Autism and My Sensory Based World

Temple Grandin
• A good teacher is gently insistent
• Early intervention essential
• Minimum 20 hours weekly
Sensory processing disorder occurs with many other disorders (co-morbid)

- Autism spectrum
- Dyslexia
- Learning problems
- ADHD
- Asperger
- Head injury
- Oppositional defiant
- Many others
Child blocks ears because certain sounds hurt

_Little Rainman_ by Karen Simmons
Auditory Threshold Normal

- Hearing auditory detail is impaired
- Stretch out and enunciate consonants
- Hearing may be like a bad mobile phone connection
- Occurs with many disorders

Echolalia increases as receptive language becomes worse

Jacqueline Roberts 1997
Attention shifting slowness occurs with many disorders.

Takes longer to shift back and forth between two different things.
Viewer with Autism (Red Line)  
Normal Comparison Viewer  
(Yellow Line)
Visual images break up and fragment

Fig. 4. The stages of “mosaic” vision, as experienced during migraine aura (see text)

Oliver Sacks
Signs of Visual Processing Problems

- Finger *flicking* near eyes
- Tilts head
- Hates *escalators*
- Hates *fluorescent lights*
- Difficulty *catching* a ball
- Eye exams may be *normal*
Perspectives: J. Stein and V. Walsh – Temporal processing and dyslexia

Words can be hard to read for several different reasons.

Fig. 1. Words can be hard to read for several different reasons. Visual confusions can cause letter reversals (‘worbs’), distortion and blurring (‘can be hard to read’) and superimposition (‘for several different’).

Dyslexia is caused by defects in brain circuits which process fast moving auditory and visual information. Reading and doing number work with one eye may improve reading and help stabilize abnormal eye movements.
Interventions for Visual Processing Problems

- Incandescent lamp by desk
- Block fluorescent lights with a hat
- Laptop computer
- Gray, tan, or pastel paper
- Irlen lenses or pale colored glasses
- Balancing games- sit on ball
- Prism glasses- Developmental Optometrist
Severe Sensory Problems

- Background noise problems
- Mono-channel
- Body boundary problems
- Often an auditory thinker

Best book

*How Can I Talk If My Lips Don’t Move: Inside My Autistic Mind*
by Tito Rajarshi Mukhopadhyay
What Have Scientists Learned?

Sensory problems are **real**

Immature **lower** brain areas

Abnormal circuits between different brain regions

Sensory problems are **variable**

Many **word based** tasks are processed in **visual areas** of the brain

Frontal cortex is **used less** because it has missing circuits

Eric Courchesne, Nancy Minshew, Margaret Bauman
Frontal Cortex
Executive Function

Language
Verbal Thought

Visual, Musical and Math Cognition

Emotion
Amygdala

Visual Processing
Auditory Processing
Sensory Problems
My mind works like Google for Images

Little Rainman by Karen Simmons
Sensory thinkers sort specific pictures, sounds, touches, and smells into categories.

*Little Rainman* by Karen Simmons
I realized my thinking was different when I asked other people to think about church steeples
Most people see in their imagination a generalized genetic steeple
I see only specific pictures of steeples I have observed.

They flash into my memory like a series of still Googled pictures.
My childhood church
First category under steeples
Local churches in Fort Collins
Secondary category under steeples
Famous Steeples
Mormon Temple, Washington, D.C.
Third category under steeples
Famous Steeples
Old North Church - Boston
Third category under steeples
Famous Steeples
Notre Dame
Third category under steeples
Famous Steeples
Westminster Abbey
Brain Scans

Control

T. Grandin

Humphreys, Minshew, Behrmann, and Cibu, 2006
Develop Talents in the Individual’s Specialist Brain

1. Photo Realistic Visual Thinking – Poor at algebra
2. Pattern Thinker Music and Math – Poor in reading
3. Verbal Facts Language Translation – Poor at drawing
4. Auditory Thinker – Visual perception fragmented

There can be mixtures of these thinking types
All my thinking uses specific examples to create concepts

It is bottom up thinking and not top down thinking

I learned ALL concepts using specific examples
Play games with categorizing many objects to learn concepts such as color, shape, bigger than, smaller than, clothing, food, etc.
Details are Attended to Instead of Whole Gestalts

