Maladaptive Behavior in Children on the Autism Spectrum: Looking Beneath the Surface in Order to Achieve Optimum Outcome

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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

“Behavior”

- “The manner of conducting one’s self”
- “Anything than an organism does involving action and response to stimulation”
- “The actions or reactions of a person or animal in response to internal or external stimuli”
Maladaptive Behavior in ASD
James Coplan, MD

Behavior

• What is the child’s developmental level?
• Is the behavior normal for the child’s developmental level?
  – Tantrums / Noncompliance
  – “Impulsivity” / “Inattention”
  – Can the child de-center?

Behavior

• Acute change or chronic?
• General health?
  – Vital signs, I&O, Level of consciousness
  – Pain?
• Anything new in child’s life?
  – Recent change of meds

Behavior

• What is the child’s ability to communicate?
  – Does “disruptive” behavior serve a communicative function?
  – Or some other function?
    • Access
    • Escape
    • Self-calming
    • Attention
  – Or: No function?

Behavior

• Developmental Model
  – Certain behaviors are characteristic at certain ages/stages, and “unfold” with time
    • Piaget
• Behaviorist Model
  – All behavior is the result of prior conditioning
    • Thorndike, Skinner, Lovaas

Behaviorism

STIMULUS (the Antecedent)
RESPONSE (the Behavior)
(What function does the behavior serve?)
The Consequence
(Reinforcers & Aversives)
**Law of Effect**

*Animal Intelligence.* Edward Thorndike, 1911

"Of several [possible] responses...to the same situation, those which are...closely followed by satisfaction to the animal will...be more likely to recur. Those which are...followed by discomfort to the animal will...be less likely to occur. The greater the satisfaction or discomfort, the great the strengthening or weakening of the bond"

- Manipulating the Consequence for a given behavior feeds back on the probability that that behavior will recur.

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**Consequences 1: Reinforcers**

- Reinforcers lead to an increase in frequency of the antecedent behavior
  - Positive Reinforcement (adds something)
  - Negative Reinforcement (removes something)

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**Positive Reinforcement**

- Attention (in neurotypical children)
- Access to desired object or activity

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**Negative Reinforcement**

- Escape (from a task, e.g.)
- Removal of an undesirable object (non-preferred food, e.g.)
  - *Negative reinforcement does not = “punishment”*
Food Selectivity
Negative and Positive Reinforcement of unwanted behavior

- Parent removes non-preferred food ([−] reinforcement)
- Parent provides child with his/her preferred food ([+] reinforcement)
- Alternatives
  - First...Then
  - Put refusal on extinction
  - The kitchen is closed between meals
  - Desensitization (non-preferred food is on table, on plate, touch, lick, mouth, eat)

Consequences 2: Aversives

- Aversives lead to a decrease in the likelihood of recurrence of the antecedent behavior
- Logical Consequences
  - If child refuses to use toilet, child must carry backpack with spare clothes, when family is in public
- Over-correction
  - Must wash out soiled diaper
  - If the child spills milk on purpose: child must mop the entire kitchen floor

Disruptive Behavior: Function & Best Response

- Attention
  - 1-2-3 «Time Out» (T.O.)
- Access
  - Never grant access to desired object in response to disruptive behavior
- Escape
  - Never permit the child to escape from a task via disruptive behavior.
  - Walk child through task first, then «Time Out».
  - OR: Send child to T.O., and as soon as T.O. is complete, resume the task where you left off.

Token Economy: The next step beyond Time Out

- Concretely specified behaviors
- Earn and Lose Points
- Points ★ Access to preferred items
  - Preferred toys, Computer time, etc.
  - NO access to preferred item at other times
  - “Extra” treats not as effective
- Works with children who understand rule-based play (CandyLand, Uno, etc.)
But…..

Children with ASD have atypical responses to internal and external stimuli

- What good is Time Out if the child has no eye contact?
- Obsessive behavior not the same as “ordinary” task refusal

Not all behavior serves an external function

- Tourette Syndrome (Tics, Coprolalia, Compulsive Touching)
- Perseveration

Or any social / behavioral function

- Seizures

Diagnostic Features of ASD

- Impaired Social Reciprocity
  - Theory of Mind (Perspective-taking)
- Impaired Language
  - Pragmatics
  - Prosody
- Repetitive Behavior
  - Physical (stereotypies)
  - Cognitive (obsessive interests)
- Abnormal responses to sensory input

Common Maladaptive Behaviors in young children with ASD - 1

- “In his own little world”
- “Fascinated” (fans, legos, alphabet)
- “Excellent memory”
- “Gives affection on his own terms”

But…. Sometimes not obvious to parents

- Firstborn / Only child
- Parents may adapt to child’s needs
- Symptoms not apparent until social contact

