

Autism and My Sensory Based World – 2nd Edition



Temple Grandin



- A good teacher is gently insistent
- Early intervention essential
- Minimum 20 hours weekly of one-to-one teaching

- A child has to be pushed to keep learning new skills
- Pushing too hard causes sensory overload and no progress
- Never have sudden surprises. This causes fright and tantrums
- Adults and teenagers must also be pushed to try new things and keep learning

Sensory processing disorder occurs with many other disorders (co-morbid)

- Autism spectrum
- Dyslexia
- Learning problems
- ADHD
- Asperger
- Head injury
- Oppositional defiant
- Many others

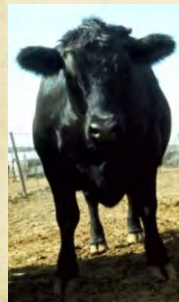
Child blocks ears because certain sounds hurt



Sounds are better tolerated when the child initiates them.

Little Rainman by Karen Simmons

Auditory Threshold Normal

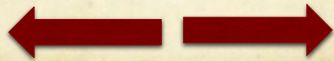


- Hearing auditory detail is impaired
- Stretch out and enunciate consonants
- Hearing may be like a bad mobile phone connection
- Occurs with many disorders

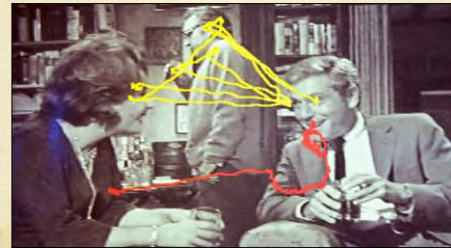
Echolalia increases as receptive language becomes worse
Jacqueline Roberts 1997

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)**



Ami Klin

Visual images break up and fragment

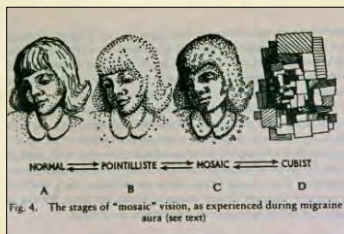


Fig. 4. The stages of "mosaic" vision, as experienced during migraine aura (see text)

Oliver Sacks

Signs of Visual Processing Problems

- Finger flicking near eyes
- Tilts head when looking at things
- Hates escalators
- Hates fluorescent lights
- Difficulty catching a ball
- Eye exams may be normal



Words vibrate and jiggle on page

Trends in Neuroscience, Vol. 20, pp. 147-152, 1997

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

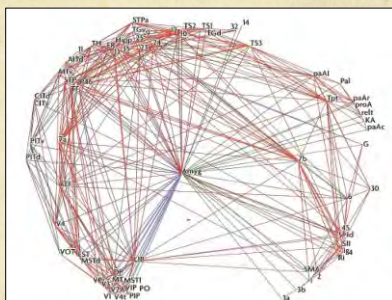
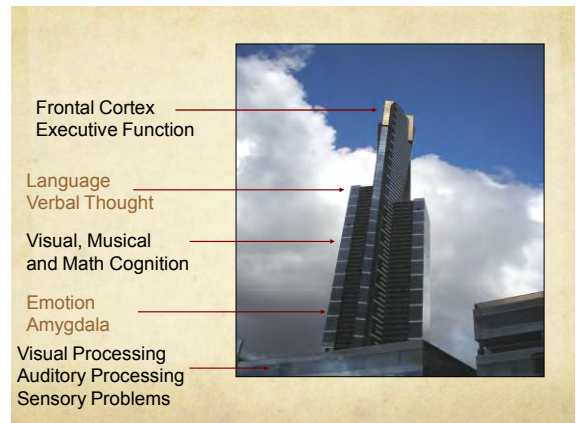
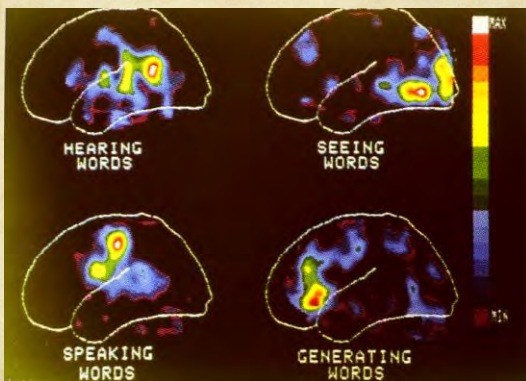
Sensory problems are variable

