

Making Sense of Autistic Spectrum Disorders

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Outline

Clinical Features and Natural History of ASD [8:30 -10:30 a.m.]

- Leo Kanner's lasting contributions
- Degrees of Atypicality (ASD in one dimension)
- Non-verbal IQ (ASD in 2 dimensions)
- Atypicality, Age, and IQ: ASD in 3D
- Progression of therapies tied to Natural History

Break [10:15-10:30]

Etiology, Epidemiology, and Quackery [10:30-12:00]

- The autism "explosion": Where did it come from, what does it mean?
- Impact of DSM5
- Causes of ASD: Proven, unproven, and disproven
- Genetics, and why you should care about it
- The signs and symptoms of quackery

LUNCH [12-1:00]

Outline

Neuropsychiatric and Neuropsychological Co-Morbidity [1:00 – 2:30]

- Cognitive Rigidity: Internalizing and externalizing behaviors
- Dysregulation of attention
- Dysregulation of arousal
- Dysregulation of mood
- Behaviorism: Its utility and its limits
- Positive Behavior Support for internalizing behavior
- Psychopharmacology for the non-physician

Break [2:30 – 2:45]

Long-Term Outcome [2:45-4:15]

- ASD as one phase in a continually evolving, lifelong neurological syndrome
- Shift from DD to Mental Health paradigm
- Family function / dysfunction: The elephant in the room
- Proposed care model

Summary / Open Q&A [4:15 - 5:00]

Disclosures

- Dr. Coplan is author of *Making Sense of Autistic Spectrum Disorders: Create the brightest future for your child with the best treatment options* (Bantam-Dell, 2010), and receives royalties on its sale



- This presentation will include a discussion of off-label drug use

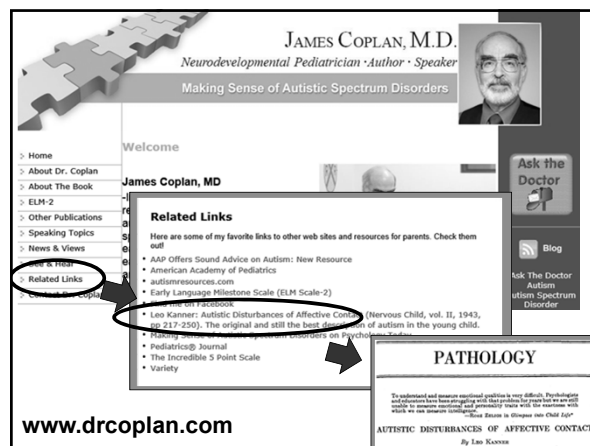
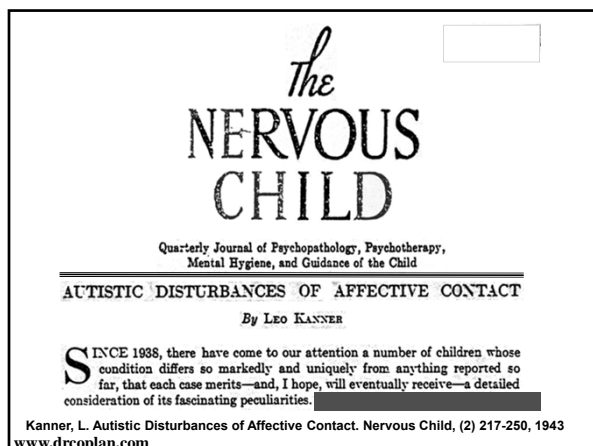
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Kanner, 1943

- **N = 11 (M 8; F 3)**
- **Age: 2 to 8 yr.**
- **Symptoms in four domains:**
 1. **Impaired socialization**
 2. **Idiosyncratic language**
 3. **Repetitious behaviors**
 4. **Unusual responses to sensory stimuli**

Kanner, L. Autistic Disturbances of Affective Contact. Nervous Child, (2) 217-250, 1943
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Impaired Socialization

- **“Aloof”**
- **“Withdrawn”**
- **Limited eye contact**
- **Indifferent to others**

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Impaired Socialization “In his own little world”



Age: 22 months. Nonverbal. CARS=44.
www.drcoplan.com MRN 11-0741

Idiosyncratic Language

- **Echolalia**
- **Delayed Echolalia**
- **Pronoun Reversal**
- **Odd inflection**

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Repetitious Behaviors

- Rigid Routines
- Stereotypies
- Lining up / spinning objects

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Unusual sensory responses

- “Petrified of vacuum cleaner”
- Drawn to, or afraid of, spinning objects
- Mouthing behavior
- Ingesting inedible materials
- Food selectivity

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It is not easy to evaluate the fact that all of our patients have come of highly intelligent parents. This much is certain, that there is a great deal of obsessiveness in the family background. The very detailed diaries and reports and the frequent remembrance, after several years, that the children had learned to recite twenty-five questions and answers of the Presbyterian Catechism, to sing thirty-seven nursery songs, or to discriminate between eighteen symphonies, furnish a telling illustration of parental obsessiveness.

One other fact stands out prominently. In the whole group, there are very few really warmhearted fathers and mothers. For the most part, the parents, grandparents, and collaterals are persons strongly preoccupied with abstractions of a scientific, literary, or artistic nature, and limited in genuine interest in people. Even some of the happiest marriages are rather cold and formal affairs. Three of the marriages were dismal failures. The question arises whether or to what extent this fact has contributed to the condition of the children. The children's aloneness from the beginning of life makes it difficult to attribute the whole picture exclusively to the type of the early parental relations with our patients.

We must, then, assume that these children have come into the world with innate inability to form the usual, biologically provided affective contact with people, just as other children come into the world with innate physical or intellectual handicaps. If this assumption is correct, a further study of our children may help to furnish concrete criteria regarding the still diffuse notions about the constitutional components of emotional reactivity. For here we seem to have pure-culture examples of *inborn autistic disturbances of affective contact*.*

Kanner, 1938 → 1943

- Gradual improvement in early childhood
 - Social skills
 - Language
 - Cognitive flexibility
 - Sensory Aversions

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Kanner, 1938 → 1943

“Between the ages of 5 and 6 years, they gradually abandon echolalia and learn spontaneously to use personal pronouns.

“Language becomes more communicative, at first in the sense of a question-and-answer exercise, and then in the sense of greater spontaneity of sentence formation....

Kanner, L. Autistic Disturbances of Affective Contact. *Nervous Child*, (2) 217-250, 1943

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Kanner, 1938 → 1943

“Food is accepted without difficulty. Noises and motions are tolerated more than previously. The panic tantrums subside. The repetitiousness assumes the form of obsessive preoccupations...

Kanner, L. Autistic Disturbances of Affective Contact. Nervous Child, (2) 217-250, 1943

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Kanner, 1938 → 1943

“Reading skill is acquired quickly, but the children read monotonously, and a story or a moving picture is experienced in unrelated portions rather than in its coherent totality...*

* “Central coherence”

Kanner, L. Autistic Disturbances of Affective Contact. Nervous Child, (2) 217-250, 1943

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Kanner, 1938 → 1943

“Between the ages of 6 and 8, the children begin to play in a group, still never with the other members of the group, but at least on the periphery alongside the group.

Kanner, L. Autistic Disturbances of Affective Contact. Nervous Child, (2) 217-250, 1943

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Kanner, 1938 → 1943

“People are included in the child's world to the extent to which they satisfy his needs...

Kanner, L. Autistic Disturbances of Affective Contact. Nervous Child, (2) 217-250, 1943

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Kanner, 1938 → 1943

All of this makes the family feel that, in spite of recognized ‘difference’ from other children, there is progress and improvement.

Leo Kanner, 1943

Kanner, L. Autistic Disturbances of Affective Contact. Nervous Child, (2) 217-250, 1943

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Kanner, 1971

- Deceased: 1
- Lost to follow-up: 2
- Institutionalized: 5
- Living on work farm: 1
- Living at home: 2
 - BA degree / bank teller
 - Sheltered workshop / machine operator

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**Natural History: “The temporal course
a disease from onset to resolution”**

Center for Disease Control & Prevention

ASD has a Natural History

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Kanner’s contributions

- **Clinical Description**
 - Social, Language, Repetitious behavior, & Sensory aversions / attractions
- Described the *Natural History* of improvement over time (irrespective of treatment)
- Attribution: An “inborn disturbance of affective contact”

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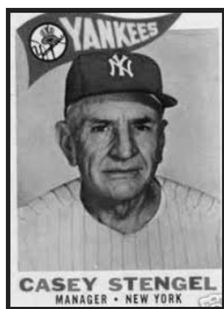


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“Line up alphabetically by height”

**Quantifying severity of ASD,
and changes over time**



Clinical Domain	Decreasing Atypicality → Increasing Age →		
	Severe / Youngest	Moderate / Older	Mild / Older
• Social			
• Language			
• Repetitious Behavior			
• Sensory			

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Social Interaction

“Our child is *among* us, but not *with* us.”

