Behavior management and psychopharmacology in children with autistic spectrum disorders

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Outline / Basic Premises - 1
• Biologically driven behaviors / traits
  – Cognitive Rigidity
  – Dysregulation of Attention
  – Dysregulation of Arousal
  – Dysregulation of Sleep
  – Dysregulation of Sensory Processing
• Occur irrespective of environmental contingencies
• Do not serve a social function
• Specific behaviors / traits are tied to specific neurotransmitters / brain systems

Outline / Basic Premises - 2
• Socially driven behaviors
  – Occur in response to environmental contingencies
  – Serve a social function
    • Attention
    • Access to desired objects or activities
    • Escape from undesired activities
  – A-B-C Model
    • What is the Antecedent to the behavior?
    • What is the Behavior itself?
    • What are the Consequences for the behavior?
Outline / Basic Premises - 3

- Behavior analysis needs to take biological and environmental factors into account:
  - Underlying biological traits often provide the child with lots of opportunities to make unfortunate discoveries (e.g., Tantrums or SIB are great ways to get attention or escape from tasks)
- Intervention often requires both pharmacologic and behavioral measures

Neuropsychological Deficits in Children with ASD

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

Cognitive Rigidity

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

“Externalizing Behaviors”
- Agitation
- Aggression
- Disruptive behavior

“Internalizing Behaviors”
- Obsessions
- Anxiety
- Depression

MAGIC BALL

- Without a doubt
- Reply hazy, try again
- Signs point to NO
- Better not tell you now...
Unaddressed internalizing behavior often comes out as externalizing behavior

Internalizing Behavior
- Anxiety
- Depression
- Perseveration
- Perfectionism
- etc

Externalizing Behavior
- Tantrums
- Aggression
- SIB
- etc

Abnormal regulation of arousal
Abnormal regulation of attention
Abnormal regulation of sleep

Cognitive Rigidity: Changes in Routine / Unmet Expectations

Perfectionism

Perfectionism

Perfectionism

Care of the Sick Child
November 13-15, 2013
Compulsions

Joseph F: 15 y.o. boy Asperger Syndrome

Anxiety

RM: 9 y.o. boy: ASD, normal IQ, anxiety d/o, disruptive behavior. Mother: Anxiety D/O; PGM hoarding & OCD

Anxiety

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

Anxiety

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

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

“I. B. MRN 06-0256

IB; 12 yr old male, Mild ASD, Superior IQ

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

“I. B. MRN 06-0256

IB; 12 yr old male, Mild ASD, Superior IQ

“Draw a picture of your family, with everybody in the picture doing something.”

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“I. B. MRN 06-0256

IB; 12 yr old male, Mild ASD, Superior IQ

“I. B. MRN 06-0256

IB; 12 yr old male, Mild ASD, normal IQ
Perseveration / Depression

IB: 12 yr old male, Mild ASD, normal IQ

Anxiety, Perfectionism, and Self-Injurious Behavior

Standard Score: 138

A.D.: 9 y.o. girl with ASD (my MRN: 06-0227)
Throughout the session, “Alice” delivered a steady stream of self-depreciating 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.

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.

Unaddressed internalizing behavior often comes out as externalizing behavior

Internalizing Behavior
- Anxiety
- Depression
- Perfectionism
- etc

Externalizing Behavior
- Task avoidance
- Tantrums
- Aggression
- SIB
- etc

FBA Behavior Plan

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Internalizing Behavior
- Anxiety
- Depression
- Perfectionism
- etc

Externalizing Behavior
- Task avoidance
- Tantrums
- Aggression
- SIB
- etc

Positive Behavior Support Plan:
Proactively avert, or identify and dissipate anxiety

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

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.”

Positive Behavior Support Plan for Internalizing Behavior

- 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

Disrespectful
Disruptive
Non-compliant
Impulsive
Unmotivated
Inattentive
Stubborn
Could do better if only he tried harder
Aggressive
Harder
Not seeing the vase
(ignoring internalizing behavior)

“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.”

Positive Behavior Support Plan for Internalizing Behavior

- Staff Awareness
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Visual Schedules

The Incredible 5-Point Scale

Karl Dunn Barney and MTI Cartels

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Positive Behavior Support Plan for Internalizing Behavior

- Staff Awareness
- Visual Schedules
  - What am I supposed to be doing now?
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- SSRIs

Serotonin (5 HT)

Serotonin

Neuler, Molecular Neuropharmacology, Fig 9.3
Serotonin (5 HT) Pathways

Stahl, Essential Psychopharmacology, fig 5.52-3

Serotonin promoting (serotonergic) drugs

A. Promote release of serotonin (Mirtazipine)
B. Mimic the action of serotonin at the 2nd neuron (Buspirone)
C. Block re-uptake of serotonin (SSRIs)

Selective Serotonin Reuptake Inhibitors (SSRIs)

- Primary targets
  - Cognitive Rigidity
  - Anxiety
  - Obsessions (thoughts)
  - Compulsions (behavior)
  - Perfectionism
  - Depression
  - Stereotypes: Probably not
- “Downstream” benefit:
  - 🌋 Disruptive Behavior
  - ⬆️ Quality of Life

Selective serotonin reuptake inhibitors (SSRIs) for autism spectrum disorder (ASD).
Williams, K., et al., Cochrane Database Syst Rev, 2010. 8: p. CD004677

- Studies reviewed: 7 randomized controlled trials / 271 participants
  - Fluoxetine (2), fluvoxamine (2), fenfluramine (2), citalopram (1)
  - Subjects: Children (5); Adults (2)
  - Varying inclusion criteria for Dx of ASD and IQ
  - 17 different outcome measures
- “Data were unsuitable for meta-analysis”
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 3), venlafaxine 2)
    - Benzodiazepines: 2 (alpracalam 1, clomazepam 1)
  - Tricyclic antidepressants: 1 (desipramine)

- Meta-analysis
  - Response rate: Medication 59%; Placebo 31%
  - 7.3% of subjects treated with SSRIs withdrew bec/o 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. 9 y.o. F, nl IQ, PDD-NOS & Anxiety. Father: GAD www.drcoplan.com

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

Anxiety
"The house is on fire and we are running for our life.
A.W.: 5 year old boy with PDD-NOS and normal IQ (MRN 11-07710)

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Fluoxetine 10 mg/d

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

Fluoxetine 10 mg/d + Psychotherapy

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 (my MRN: 06-0227)

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.