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

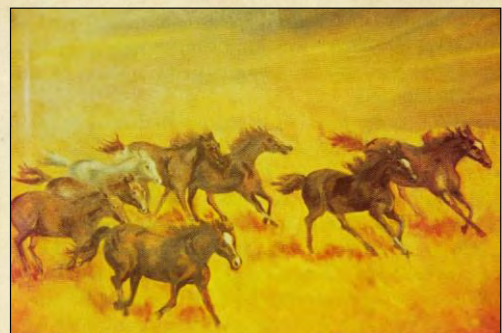
Frontal cortex is used less because it
has missing circuits



Eric Courchesne, Nancy Minshew, Margaret Bauman



Heller, W., and Nitsch, J.B. 1997, Cognition and Emotion, 11:637-661.



Miller et al., 1998 *Neurology*, 51:978-981

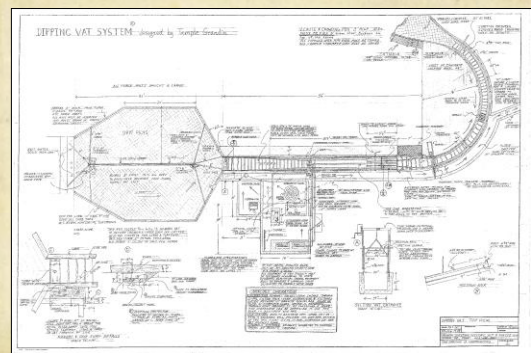
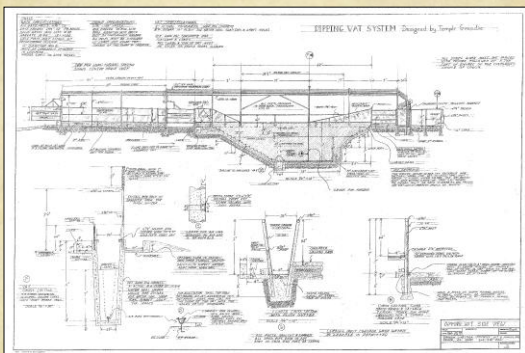
Develop the Child's Strengths



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 generic 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**