Parent of a 4 year old with ASD

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Clinical Domain ↓	Decreasing Atypicality / Increasing Age ⇒		
	Severe / Youngest	Moderate / Older	Mild / Older
1. Social Interaction	<ul style="list-style-type: none"> •No eye contact •No physical affection •Cannot be engaged in imitative tasks 	<ul style="list-style-type: none"> •Intermittent eye contact •Seeks affection "on his own terms" •May invade personal space of others (not true affection) •Engageable in imitative tasks, although with difficulty 	<ul style="list-style-type: none"> •Good eye contact •Shows interest in others, but often does not know how to join in •Easily engaged in imitative activities •Rigid; has difficulty if perceives that rules have been broken •Difficulty with "Theory of Mind" tasks

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Theory of Mind



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Theory of Mind

- Realization that other people have an internal mental & emotional state, different from one's own
- Ability to gauge the internal mental & emotional state of others
 - Able to infer motives & predict behavior of others
 - Empathy
 - Humor

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Theory of Mind



*How does the boy feel?
Why?*

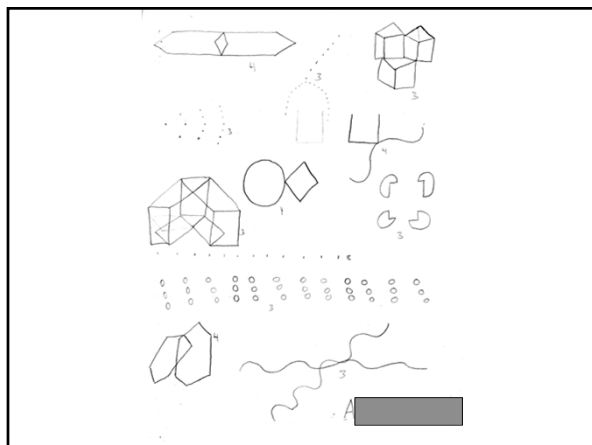
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Theory of Mind



*Q: How does the boy feel?
A: "I don't know, because I can't see his mouth."*

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Eye Contact

- 15 y.o. boy, normal IQ, no SDI; referred for eval. of possible reading disability.
- Does not look up after each Bender card.

*Q: "Did you know that there are two ways
you can tell me you're done: Say 'done,' or
look up?"*

A: "No, no one ever taught me that."

Eye Contact

*Q: How am I supposed to know when you're ready
for another card?*

A: Because my pencil has stopped moving?

Q: Why is it important to look up after each card?

A: To see if I got the right answer?

Q: When you look up, what does that tell me?

A: That I'm paying attention?

Theory of Mind

Muff

Muff is a little yellow kitten.
She drinks milk.
She sleeps on a chair.
She does not like to get wet.

Q: How would Muff feel, if you gave her a bath?

A: Clean!

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Theory of Mind



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Theory of Mind

"Draw a picture of your family, with everybody doing something."



A.W.: 10 year old boy with ASD and normal IQ (MRN 11-07710)

Theory of Mind

"Draw a picture of your family, with everybody doing something."



A.W.: 10 year old boy with ASD and normal IQ (MRN 11-07710)



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Language

"My child talks, but he doesn't communicate."

Mother of a 3 year old with autism

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Quantifying severity of ASD - 2

Clinical Domain ↓	Decreasing Atypicality / Increasing Age ⇒		
	Severe / Youngest	Moderate / Older	Mild / Older
2. Language •Pragmatics •Prosody	<ul style="list-style-type: none"> •Nonverbal •No response to voice; may "act deaf" •No use of gestures as a means of compensating for absence of spoken language •May use "hand-over-hand" to guide caregiver to desired objects 	<ul style="list-style-type: none"> •Echolalia, Delayed echolalia •Verbal Perseveration •Odd Inflection (stilted, sing-song, ↑ volume) •May use stock phrases in an attempt to communicate •Makes use of visual communication modalities (symbol cards; sign language) 	<ul style="list-style-type: none"> •Speaks fluently, but literal; lacks understanding of verbal nuance •Difficulty with Pragmatics (framing, turn-taking, topic maintenance; conversational repair; talks "at" rather than "with" others) and Theory of Mind language tasks (fibbing; humor, verbal make-believe)

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Language Deficits in ASD

- **Pragmatics:** Use of language for the purpose of social interaction
 - Framing
 - Topic maintenance, Turn taking
 - Conversational repair
 - Impaired Pragmatics:
 - Echolalia, delayed echolalia (“scripting”)
 - Lack of framing
 - Off-topic responses
 - Person talks “at” rather than “with” partner

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Language Deficits in ASD

- **Prosody:** Tone, Pitch, Volume
 - Stilted
 - Sing-song
 - Robotic
 - Pedantic
 - Overly loud
 - Difficulty “reading” prosodic cues of others
- [Difficulty with nonverbal cues (body language)]

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Literal



Q: Who lives in a tree?
A: Nobody lives in a tree!
Q: What *animals* live in a tree?
A: Birds, squirrels....

Theory of Mind

Camping

Six boys put up a tent by the side of the river. They brought things to eat with them. When the sun went down, they went into the tent to sleep. In the night, a cow came and began to eat grass around the tent. The boys were afraid. They thought it was a bear.

Q: Is this a sad story, a scary story, or a funny story?

- A scary story, because the boys were scared. (PDD-NOS)
- It was a most unusual story, because you don't often find cows in the woods. (Asperger Syndrome)

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Repetitious Behavior

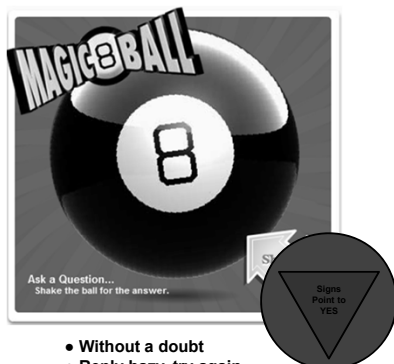
“My child has over-attention deficit disorder.”

Father of a 10 year old with autism and perseverative behavior

Quantifying severity of ASD - 3

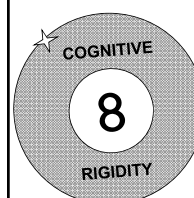
Clinical Domain ↓	Decreasing Atypicality / Increasing Age ⇒		
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3. Repetitious Behaviors <i>Cognitive Rigidity</i>	<ul style="list-style-type: none"> • Extreme distress if routines are changed or when required to transition from one task to another • Fascination with odd objects (tags, wheels, fans, etc.) 	<ul style="list-style-type: none"> • Same, but with diminishing level of distress; able to accept verbal preparation for changes in routine • Complex repetitious play (lining up objects, memorizes numbers, letters, etc) 	<ul style="list-style-type: none"> • May demonstrate conscious awareness of preference for routines; easier to self-modulate • Play remains repetitious, but repetitive quality is more subtle; “obsessive preoccupations” • Problems with Central Coherence
<i>Motoric</i>	<ul style="list-style-type: none"> • Frequent, intense stereotypical movements (flapping, spinning, toe-walking, finger twiddling) 	<ul style="list-style-type: none"> • Motor stereotypies occasional; may re-emerge when excited 	<ul style="list-style-type: none"> • Motor stereotypies rare or absent

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- Without a doubt
- Reply hazy, try again
- Signs point to NO
- Better not tell you now...