Common Maladaptive Behaviors in young children with ASD - 2

- Doesn’t come for circle time
- Stereotyped play
- Disregards or “polices” peers
- Limited language
  - Off-topic utterances
  - Odd inflection
- Agitated, disruptive, but not malicious
- “Hyperactive”
- Anxious

Underlying Neuropsychological Abnormalities in Persons with ASD

- Cognitive Rigidity
- Abnormal Regulation of Attention
- Abnormal Regulation of Arousal
- Abnormal Regulation of Sleep
- Abnormal Sensory Processing
Cognitive Rigidity

- Inability to shift mental sets
  - Insistently repetitious behavior
- Problems with unmet expectations, or changes in routine
  - Perfectionism
  - Compulsions
  - Obsessions
- (Anxiety)
- (Depression)

“Internalizing Behaviors”

Changes in Routine

Perfectionism

Anxiety

RD: 7 y.o. F, ml IQ, PDD-NOS & Anxiety. Father: OAD

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info@drcoplan.com
Anxiety

RD. 7 y.o. F, nl IQ, PDD-NOS & Anxiety. Father: GAD
MRN: 07-0427

Joseph F: 15 y.o. boy Asperger Syndrome & chronic anxiety
MRN: 05-0096

Depression

KO; 10 yr old female, PDD-NOS, normal IQ

Throughout the session, “Alice” delivered a steady stream of self-deprecating comments, calling herself “stupid,” or perseveratively asking if she was “fat.” During the Bender, she anxiously and angrily twisted the eraser off the tip of the pencil, while declaring “Why do I keep making stupid mistakes?” As her stress level rose, she escalated to slapping herself, and then punching herself in the face.

Anxiety, Perfectionism, and Self-Injurious Behavior

Standard Score: 138

A.D.: 9 y.o. girl with ASD (MRN: 16-0227)
Maladaptive Behavior in ASD  
James Coplan, MD

How do you kill a blue elephant?  
*Shoot it with a blue elephant gun.*

How do you kill a pink elephant?  
*Hold it by the trunk until it turns blue, then shoot it with a blue elephant gun.*

“An ounce of prevention is worth a pound of cure”

Positive Behavior Support Plan for Cognitive Rigidity

- **Staff Awareness**
- **Visual Schedules**
  - What am I supposed to be doing do now?
  - What am I supposed to do next?
- **Relaxation Techniques**
  - Mental Imagery
  - Isometrics
  - Deep Breathing
  - “Break” cards
- **Cognitive Behavioral Therapy (CBT)**
- **SSRIs**
The Story of Billy’s Box - 1
(or, why it’s important to ID internalizing behavior)

• 8 y.o. boy with ASD and normal Nonverbal IQ
• Severe tantrums at school
• Antecedents:
  – TRANSITIONS
• Function?
  – Not attention, escape, access
  – “Biological” (i.e. just part of his ASD)?

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The Story of Billy’s Box - 2
(or, why it’s important to ID internalizing behavior)

Q: “Billy – You’re always getting in trouble at school. What’s going on?”
A: “I’m afraid that if I hand in my work, I’ll never get a chance to go back and make it perfect.”

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The Story of Billy’s Box - 3
(or, why it’s important to ID internalizing behavior)

“Put your papers in the box, and we promise you will be able to go back later and work on them some more, if you want to.”

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Cognitive Rigidity

• Interventions
  – Visual Schedules
    • What am I supposed to be doing do now?
    • What am I supposed to do next?
  – CBT, Relaxation Techniques
  – SSRIs

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When My Worries Get Too Big!
A Relaxation Book for Children Who Struggle with Anxiety
Written and Illustrated by Karl Dunn Buron
Foreword by Brenda Smith Myles

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SSRIs in ASDs
- **Primary targets**
  - Cognitive Rigidity
    - Anxiety
    - Obsessions (thoughts)
    - Compulsions (behavior)
    - Perfectionism
  - Depression
  - Stereotypies: Probably not
- **“Downstream” benefit:**
  - ⚠️ Disruptive Behavior
  - 🎉 Quality of Life

Serotonin (5 HT)

Serotonin (5 HT) Pathways

Nestler, Molecular Neuropharmacology, Fig 9.3

Stahl, Essential Psychopharmacology, fig 5.52-3
Selective serotonin reuptake inhibitors (SSRIs) for autism spectrum disorder (ASD).
Williams, K., et al., Cochrane Database Syst Rev, 2010. 8: p. CD004677

Authors’ conclusion:
“There is no evidence that SSRIs are effective as a treatment for children with autism. In fact, there is emerging evidence that they are not effective and can cause harm. As such SSRIs cannot be recommended as a treatment for children with autism at this time.”
Pharmacotherapy for anxiety disorders in children and adolescents

