Psychopharmacology in children with autistic spectrum disorders: When “behavior” is more than just behavior

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Disclosures / References

• 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

Chapter 12: Behavior management and psychopharmacology

• This presentation will include a discussion of off-label drug use
Outline / Basic Premises

- Biologically driven behaviors
  - Occur irrespective of environmental contingencies
  - Do not serve a social function
- Specific behaviors are tied to specific neurotransmitters / brain systems
  - Internalizing Behaviors
  - Externalizing Behaviors
- How to recognize
- What to do

Neuropsychological Deficits in Children with ASD

- Cognitive Rigidity
- Abnormal Sensory Processing
- Abnormal regulation of sleep
- Abnormal regulation of attention
- Abnormal regulation of arousal

- Agitation
- Aggression
- Disruptive behavior
- Abnormal regulation of attention
Abnormal regulation of arousal

Abnormal regulation of sleep

Abnormal regulation of attention

Abnormal sensory processing

Cognitive Rigidity:
Changes in Routine / Unmet Expectations

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

Rainman, 1988
Cognitive Rigidity
(Difficulty shifting mental sets)

- Insistently repetitious behavior
- Difficulty with unmet expectations
- Perfectionism
- Obsessions
  - (Anxiety)
  - (Depression)

"Internalizing Behaviors"

Perfectionism

Perfectionism

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Compulsions

Joseph F: 15 y.o. boy Asperger Syndrome

Anxiety

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

“A house is on fire and we are running for our life.”
A.W.: 9 year old boy with PDD-NOS and normal IQ (MRN 11-07710)

Anxiety

“Standing in the Atlantic Ocean. The ocean has a very high surface, up to their mouth, so they can’t breathe.” Six year old boy with ASD and Anxiety.

Depression

KO: 10 yr old female, PDD-NOS, normal IQ
Depression, Anger

Unaddressed internalizing behavior often comes out as externalizing behavior

"An ounce of prevention is worth a pound of cure"
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.*
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”)?

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.”
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.”

“We caution against the use of the word “stubborn” to characterize Ryan’s classroom behavior. Ryan’s task avoidance and non-adherence to teacher instruction reflect **cognitive rigidity and anxiety, rather than “stubborn” behavior.** Re-framing his actions will lead to more appropriate intervention, placing the focus on **anxiety management and cognitive flexibility,** rather than “compliance.”

<table>
<thead>
<tr>
<th>Self-centered</th>
<th>Unmotivated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inconsiderate of others</td>
<td>Inattentive</td>
</tr>
<tr>
<td>Non-compliant</td>
<td>Lazy</td>
</tr>
<tr>
<td>Willfully Disobedient</td>
<td>Disrespectful</td>
</tr>
<tr>
<td>Stubborn</td>
<td>Could do better if only he tried harder</td>
</tr>
<tr>
<td>Rude</td>
<td></td>
</tr>
</tbody>
</table>
Selective Serotonin Reuptake Inhibitors (SSRIs)

- Primary targets
  - Cognitive Rigidity
  - Anxiety
  - Obsessions (thoughts)
  - Compulsions (behavior)
  - Perfectionism
  - Depression
  - Stereotypies: Probably not

- “Downstream” benefit:
  - Disruptive Behavior
  - Quality of Life

SSRIs in ASDs

- Side Effects
  - Activation
    - Hyperactivity
    - Irritability
    - Insomnia
    - Agitation
  - Uncommon or irrelevant
    - GI dysfunction
    - Sexual dysfunction
    - “Black Box” warning (suicidal mentation)
### Selective Serotonin Reuptake Inhibitors (SSRIs)

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
<th>Comment</th>
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</thead>
<tbody>
<tr>
<td>Fluoxetine</td>
<td>Prozac</td>
<td>The first selective SRI</td>
</tr>
<tr>
<td>Fluvoxamine</td>
<td>Luvox</td>
<td></td>
</tr>
<tr>
<td>Sertraline</td>
<td>Zoloft</td>
<td>May be less activating</td>
</tr>
<tr>
<td>Citalopram</td>
<td>Celexa</td>
<td>Prolonged QT interval</td>
</tr>
<tr>
<td>Escitalopram</td>
<td>Lexapro</td>
<td>Prolonged QT interval</td>
</tr>
<tr>
<td>And others</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Anxiety

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

### Anxiety after Rx with CBT & Escitalopram

RD. 9 y.o. F, nl IQ, PDD-NOS & Anxiety. Father: GAD
Abnormal regulation of arousal

- Abnormal regulation of sleep

Abnormal sensory processing

Rigid

Regulation of Attention

Let go & Shift

Attend to stimulus #1

Attend to stimulus #2

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 arousal

Abnormal regulation of attention

- Perseveration
- Inattention

Cognitive Rigidity

Rigid + Perseverative

SSRIs

Abnormal regulation of sleep

Abnormal Sensory Processing

Routines

Stereotypies

Agitation

Aggression

SIB

"Draw a picture of your family" – Typical 4 year old

"Draw a picture of your family" – 8 yr old with ASD
Perseveration

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
Abnormal regulation of arousal