Cognitive Rigidity (Difficulty shifting mental sets)



- “Externalizing Behaviors”
- **Insistently** repetitious behavior
 - Difficulty with unmet expectations
 - Perfectionism
 - Compulsions
 - (Aggression, SIB)
- “Internalizing Behaviors”
- Obsessions
 - (Anxiety)
 - (Depression)

Quantifying severity of ASD - 3

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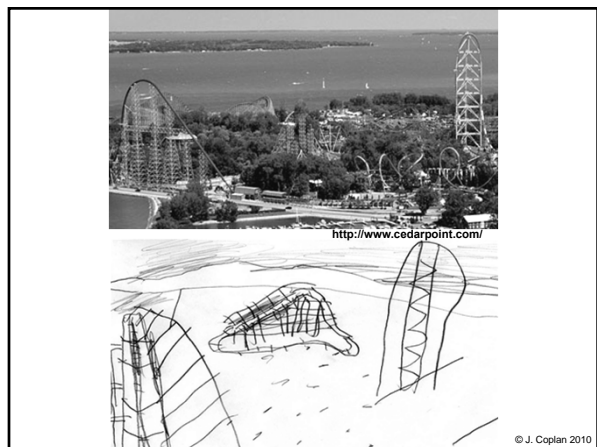
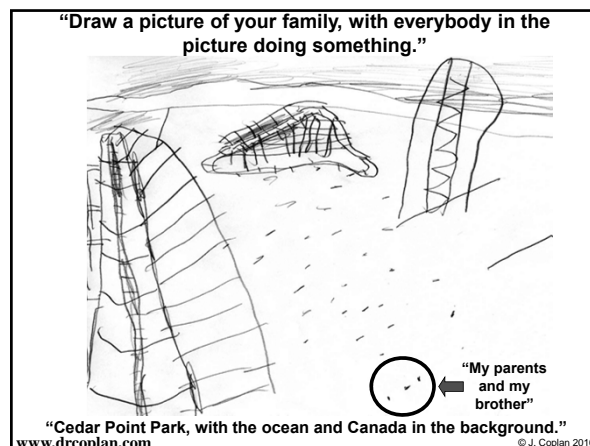
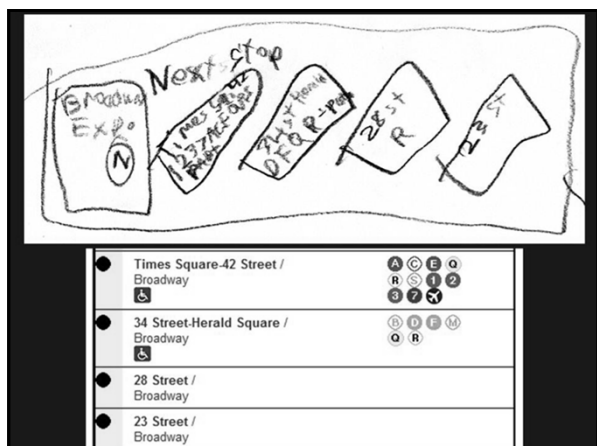
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9 y.o. with ASD and normal intelligence (lives in Philadelphia, not NYC) MRN 06-0211



Central Coherence

- Ability to see “the big picture” rather than a collection of individual elements

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**Tasks requiring Central Coherence
(in addition to Theory of Mind)**



What's happening in this picture?



"The man is drowning."

What's happening in this picture?



"The man is swimming, and the car is about to fall on him."

What's happening in this picture?



"Two strangers got into the house and are handing out newspapers."

What's happening in this picture?



What's happening in this picture?



What's happening in this picture?

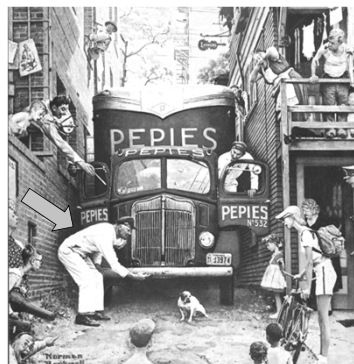


"That girl is trying to steal the other girl's book."

What's happening in this picture?



What's happening in this picture?



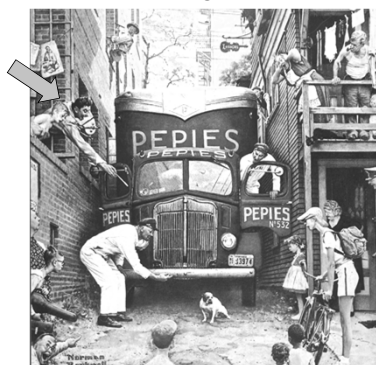
"The man is trying to fix the truck."

What's happening in this picture?



"The man is playing with his dog. The truck can't go because all the people are in the way."

What's happening in this picture?



"He's cleaning the truck. The driver is distressed because it's taking so long."

13-0833

Can you figure out this story from the pictures?



Q: What's happening in this picture?

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Q: What's happening in this picture?

A: The kitten is on the boy's back and is about to eat him.

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Q: What's happening in this picture?

A: The boy is hoarding animals.



Q: What's this?

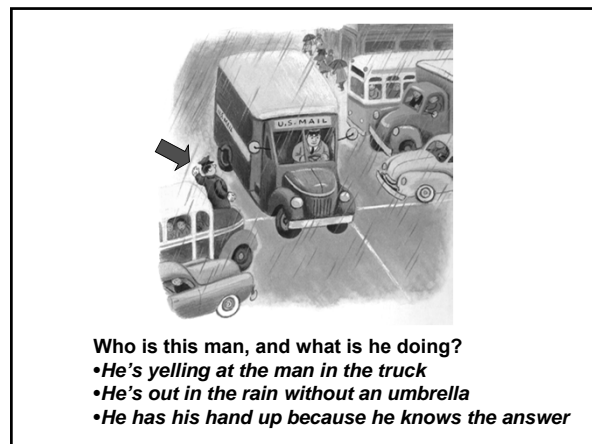
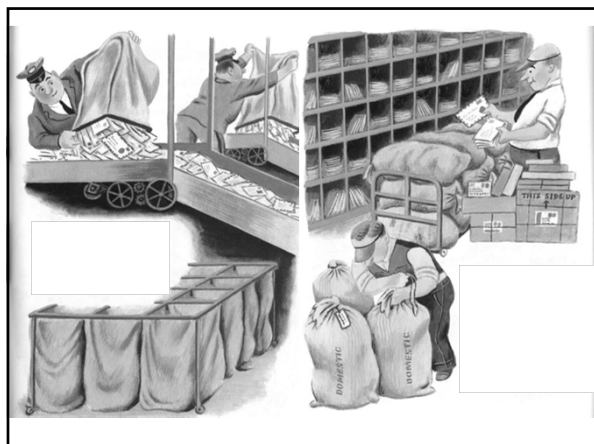
A: It's a rectangle with a triangle and an X on it.

© Coplan, J. Making Sense of Autistic Spectrum Disorders. Bantam-Dell, 2010

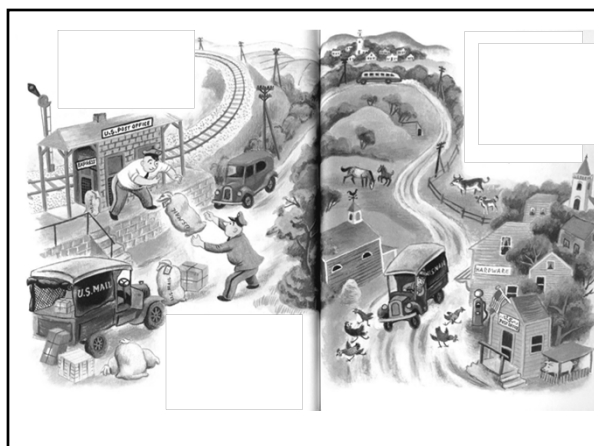
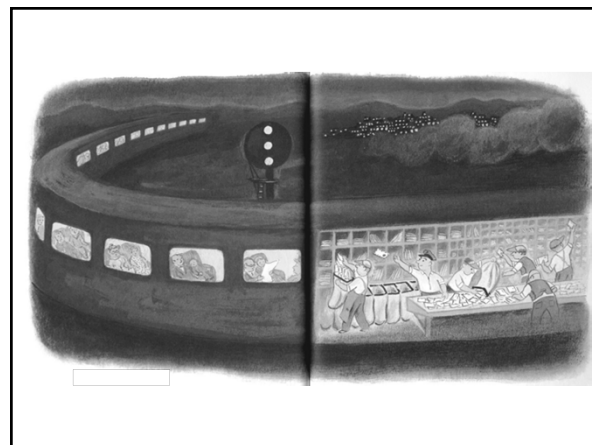
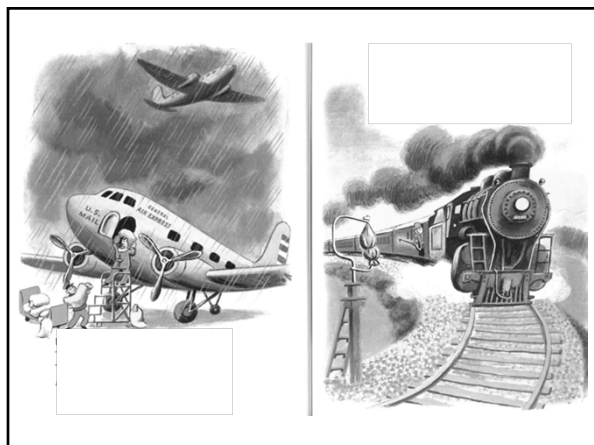


Where is the letter now?