- Studies reviewed: 22 RCTs/2,519 participants
  - Short-term (average 11 wks)
  - Mean age 12 yrs
  - Drugs studied (versus placebo)
    - SSRIs: 15 (fluoxetine 6, fluvoxamine 2, paroxetine 3, sertraline 4)
    - SNRIs: 5 (clomipramine 1, venlafaxine 2)
    - Benzodiazepines: 2 (alprazolam 1, clonazepam 1)
    - Tricyclic antidepressants: 1 (desipramine)

- Meta-analysis
  - Response rate: Medication 59%; Placebo 31%
  - 7.3% of subjects treated with SSRIs withdrew b/c side effects
  - “The overwhelming majority of evidence of efficacy was for the SSRIs, with the most evidence in paediatric OCD”

Anxiety after Rx with CBT & Escitalopram
RD. 7 y.o. F, nl IQ, PDD-NOS & Anxiety. Father: GAD
MRN: 07-0427

Anxiety
“The house is on fire and we are running for our life.”
A.W.: 9 y.o. girl with ASD (MRN 11-07710)

Fluoxetine 10 mg/d
A.W.: 9 year old boy with PDD-NOS and normal IQ (MRN 11-07710)

Anxiety, Perfectionism, and Self-Injurious Behavior
A.D.: 9 y.o. girl with ASD (MRN: 16-0227)
Throughout the session, “Alice” delivered a steady stream of self-deprecating comments, calling herself “stupid,” or perseveratively asking if she was “fat.” During the Bender, she anxiously and angrily twisted the eraser off the tip of the pencil, while declaring “Why do I keep making stupid mistakes?” As her stress level rose, she escalated to slapping herself, and then punching herself in the face.
After one week on Sertraline

Sent: Thursday, May 31, 2012
To: James Coplan
Subject: amazing shift in A.D.
Importance: High

Dr. Coplan,
I “know” that it takes several weeks for SSRIs to “kick in” but the child I saw in my office today is simply a different child and the improvements are being noted across settings by multiple adults. There was NO self abuse, NO negative self statements, an availability for interventions, just a complete transformation. We “fixed” mistakes, “re-did” errors, told jokes, and played together. The “core” Autistic symptoms are obviously still there - perseveration on bras, drawing, etc - but mood-wise there is no question that A. is already benefitting from the Sertraline... Impossible perhaps but really visibly clear...
Thank you very much.
S.S. Ph.D.

Abnormal Regulation of Attention - 1

- Perseveration
  - Inability to “Let go and shift”
  - Gets “stuck”
  - “Overattention Deficit Disorder”
- Compounds the effects of cognitive rigidity
Abnormal Regulation of Attention (Perseveration)

- **Interventions**
  - Verbal preparation for transitions
  - Visual Schedules
  - SSRIs (OCD: Proven; ASD: likely)
Abnormal Regulation of Attention - 2

- Inattention
  - Inability to focus
  - Impulsive
  - Distractible

Inattention

- Interventions
  - Limited stimuli
  - Short work periods
  - Medication
    - Stimulants (may → anxiety / rigidity / agitation)
    - alpha-2 agonists

Noradrenergic pathways

Stahl, Essential Psychopharmacology, fig 5.25
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James Coplan, MD

Stimulants
(Dopaminergic; Noradrenergic; Sympathomimetic)

Stimulants in children with ADHD → "Paradoxical" calming

Hyperactivity

Stahl, Essential Psychopharmacology, fig 12.1

Stimulants
(Dopaminergic; Noradrenergic; Sympathomimetic)

A. Promote release of Dopamine & Norepinephrine (Stimulants)
B. Mimic the action of Dopamine & Norepinephrine (Stimulants)
C. Block re-uptake of Dopamine & Norepinephrine (Atomoxetine)

Excess Noradrenergic Activity → Hypervigilance, Agitation

Stahl, Essential Psychopharmacology, fig 5.26

Stimulants, NRI's

<table>
<thead>
<tr>
<th>Generic Name(s)</th>
<th>Brand Name(s)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphetamine</td>
<td></td>
<td>FDA Schedule II</td>
</tr>
<tr>
<td>Dextroamphetamine</td>
<td>Dextrostat</td>
<td>FDA Schedule II</td>
</tr>
<tr>
<td>Dextroamphetamine + amphetamine</td>
<td>Adderall</td>
<td>FDA Schedule II</td>
</tr>
<tr>
<td>Methylphenidate</td>
<td>Concerta, Ritalin, Metadate</td>
<td>FDA Schedule II</td>
</tr>
<tr>
<td>Dextymethylphenidate</td>
<td>Focalin</td>
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</tr>
<tr>
<td>Lisdexamfetamine</td>
<td>Vyvanse</td>
<td>Metabolized to D-Amphetamine, Not FDA Sch. II</td>
</tr>
<tr>
<td>Atomoxetine, Attentin</td>
<td>Strattera</td>
<td>Norepinephrine reuptake inhibitor (NRI), not FDA Schedule II</td>
</tr>
</tbody>
</table>