Abnormal regulation of attention
- Perseveration
- Inattention

Cognitive Rigidity

Abnormal regulation of sleep

Abnormal Sensory Processing

Routines

Stereotypies

Agitation

Aggression

SIB

Impulsivity

Hyperactivity

- Stimulants
- \(\alpha\)-2 agonists

Impulsive Rigid + Perseverative

Inattention

- Classroom interventions
  - Limited stimuli
  - Short work periods
  - Preferential seating

- Medication
  - Stimulants & Norepinephrine Reuptake Inhibitors (NRIs)
    - May \(\uparrow\) anxiety / rigidity / agitation / Tics
  - Alpha-2 agonists
    - Sleepiness
    - Occasional weepiness
    - Hypotension: Rare (start low, & go slow)

Stimulants, NRI's

<table>
<thead>
<tr>
<th>Generic Name(s)</th>
<th>Brand Name(s)</th>
<th>Comment</th>
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</thead>
<tbody>
<tr>
<td>Amphetamine</td>
<td></td>
<td>FDA Schedule II</td>
</tr>
<tr>
<td>Dextroamphetamine</td>
<td></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>Dexamfetamine</td>
<td>Focalin</td>
<td>FDA Schedule II</td>
</tr>
<tr>
<td>Atomoxetine, Attentin</td>
<td>Strattera</td>
<td>Norepinephrine reuptake inhibitor (NRI), not FDA Schedule II</td>
</tr>
<tr>
<td>Lisdextroamphetamine</td>
<td>Vyvanse</td>
<td>Pro-drug of D-amphetamine; Not FDA-II</td>
</tr>
</tbody>
</table>
### Alpha-2 Agonists

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name(s)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clonidine</td>
<td>Catapres</td>
<td>More sedating than guanfacine</td>
</tr>
<tr>
<td>Guanfacine</td>
<td>Tenex, Intuniv</td>
<td></td>
</tr>
</tbody>
</table>

- Frontal cortex / Locus Ceruleus: post-synaptic alpha-2 receptors
- Sympathetic outflow (autonomic nervous system): Pre-synaptic autoreceptors ●●BP

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### Clinical Pearl

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

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### Regulation of Arousal

Hypoarousal  
- Lethargic ↔ 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
- (Hypo-arousal)
- (Hyper-arousal)

Routines
Stereotypies
Agitation
Aggression
SIB
Impulsivity
Hyperactivity

Atypical Neuroleptics

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand Name</th>
<th>Comment</th>
</tr>
</thead>
</table>
| Aripiprazole | Abilify   | • Relatively less risk of weight gain  
|              |           | • FDA approved for Rx of ASD       |
| Clozapine    | Clozaril  | • Bone marrow suppression           |
| Olanzapine   | Zyprexa   | • Greater risk of weight gain       |
| Quetiapine   | Seroquel  | • Greater sedation                 |
| Risperidone  | Risperdal | • Greater risk of weight gain       
|              |           | • FDA approved for Rx of ASD       |
| Ziprazidone  | Geodon    | Relatively less risk of weight gain |

“He is so hard to calm down when he gets upset….His emotional thermostat doesn't work… We feel like we’re walking on eggshells all the time.”
Parent of an 8 year old with ASD and unpredictable bursts of agitation
Regulation of Sleep - 1

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

Regulation of Sleep - 2

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

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


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

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Abnormal regulation of arousal
- Hyperactivity
- Agitation
- Aggression
- SIB
- Sensory overload
- Sensory seeking
- Impulsivity
- Hyperactivity
- Disruptive
- Rigid
- Perseverative

Abnormal regulation of sleep
- Abnormal regulation of sleep
- Metabolism
- Sensory overload
- Hypo-arousal
- Hyper-arousal

Abnormal regulation of attention
- Perseveration
- Inattention

Cognitive Rigidity

Sensory Dysfunction

Routine Stereotypes

Abnormal Sensory Processing

Disordered Sleep

SSRIs

Disordered Sleep

Sensory Dysfunction

Impulsive + Agitated / Disruptive

Impulsivity Hyperactivity

Atypical neuroleptics, α-2 agonists

Stimulants, α-2 agonists

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)

Summary

- Why this child?
  - Neuropsychological factors?
    - Cognitive Rigidity
      - Internalizing Behavior ⇒ Externalizing Behavior
    - Dysregulation of attention
    - Dysregulation of arousal
    - Sensory Seeking / Sensory Overload
  - Behavioral Intervention – Usually
  - Academic Intervention – sometimes
    - Shift from rote to inferential learning (2nd - 3rd grade): challenge
  - Medication - Sometimes
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