Who is this man, and what is he doing?
•He's yelling at the man in the truck
•He's out in the rain without an umbrella
•He has his hand up because he knows the answer





Q: Who is that?
A: A grandmother.

Q: Whose grandmother is she?
A: I don't know.

Q: Who sent her the letter?
A: "The policeman?"

Repetitious behavior in ASD

- A direct expression of the underlying biology
 - Cognitive Rigidity
 - Stereotypies
- Stress relief
- A coping mechanism, to offset deficits in Theory of Mind & Central Coherence
 - "Better the devil you know..."



Sensory & Motor Processing

Quantifying severity of ASD - 4

Clinical Domain ↓	Decreasing Atypicality / Increasing Age ⇒		
	Severe / Youngest	Moderate / Older	Mild / Older
4. Sensorimotor: • Intense aversion or attraction to specific classes of stimuli • Clumsiness	<ul style="list-style-type: none"> • Auditory: Hyperacusis, covers ears, acts deaf • Visual: self-stimulation (lights/patterns); looks at objects from odd angles • Tactile: rubbing, licking, mouthing, deep pressure; averse to light touch • Olfactory: Sniffing • Extreme food selectivity • ↑ Pain threshold • Fears: Heightened / blunted 	Same, but diminishing intensity	Same, but diminishing intensity

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Abnormal responses to sensory stimuli



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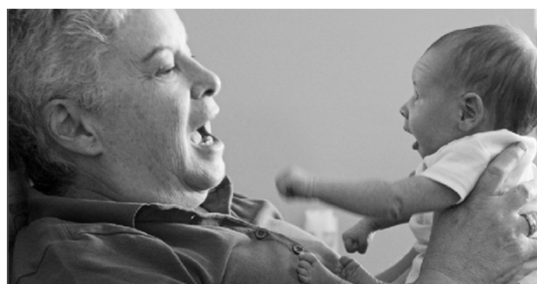


Figure 2.5. Stimulus faces of Andrew Meltzoff and a young mimic.

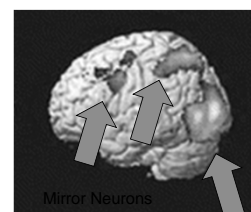
Meltzoff, Andrew N. and Moore, M. K. Imitation of facial and manual gestures by human neonates. Science 198:75-78, 1977



http://en.wikipedia.org/wiki/File:Makak_neonatal_imitation.png

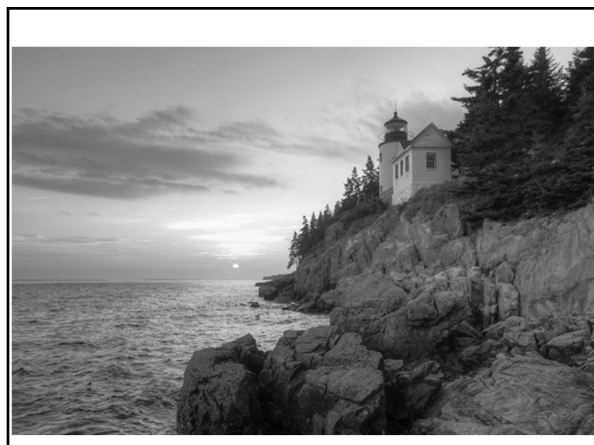
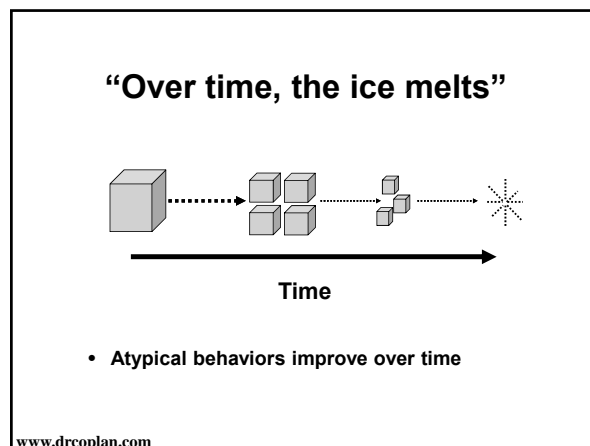
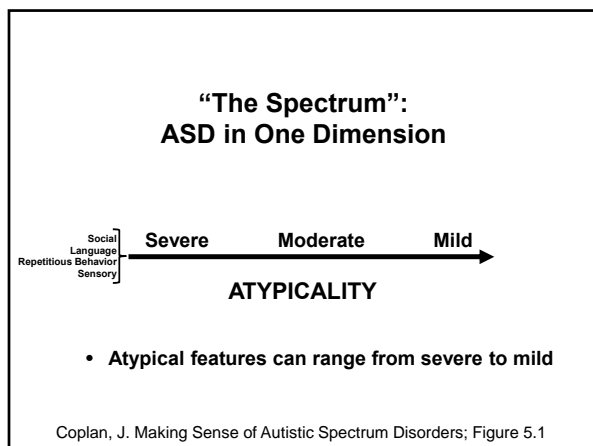


Mirror Neurons: The Missing Link?



Visual Cortex

Mirror Neurons: From discovery to autism
Rizzolatti & Fabbri-Destro; Exp Brain Res 2010



Outline

Clinical Features and Natural History of ASD [9-10:30 a.m.]

- Leo Kanner's lasting contributions
- Degrees of Atypicality (ASD in one dimension)
 - Non-verbal IQ (ASD in 2 dimensions)
- Atypicality, Age, and IQ: ASD in 3D
 - Progression of therapies tied to Natural History

Measuring intelligence in ASD

- How to operationalize the measurement of intelligence in ASD?
 - Omit ASD-specific areas of dysfunction or inflator scores:
 - Language
 - Social judgment
 - Savant skills
 - What's left?
 - Non-verbal Problem-Solving
 - Adaptive skills (somewhat)
 - Play skills (somewhat)

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Non-verbal Problem-Solving

- Object permanence
- Cause & Effect
- Rule-based behavior






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Problem-Solving

1" Cubes


- Takes one: 6 m
- Transfers: 7 m
- Bangs two: 9 m
- Takes three: 10-12 m
- Copies
 -  14 m
 -  18 m
 -  24-27 m

• Builds:






-  30-36 m
-  3 1/2 yr
-  4 yr
-  5 yr
-  6 yr

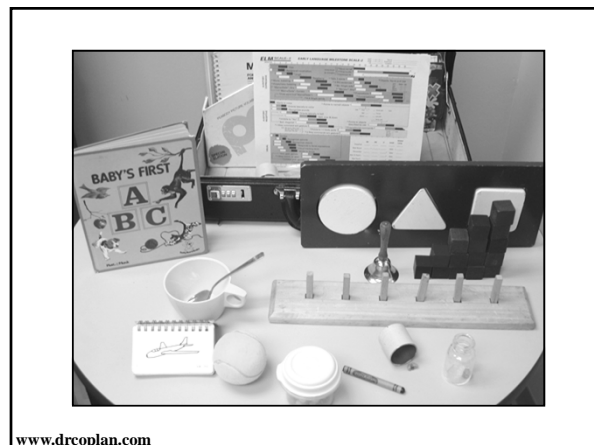
Problem-Solving

Crayon

- Mouths: < 9 m
- Makes marks 10-12 m
- Scribbles p demo: 14 m
- Scribbles spont: 16 m
- Alternates from stroke to scribble: 22 m
-  24-27 m

• Draws:

-  30-36 m
-  3 1/2 yr
-  4 yr
-  5 yr
-  6 yr



Cognitive Profile in ASD

<i>Weaker</i>	<i>Stronger</i>
Fluid Verbal Intelligence <ul style="list-style-type: none"> • WISC: <i>Comprehension</i> • Reading comprehension (>2G) • Oral pragmatics 	Crystallized Verbal Intelligence <ul style="list-style-type: none"> • WISC: <i>Information, Vocabulary</i> • Reading comprehension <2G • Pseudoword decoding
Often <ul style="list-style-type: none"> • Executive Dysfunction <ul style="list-style-type: none"> • Working Memory Index • Processing Speed Index 	Non Verbal Intelligence <ul style="list-style-type: none"> • WISC: <i>Block Design</i>

[Obsessive Mentation and/or Anxiety can mimic ADD]

BASC: Anxiety, Attention, Atypicality, Withdrawal (look for differences between raters)