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Noradrenergic pathways
(Norepinephrine)

Excess Noradrenergic Activity → Hypervigilance, Agitation

Stahl, Essential Psychopharmacology, fig 5.26

Alpha-2 agonists
(clonidine, guanfacine)

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Alpha-2 Agonists

**Generic Name** | **Brand Name(s)** | **Comment**
--- | --- | ---
Clonidine | Catapres | More sedating than guanfacine
Guanfacine | Tenex, Intuniv |  

**Benefits**
- ↓ Agitation
- ↓ Hyperactivity
- ↑ Attention Span
- No exacerbation of anxiety / rigidity

**Side Effects**
- Sleepiness: Common
- Emotional Lability (crying) - occasional
- Hypotension (low BP) - rare

**References**

**Clinical Pearl**
- Beware of anxiety or perseveration masquerading as inattention
  - Perseveration on inner stimuli: “Inattentive”
  - Perfectionism: “Problems w. task completion”
  - Anxiety: “Rushes through work”
“He is so hard to calm down when he gets upset….His emotional thermostat doesn’t work”

Parent of an 8 year old with ASD

Regulation of Arousal

Hypoarousal
- Lethargic
- Relaxed

Calm
- &
- Relaxed

Fight or Flight Response

“Red Alert”
- Adrenaline
- Heart Rate
- Resp. Rate
- Combative

Abnormal regulation of arousal

Abnormal regulation of attention
- (Perseveration)
- (Inattention)

Cognitive Rigidity

Abnormal regulation of sleep

Abnormal Sensory Processing

Abnormal regulation of stress

Dopamine

(Dopaminergic; Noradrenergic; Sympathomimetic)

Atypical Neuroleptics

Dopamine

Substantia Nigra (“black stuff”), Ventral tegmentum, arcuate nucleus

Nestler, Molecular Neuropharmacology, Fig 8.6
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NAEYC 11/09/2012

Atypical Neuroleptics
(Dopamine Blockers)

Side Effects
Sleepiness (initially)
Weight Gain (common)
Diabetes (uncommon)
Movement Disorder (rare)

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Atypical Neuroleptics

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References
(neuroleptics, AEDs, GABA)


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Regulation of Sleep - 1

- Melatonin
  - Brain hormone
  - Metabolic rate (Heart, Temp)
  - "You’re sleepy now"
- Suppressed by light
  - 24 hr cycle
  - Seasonal cycle

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Regulation of Sleep - 2

- Abnormal melatonin cycling
  - Primary disorders of sleep
  - Blindness
  - ASD
- Symptoms
  - Delayed onset of sleep
  - Shortened duration / frequent wakening

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Regulation of Sleep - 3

- Shared genetic control
  - Regulation of sleep
  - Regulation of arousal
- Family history of sleep disorder

Sensory Processing

- Subjective Properties
  - Familiar / Unfamiliar
  - Pleasant / Unpleasant
  - Strong / Weak
  - Internal / External
- Sensory Input ➔ Self-awareness
- Mirror Neurons ➔ Empathy


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Summary

Why this child?
- What is this child’s developmental level?
  - Is this stage-appropriate behavior?
  - Does the behavior serve a social function?
    - Escape, access, attention
  - Is the classroom placement appropriate?
    - Language level?
  - Does this behavior occur in other settings?
    - Family factors?
      - Parents consistent at home?
      - Parental psychopathology? (Anxiety, Depression, Alcohol)

Behavioral Intervention – Usually
- Medication: Sometimes

An ounce of prevention….

- Identify internalizing behaviors before they lead to externalizing behaviors
  - Behavior Management Plan that proactively seeks to avert or dissipate anxiety

The whole is greater than the sum of its parts
Max Wertheimer
Clinical Pearl

- Beware of anxiety or perseveration masquerading as inattention
  - Perseveration on inner stimuli: “Inattentive”
  - Perfectionism: “Problems w. task completion”
  - Anxiety: “Rushes through work”

Summary

Directions for future research:
- Better phenotyping of ASD
  - Clinical
  - Genetic
- Better drug studies
  - Drug vs. Behavioral Therapy vs. Combination
  - Drug vs. Drug (not just drug vs. placebo)
  - Drug combinations (not just monotherapy)
    - Stimulant + SSRI, e.g.
    - Better outcome measures
    - Quality of Life
    - Long-term outcome
- Brain / Behavior / Drug imaging

For additional information:

- Or go to: www.drcoplan.com and click on “When is behavior not behavioral?”

Thank you