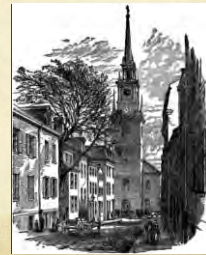
Famous Steeples

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

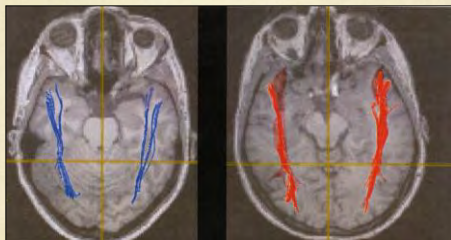
Westminster Abbey



Brain Scans

Control

T. Grandin

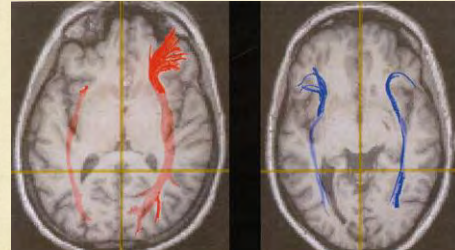


Humphreys, Minshew, Behrmann, and Cibu, 2006

Brain Scans

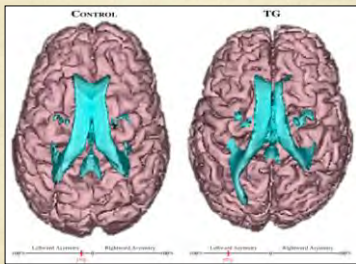
T. Grandin

Control



Humphreys, Minshew, Behrmann, and Cibu, 2006

Abnormalities in Left Hemisphere



University of Utah, 2010

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

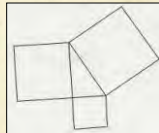


There can be mixtures of these thinking types

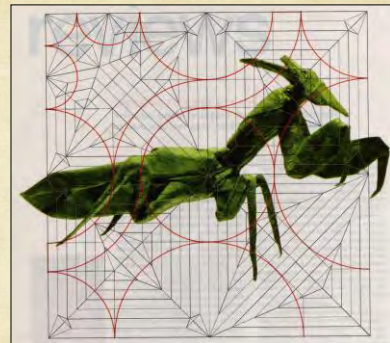
Two Categories of Mathematicians

Geometers – See this figure

Algebraists
 $a^2 + b^2 = c^2$

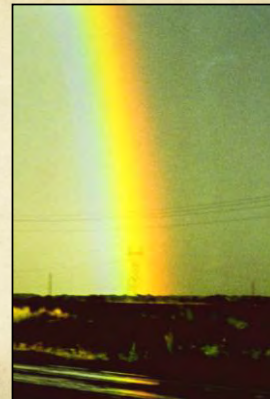


Masha Gessen – Perfect Rigor, 2009



Robert Lang, 2006

Hands-on Activities Taught Practical Problem Solving Skills

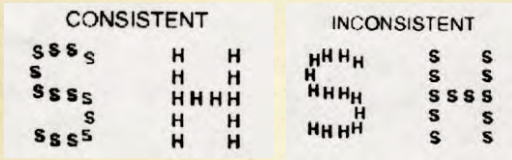


- All my thinking uses specific examples to create concepts
- It is **bottom up thinking** and not **top down thinking**
- I learned ALL concepts using specific examples

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.

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



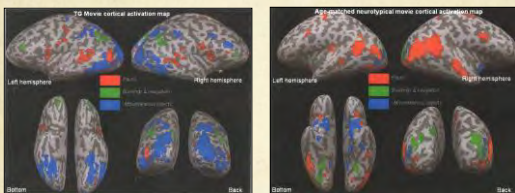
Teach Word Concepts with Specific Examples

- Walk **down** the stairs
- A plane goes **down** and lands
- Put a cup **down**
- Lie **down** on the bed

Objects are More Interesting than Faces

T. Grandin

Control



Blue = objects

Red = faces

Humphreys, Minshew, Behrmann, and Cibu, 2006

Social Interaction Through Shared Interests

- School Clubs
- Organizations such as Scouting
- 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 – such as board games
- ❖ Being on time
- ❖ Doing family activities I disliked
- ❖ 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

Teach Social Skills in the Community

- Shaking hands
- Eye contact when meeting people
- Ordering food in restaurants
- Table manners
- Shopping – Talking to store staff

Kids doing projects and playing games where the rules and duties are negotiated teaches valuable social skills



- Eccentric is acceptable; being dirty and rude is not.
- Do not try to de-geek the geek!



NASA Space Scientist Cries When the Shuttle Was Cancelled



It's ok for Geeks to cry!

Rule System

1. Really bad things
2. Courtesy rules
3. Illegal, but not bad
4. Sins of the system

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. My amygdala (fear center) is three times larger.