Adaptive Skills

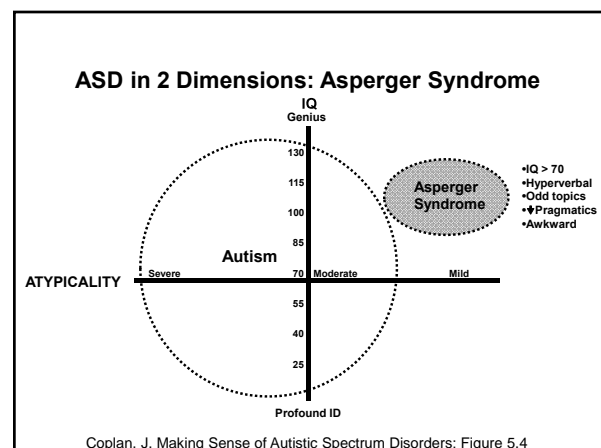
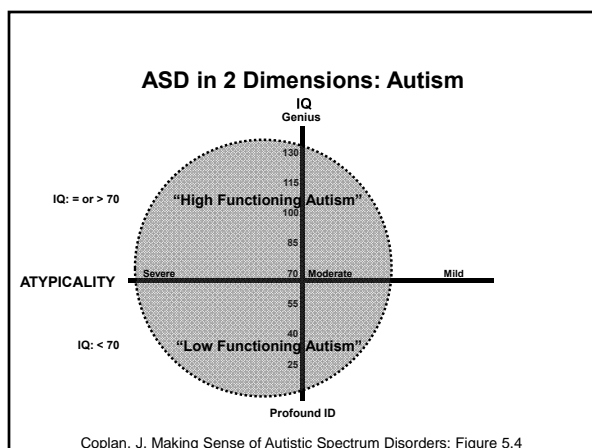
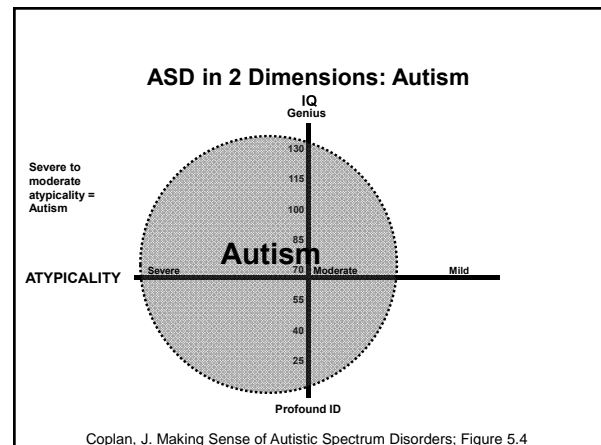
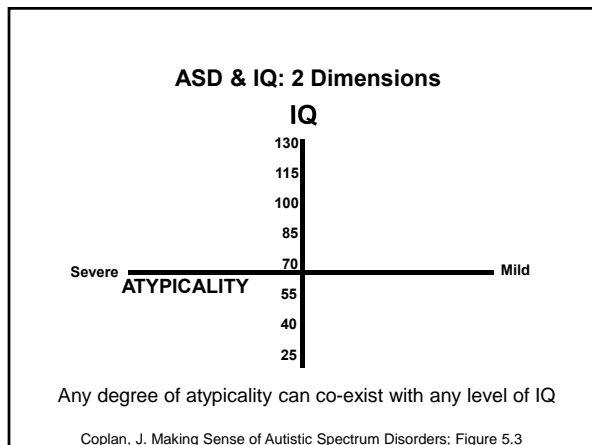
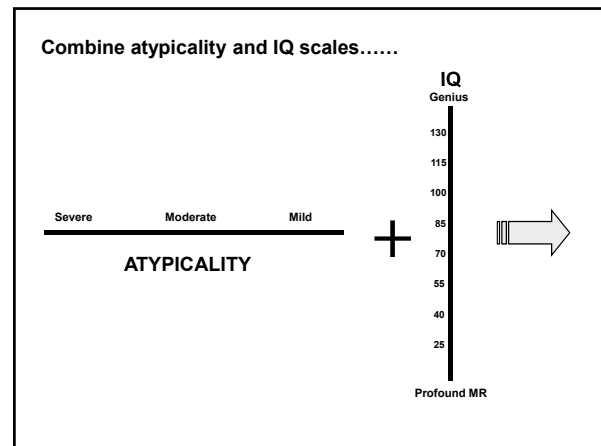
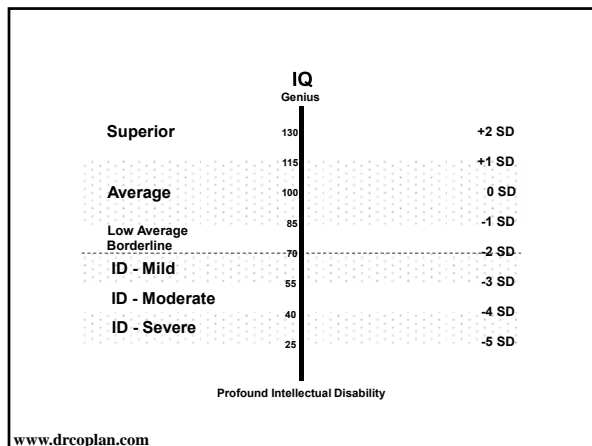
- **Self-feeding**
 - Finger-feeding
 - Cup
 - Spoon (tool use)
- **Self-dressing**
 - Unbuttoning, buttoning
 - Zippers, Snaps
 - Tie shoes
- **Toilet-training**

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Play

- Midline hand play (3 mo)
- Banging & Mouthing (7 - 9 mo)
- Casting (12 mo)
- Tools (crayon) ~ 14 mo
- Cause & Effect (14 to 16 mo & up)
- Imitative Play (24 mo)
- Imaginative Play (36 mo)
- Rule-based Play (48 mo)

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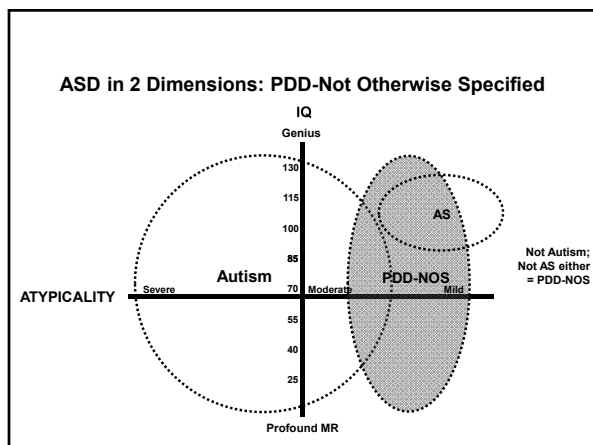


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Asperger's Disorder will be Back[1]

Journal of autism and developmental disorders [0162-3257]
Tsai, Luke: 2013 vol:43 iss:12 pg:2914-2942 Luke Y. Tsai¹

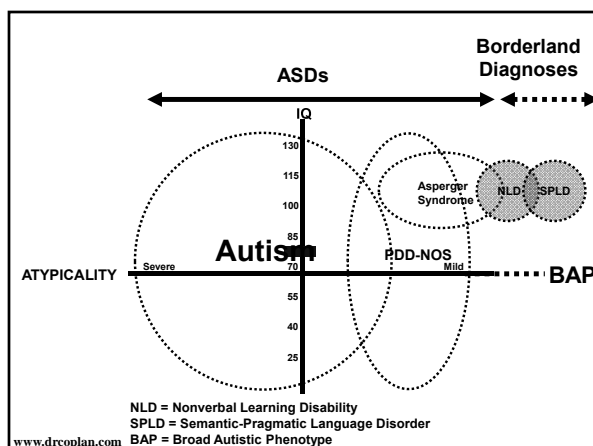
128 publications were identified through an extensive search of major electronic databases and journals. Based on more than 90 clinical variables, 94 publications concluded that there were statistically significant or near significant differences between Asperger's Disorder (AspD) and Autistic Disorder / HFA groups; 4 publications found both similarities and differences between the two groups; 30 publications concluded with no differences between the two groups. DSM-5 will eliminate Asperger's Disorder. However, it is plausible to predict that the field of ASD would run full circle during the next decade or two and that AspD will be back in the next edition of DSM.