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 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

Abnormal regulation of arousal

Abnormal regulation of attention

- (Perseveration)
- (Inattention)

Cognitive Rigidity

Abnormal Sensory Processing

Abnormal regulation of sleep

Noradrenergic pathways

(Norepinephrine)

Locus Ceruleus ('blue spot'): Principal noradrenergic source in brain.

Neufer, Molecular Neuropharmacology, Fig 8.5

Noradrenergic pathways

(Norepinephrine)

Stahl, Essential Psychopharmacology, fig 5.25
Noradrenergic pathways
(Norepinephrine)

Excess Noradrenergic Activity ➔ Hypervigilance, Agitation

Stahl, Essential Psychopharmacology, fig 5.26

Inattention

Insufficient activation of frontal cortex ➔ Inattention

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)

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Stimulants, NRI’s

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<tr>
<td>Atomoxetine, Attentin</td>
<td>Strattera</td>
<td>Norepinephrine reuptake inhibitor (NRI), not FDA Schedule II</td>
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Alpha-2 Agonists

**Alpha-2 Agonists**

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

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

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

Alpha-2 Agonists

- Clonidine
  - Catapres
  - More sedating than guanfacine
- Guanfacine
  - Tenex, Intuniv

Clinical Pearl

- Beware of Cognitive Rigidity masquerading as ADHD
  - Perseveration on inner stimuli: “Inattentive”
  - Perfectionism:
    - “Problems w. task completion”
    - (Or: Task avoidance!)
  - Anxiety:
    - “Rushes through work”
    - “Out of seat behavior”
**Regulation of Arousal**

Hypoarousal
- Lethargic

Calm & Relaxed

Fight or Flight Response

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

Dopamine

Substantia Nigra ("black stuff"), Ventral tegmentum, arcuate nucleus

Netter, Molecular Neuropharmacology, Fig 8.6

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

Combative

“Fight or Flight” Response

Hyporarousal

Calm & Relaxed

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

Dopamine

Substantia Nigra ("black stuff"), Ventral tegmentum, arcuate nucleus

Netter, Molecular Neuropharmacology, Fig 8.6

“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

F.O. MRN 06-0208

Dopamine

(Dopaminergic; Noradrenergic; Sympathomimetic)

Re-Uptake

Attention

Agitation

Aggression

Fight or Flight
Atypical Neuroleptics
(Dopamine Blockers)

- Atypical neuroleptics block D2 receptors

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

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Anger (mood)
9 y.o. boy with ASD, Normal IQ
Angry, sullen, ?anxious / depressed
“Draw a picture of your family with everybody in the picture doing something.”

JH; 10 yr old male, PDD-NOS

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Anger (mood)
9 y.o. boy with ASD, Normal IQ
Angry, sullen, ?anxious / depressed

L.C., MRN 10-0660

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Atypical Neuroleptics

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<td>• FDA approved for Rx of ASD</td>
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<td>Clozaril</td>
<td>• Bone marrow suppression</td>
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<td>• FDA approved for Rx of ASD</td>
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<tr>
<td>Ziprazidone</td>
<td>Geodon</td>
<td>Relatively less risk of weight gain</td>
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Abnormal regulation of arousal
Abnormal regulation of attention
Cognitive rigidity

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

Regulation of Sleep - 3

- Shared genetic control
  - Regulation of sleep
  - Regulation of arousal
- Family history of sleep disorder
Behaviorism made simple

**STIMULUS (the Antecedent)**

**RESPONSE (the Behavior)**

**The Consequence**
Antecedents

- External:
  - Imposition of a task
  - Change in routine
  - Denial of access to preferred object
- Internal:
  - Hunger, Thirst
  - Cognitive Rigidity (anxiety, perfectionism, etc.)
  - Other biological drivers

Antecedents: A caveat….

- Behaviorism disregards “private mental events” (“emotions”)
  - Ignores anxiety, depression, perfectionism
  - Lacking recourse to internal emotional state, Behaviorism tends to infer task avoidance, rather than anxiety avoidance, as the “presumed function” of many behaviors

Behavior

- “Topography”
  - “What does the behavior look like?”
    - Verbal defiance
    - Task refusal
    - Flopping
    - Property destruction
    - SIB (describe)
    - Eloping
    - Etc…

Consequences 1: Reinforcers

- Reinforcers lead to an increase in frequency of the antecedent behavior
  - Positive Reinforcement (adds something)
    - Attention
    - Access to desired object / activity
  - Negative Reinforcement (removes something)
    - Escape from task

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.
  - OR: Simplify the task to a level that the child can achieve, then work back up to the harder task
  - 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 behavior / games**
An ounce of prevention….

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

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
    - Dysregulation of attention
    - Dysregulation of arousal
    - Sensory Seeking / Sensory Overload
  - Behavioral Intervention – Usually
  - Change in classroom setting – sometimes
    - Shift from rote to inferential learning (2nd - 3rd grade): challenge
  - Medication: Sometimes