University of Utah, 2010



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
6. Sell your skill, not yourself



Make portfolio - people respect talent

I was a poor student but I learned lots of valuable work skills in high school. I did building projects that other people appreciated

Before



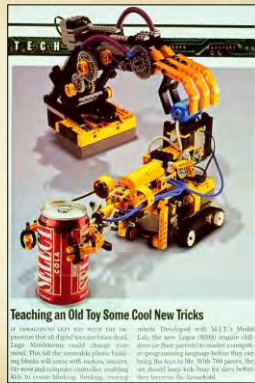
After



Jobs for Middle School and High School Kids

- Walking dogs
- Maintaining computers
- Making PowerPoint presentations
- Selling artwork or crafts
- Working on church or neighborhood website

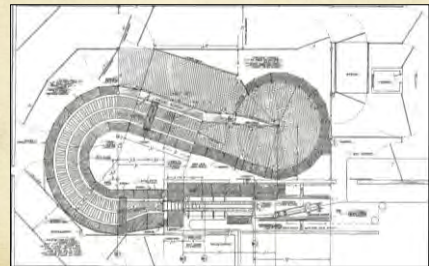
LEGO® MINDSTORMS™ & LEGO Technic



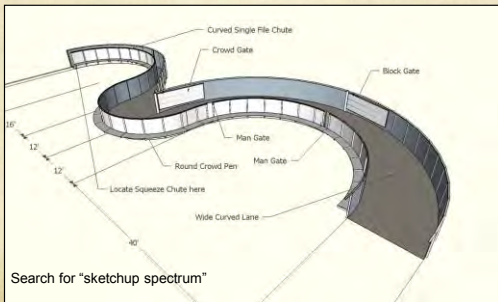
Teaching an Old Toy Some Cool New Tricks

or mechanical LEGO MINDSTORMS™ (LEGO Mindstorms) could change your mind. This kit for assembly-grade building blocks will come with motors, sensors, the standard computer interface, including both for custom building. Utilizing standard

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
- Wolfram Mathematica

Show Kids Interesting Things



The Guys Have Fun with Stuff the Mechanical Cow on the HBO Movie Site



**I was wearing my portfolio.
People respect ability.**

Jobs for Visual Thinkers

- Industrial design
- Computer network specialist
- Graphic arts
- Drafting
- Auto mechanic
- Computer repair
- Handcrafts
- Equipment design
- Convention AV technician
- 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

Specialty Retail
 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 Antidepressants

Work really well for anxiety and panic attacks



Prozac

(fluoxetine)



Zoloft

(sertraline)



Celexa

(citalopram)

Lexapro

(escitalopram)



Paxil

(paroxetine)



Atypical Anti-Psychotics

May have severe side effects



Risperdal (risperidone)



Geodon (ziprasidone)



Zyprexa (olanzapine)



Abilify (aripiprazole)



Seroquel (quetiapine)

Low Dose Principle

Some individuals on the autism spectrum need only ¼ to ½ 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 Risperdal.

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

Blood Pressure Medications Reduce Anxiety and Are Used as Sleep Aids

Much Safer than Atypicals

- Beta blocker propranolol
- Clonidine

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

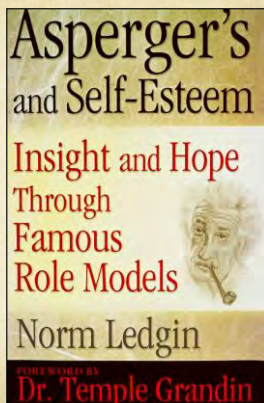
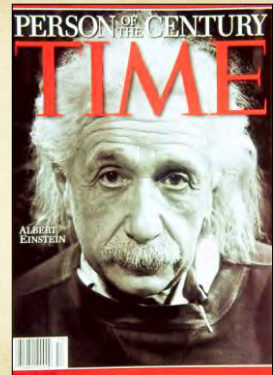
- Prescription drugs
- Non-prescription drugs
- Herbal supplements

- Special diets work for some individuals
- Vitamins and supplements B6 and Magnesium
- 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, 2nd Edition
Animals Make Us Human