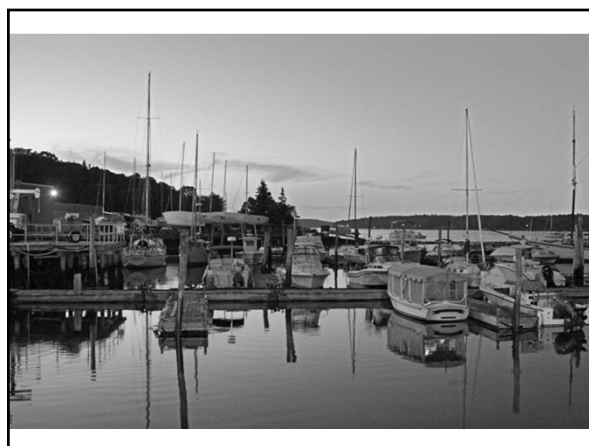
At the “Borderland” of ASD

- **Nonverbal Learning Disability (NLD)**
 - ↓ Language pragmatics
 - ↓ Social skills
 - Disregard for personal space
 - ↓ Coordination / Sensory processing
 - Verbal IQ > Performance IQ
- **Semantic-Pragmatic Language Disorder (SPLD)**
 - ↓ Language pragmatics only
 - DSM5: “Social (Pragmatic) Communication D/O”
- **(Broad Autistic Phenotype: Traits, not disorder)**

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Outline

Clinical Features and Natural History of ASD [9-10:30 a.m.]

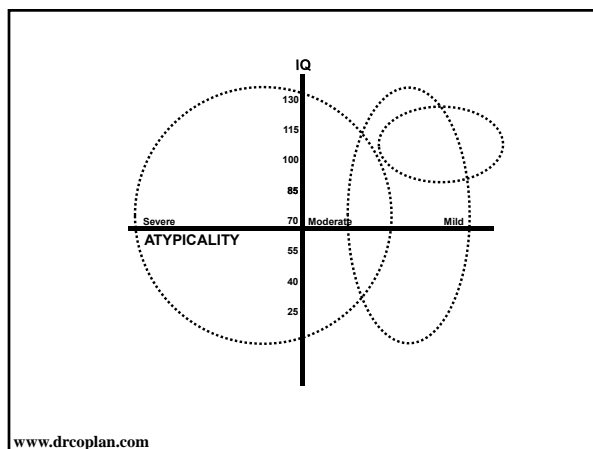
- Leo Kanner's lasting contributions
- Degrees of Atypicality (ASD in one dimension)
- Non-verbal IQ (ASD in 2 dimensions)
- ASD in 3D
- Progression of therapies tied to Natural History

Influence of IQ on Prognosis

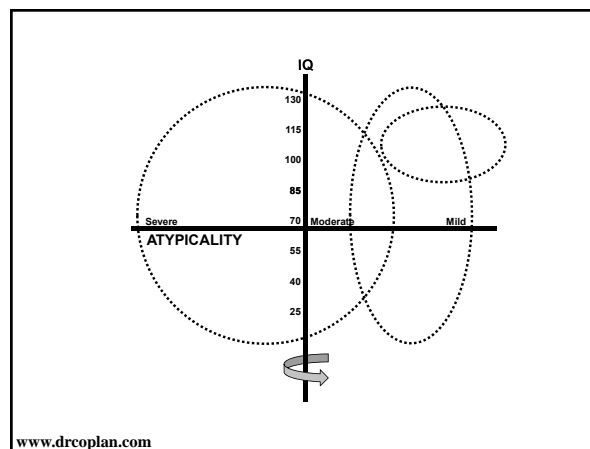
- “In terms of scholastic progress, social competence, and work opportunities, the child's IQ level is as influential as the presence of autism.”*
- 1973-2005: > 10 studies; >1000 subjects (reviewed in Coplan, 2010)

* Bartak, L. and M. Rutter, Differences between mentally retarded and normally intelligent autistic children. *Journal of Autism & Childhood Schizophrenia*, 1976. 6(2): p. 109-20

