,000 hits
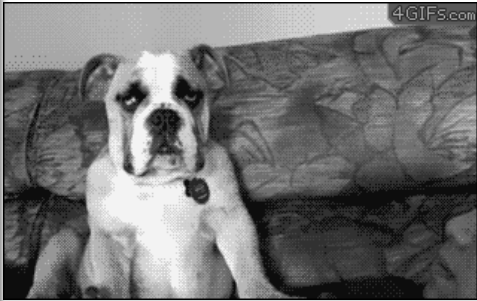
Internet use over 24 hours➔

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- Howlin, P. & Moss (2012) Adults with autism spectrum disorders. Canadian Journal of Psychiatry, 57 (5), 275–283.

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