- Autism faster response time to small letters
- Attend to details of faces instead of the whole

Behrmann et al., *Neuropsychologia* 2005
Is autistic learning just memorization? It is memorization and scripting, but as more information is memorized, it can be assembled into more and more categories which will help thinking to become more flexible.
Make number concepts real with objects the child can manipulate

Base Ten Blocks work well
Teach Number Concept Generalization

- Count a variety of different kinds of objects
- Addition and Subtraction - Teach with many objects
- Fractions – Teach by cutting up fruit and paper circles
I am what I do more than what I feel. Social skills can be taught but social emotion relatedness may remain absent or weak.
Objects are More Interesting than Faces

T. Grandin

Blue = objects

Control

Red = faces

Humphreys, Minshew, Behrmann, and Cibu, 2006
Social Interaction Through Shared Interests

- School Clubs
- Hobbies
- Careers
- Classes that really interest an individual
Categorize Behavior Problems

- Is it biological?
  - Sensory over sensitivity
  - Hidden painful medical problem

- Is it behavioral?
  - Frustration because cannot communicate
  - Get attention
  - Escape from a task
Sensory and Neurological Problems That May Need Accommodations

- Screams when the fire alarm rings
- Tantrums in a supermarket
- Cannot tolerate scratchy clothes
- Poor handwriting
- Tantrums or hyperactive under fluorescent lights
- Difficulty multitasking
- Difficulty with long verbal directions
My 1950’s upbringing taught me many important social and job skills. Everything was learned by categorizing specific examples into these concepts:

- Turn taking in conversation and activities
- Being on time
- Do things I was asked to do
- Doing things that pleased other people
- Saying *please* and *thank you*
- Social mistakes were instantly corrected by telling me what to do
Bad Behavior Was Not Tolerated When I was a Child

- Being rude
- Bad table manners
- Manipulating a teacher by having a tantrum
- Poor grooming and sloppy clothes
- Laughing at an overweight woman
- Swearing
Eccentric is acceptable; being dirty and rude is not.

Do not try to de-geek the geek!
Rule System

1. Really bad things
2. Courtesy rules
3. Illegal but not bad
4. Sins of the system
Teach Values One Concrete Example at a Time

My childhood 1950’s TV heroes had clear values of right and wrong

Kids today see too many grownups behaving badly
Hidden Painful Medical Problems in Non-Verbal Individuals That Can Cause SEVERE Behavior Problems

- Acid Reflux heartburn (most common). Not always obvious.
- Constipation
- Urinary tract infection
- Yeast infection
- Ear infection
- Bad tooth
- H pylori (stomach, ulcer bug)
The squeeze machine helped reduce anxiety and panic attacks.
Fear is the main emotion in Autism
Using pressure to calm the nervous system during therapy
Sometimes speech is easier when the child is swinging
Sitting on a ball and wearing a weighted vest helps concentration. Use for 20 minutes then take off for 20 minutes.
It is important to desensitize touch sensitive autistic children so that they will enjoy affection. Feeling the good feelings of being held helps to develop feelings of kindness.
Preparing for Employment

1. Jobs for teenagers
2. Mentors
3. Visit work place
4. Trade journals
5. Wall Street Journal
   - Make portfolio - people respect talent
6. Sell your skill, not yourself
I was a poor student but I learned lots of valuable work skills in high school. I did building projects that other people appreciated.
LEGO® MINDSTORMS™ & LEGO Technic

Teaching an Old Toy Some Cool New Tricks

If Tamagotchi left you with the impression that all digital toys are brain dead, Lego Mindstorms could change your mind. This fall the venerable plastic building blocks will come with motors, sensors, CD-ROM and computer controller, enabling kids to create blinking, thinking, moving robots. Developed with M.I.T.’s Media Lab, the new Legos ($200) require children (or their parents) to master a computer-programming language before they can bring the toys to life. With 700 pieces, the set should keep kids busy for days before they terrorize the household.
People Were Impressed With My Drawings
My Design in Google SketchUp

Search for “sketchup spectrum”
Educational Resources

- Community Colleges
- Technical Schools
- On-line Learning
- University Courses
Science Websites