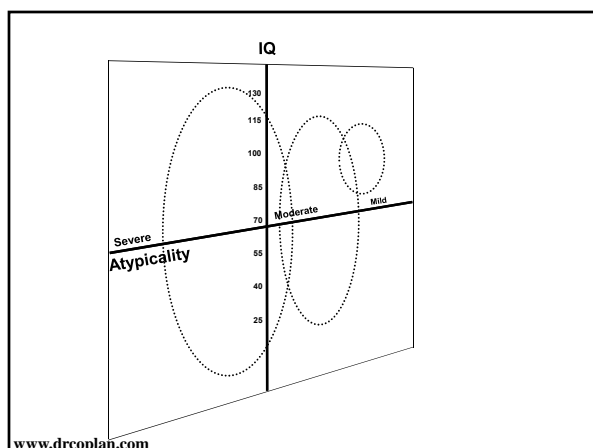
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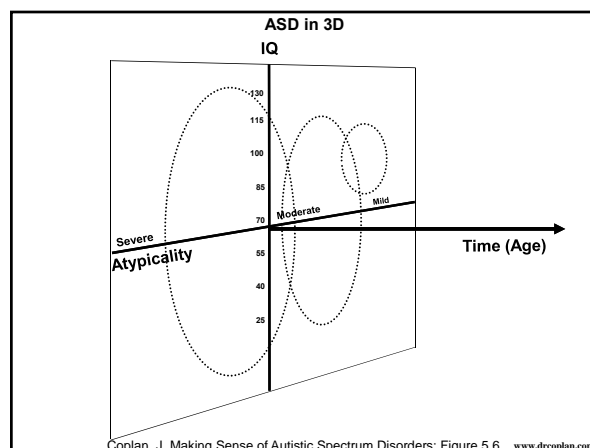
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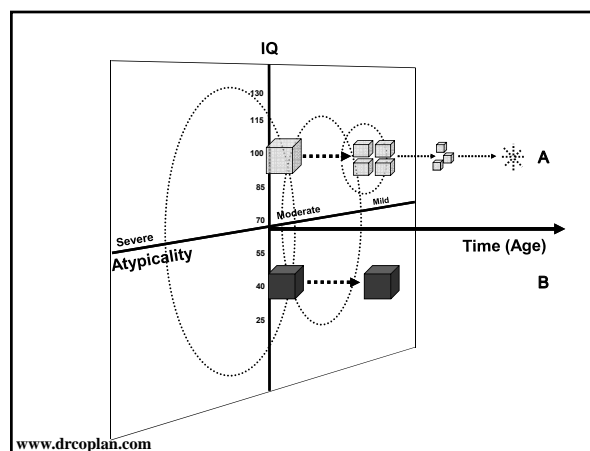
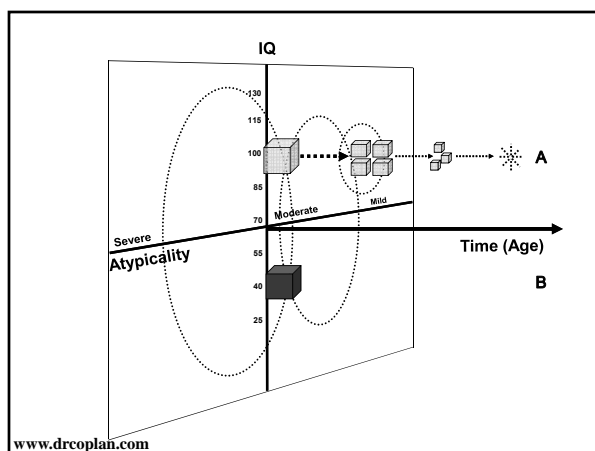
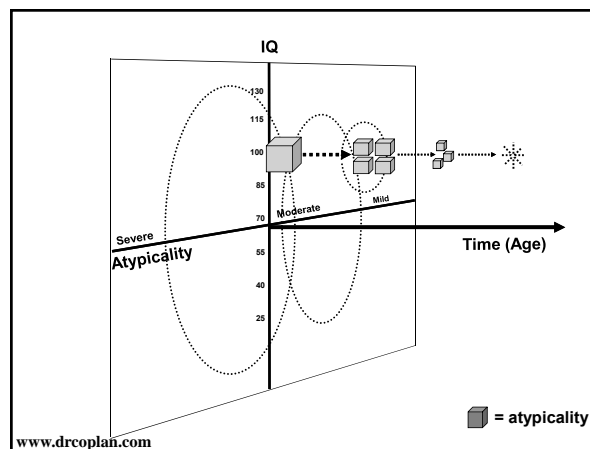
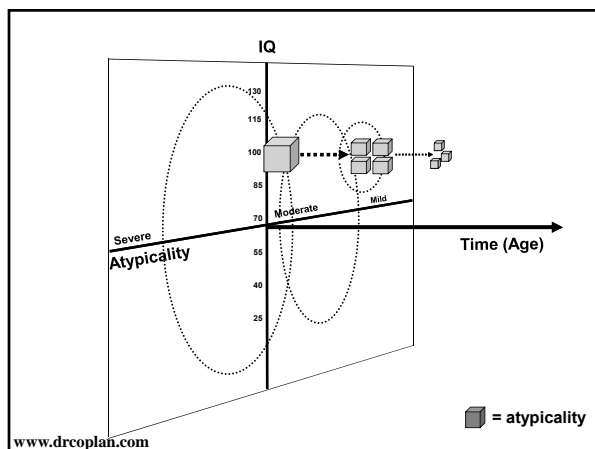
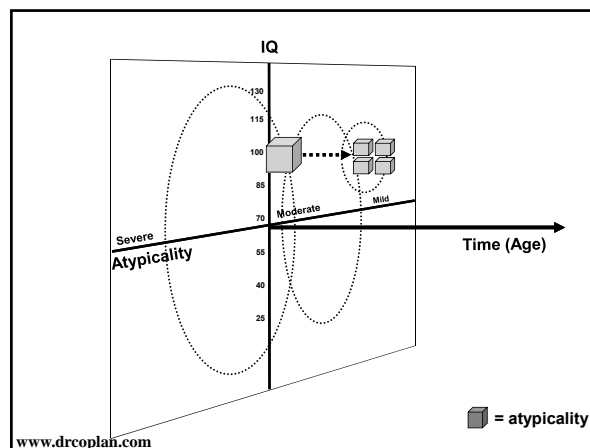
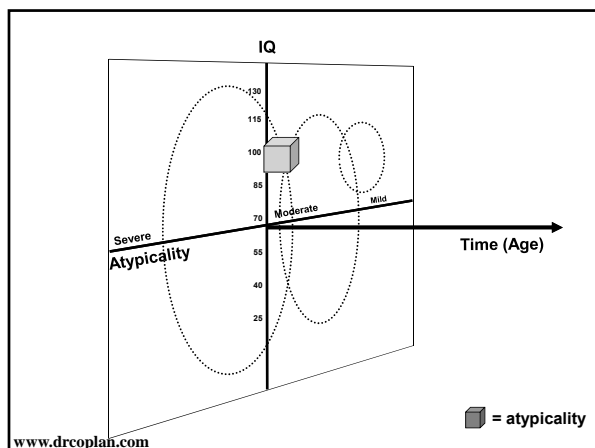
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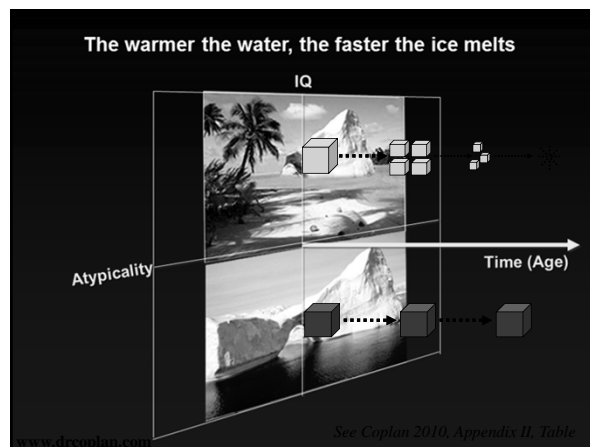
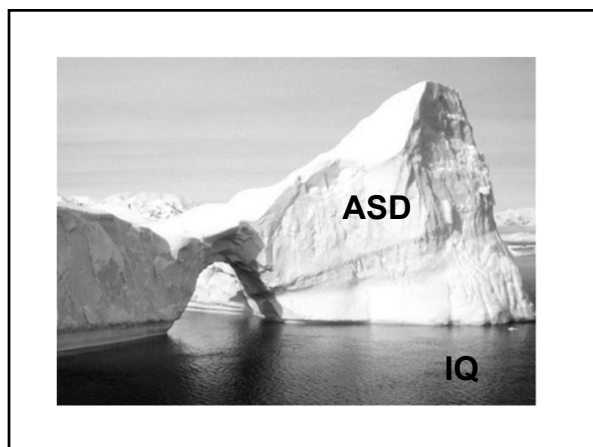
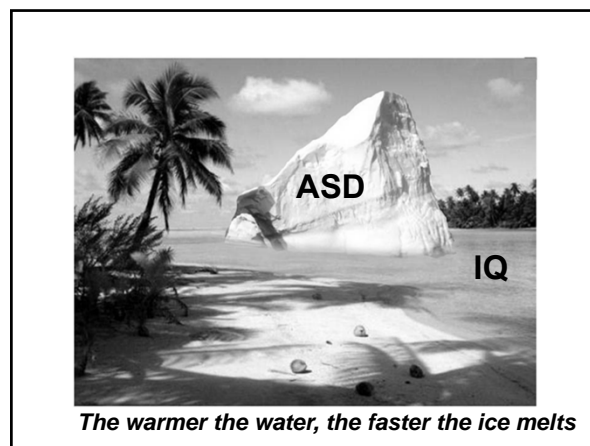
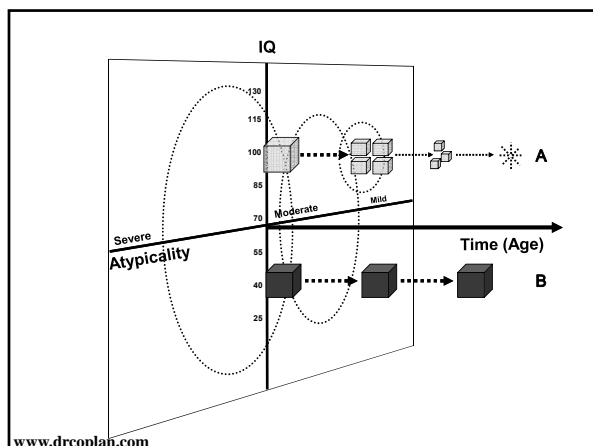


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Coplan, J. Making Sense of Autistic Spectrum Disorders; Figure 5.6 www.drcoplan.com





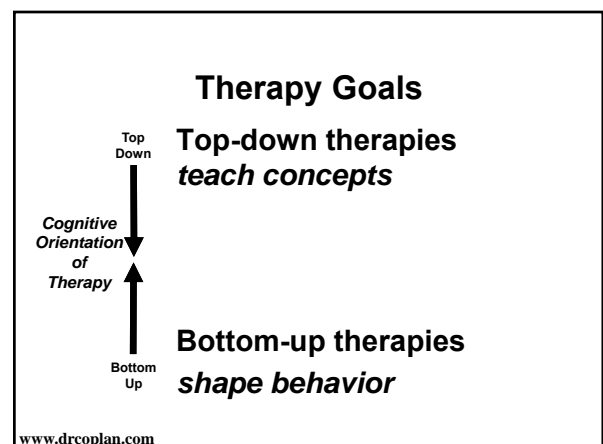
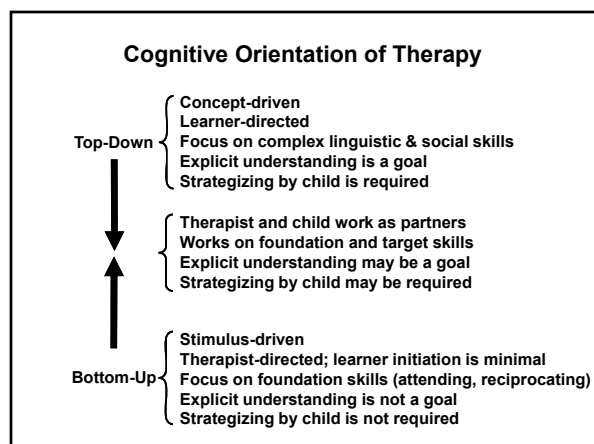
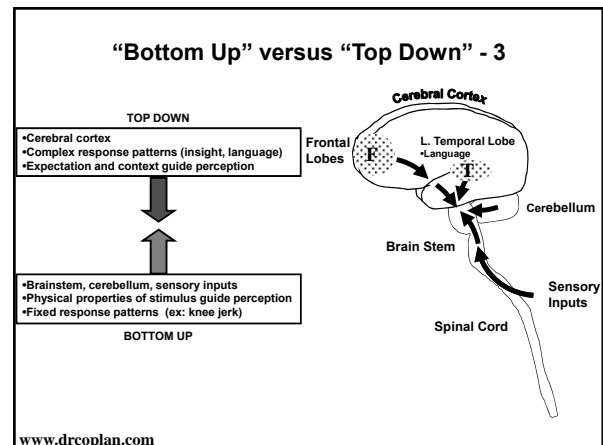
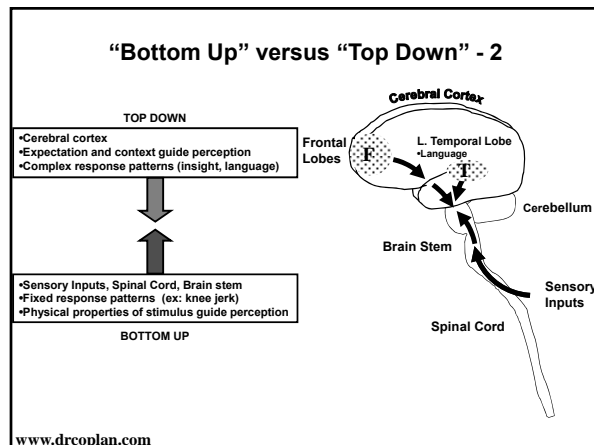
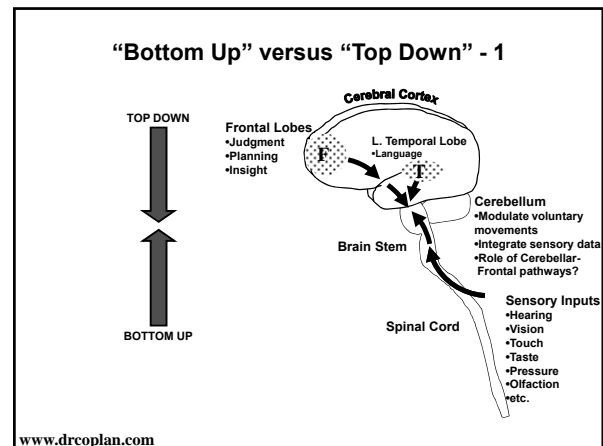
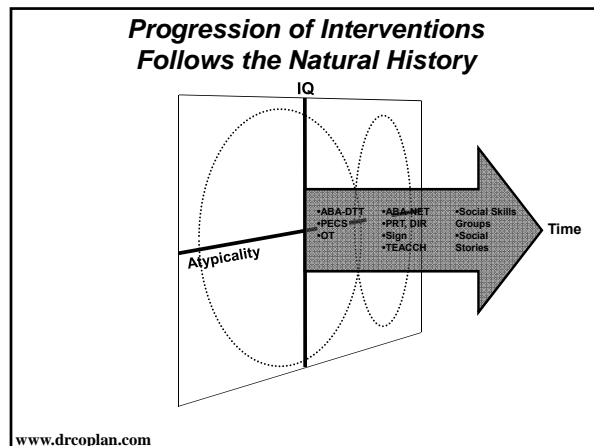
Outline

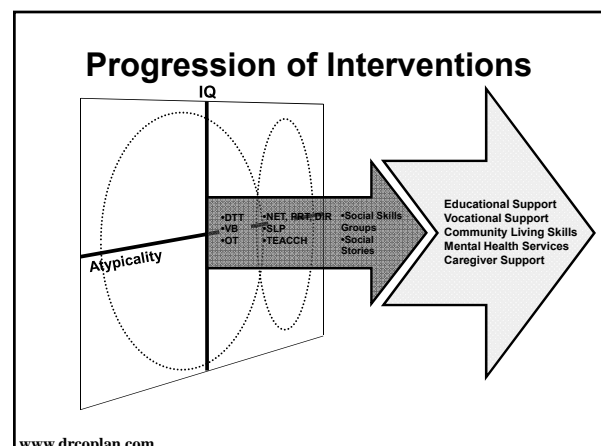
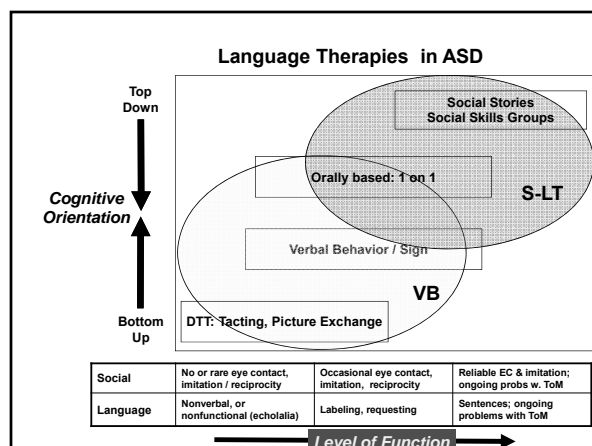
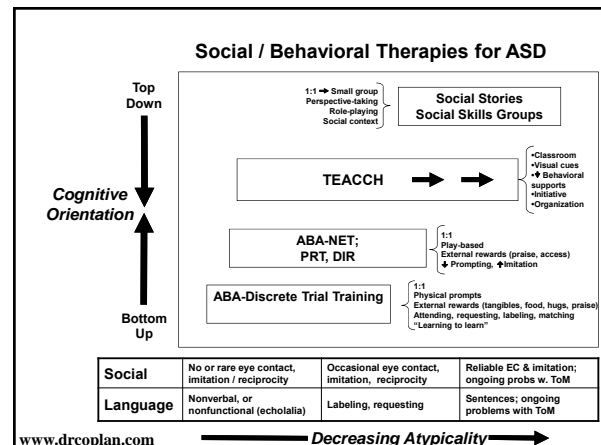
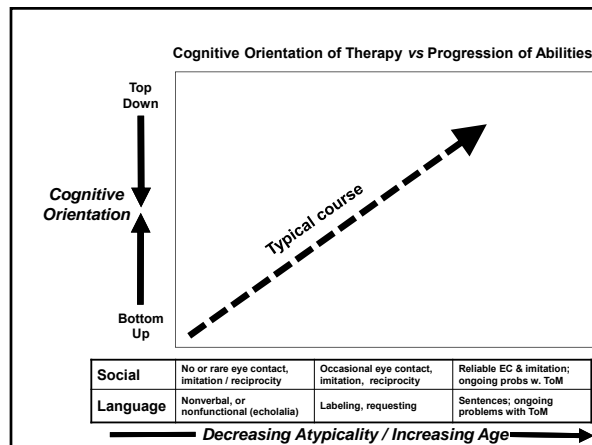
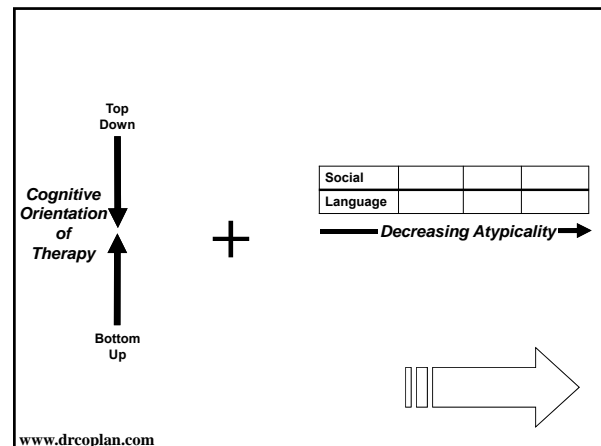
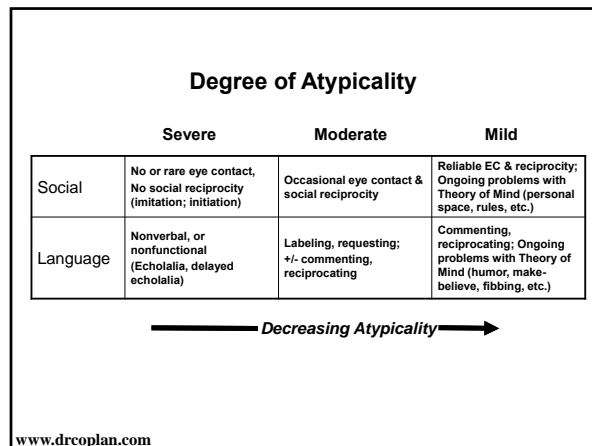
Clinical Features and Natural History of ASD [9-10:30 a.m.]

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- ASD in 3D
- Progression of therapies tied to Natural History

Therapies for ASD: A Modest Proposal

- Therapies for ASD should be matched to the natural history of ASD itself
 - As the child's symptoms evolve, so should the forms of therapy
 - It's not a matter of right vs wrong; It's a matter of what & when







Summary

- ASD has a natural history
- Any level of atypicality can coexist with any level of intelligence
- IQ is the major co-factor driving prognosis
- 3D “map” of ASD + IQ + Time:
 - Track child's progress over time
 - Select best therapy at any given point in time
 - Anticipate future needs (prognosis)
- Therapies follow a bottom-up to top-down progression, in parallel with the natural hx of ASD itself

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