- U.S. National Science Digital Library Project
- The Science Prize for Online Resources in Education (SPORE)
- Physics Education Technology PhET
- Open Course Ware Consortium
Show Kids Interesting Things
The Guys Have Fun with Stuffy the Mechanical Cow on the HBO Movie Site
Jobs for Visual Thinkers

- Industrial design
- Computer network specialist
- Graphic arts
- Drafting
- Auto mechanic
- Computer repair
- Handcrafts
- Equipment design
- Computer troubleshooter
- Photographer
- Animal trainer
- Architect
Jobs for Music and Math Thinkers

Math teacher
Scientific researcher
Electronics technician
Music teacher
Chemist

Computer programmer
Engineer
Physicist
Musician/composer
Statistician
Jobs for Verbal Thinkers

- Stocks and bonds analyst
- Journalist
- Translator
- Librarian
- Copy editor
- Accountant
- Bookkeeper & record keeper
- Budget analyst
- Special education teacher
- Book indexer
- Speech therapist
- Inventory control specialist
- Legal researcher
- Stage actor
Bad Jobs for People with Autism

Require lots of short term working memory and fast processing information

My working memory is terrible

Cannot remember more than three steps

Cashier in a busy restaurant would be very difficult
Jobs for People with Poor Verbal Skills or Non-Verbal

- Shelve Library Books
- Factory Assembly Work
- Fast Food Restaurant Work
- Data Entry
- Lawn and Garden Work
- Recycling Plant/Warehouse
- Stocking Shelves
- Inventory Control
- Handcrafts
Evaluation of Treatments

- Risk versus Benefit
- Cost versus Benefit
- Evidence of Effectiveness
SSRI’S

Work really well for anxiety and panic attacks

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Brand Name</th>
<th>Active Ingredient</th>
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<tbody>
<tr>
<td></td>
<td>Prozac</td>
<td>(fluoxetine)</td>
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<tr>
<td></td>
<td>Zoloft</td>
<td>(sertraline)</td>
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<td></td>
<td>Celexa</td>
<td>(citalopram)</td>
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<td></td>
<td>Lexapro</td>
<td>(escitalopram)</td>
</tr>
<tr>
<td></td>
<td>Paxil</td>
<td>(paroxetine)</td>
</tr>
</tbody>
</table>
Atypicals
May have severe side effects

- Risperdal (risperdone)
- Geodon (ziprasidone)
- Zyprexa (olanzapine)
- Abilify (aripiprazole)
- Seroquel (quetiapine)
Low Dose Principle

Some individuals on the autism spectrum need only \( \frac{1}{4} \) to \( \frac{1}{2} \) of the normal starting dose of drugs in these 3 classes:

- SSRI Antidepressants
- Tricyclic Antidepressants
- Atypical Antipsychotics

Too much causes insomnia, agitation and irritability. Other drugs usually require normal doses. If used in small children, micro doses – 1/10 of mg of Rispordal.
Principles of Using Medication

- Try one thing at a time
- A medication should have an obvious beneficial effect
- Withdraw a medication slowly, if a person has been on it a long time
- Be careful switching brands
- Don’t expect 100% control of a symptom
Beta - Blockers

Propranolol
Anti-Convulsant Drugs for Aggression and Mood Stabilization

- Depakote
- Lamitel (lamotrigine)
- Topamax (topiramate)
ADHD Drugs and Autism

- Stimulants tend to make classical autism worse
- Stimulants sometimes help individuals with mild asperger’s
Look Up All Drug Interactions

- Prescription drugs
- Non-prescription drugs
- Herbal supplements
Special diets work for some individuals

Vitamins and supplements

Vigorous exercise for calming

Weighted blanket or vest for calming

Omega 3 supplements help the brain

Poor diet – more depression
Traits in Close Relatives

Four Generations of Bankers
MIT-Trained Engineer/Co-Inventor Auto Pilot
Anxiety
Depression
Visual Thinking Skills – Artist, Home Decorators
Food Allergies
Intellectual Giftedness – Writing English Literature
Asperger Traits
Einstein had many autistic traits
Autism.org

800-3-AUTISM

grandin.com

Future Horizons
http://www.fhautism.com/

Autism Asperger Publishing
Books by Temple Grandin

- Thinking in Pictures
- Developing Talents
- Animals in Translation
- Unwritten Social Rules
- Emergence Labeled Autistic
- The Way I See It
- Animals Make Us Human