

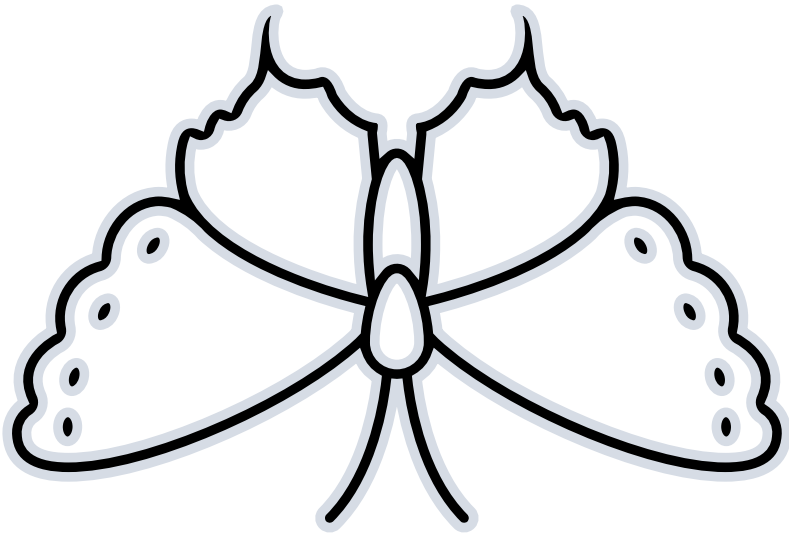
Thinking & Upside-Down Butterflies

*What reversed RDS stereo
imagery can tell us about vision
and cognition.*

KISS

Tod Davis, OD, FCOVD

Jan 2024



What can reversed RDS stereo imagery tell us about vision and cognition?

Years ago, I read an article in OEP papers by Dr. Selwyn Super about Stereopsis and Education.



He noted that testing with upside 3-D targets provided insight into a patient's thinking.

I did not understand how 3-D and learning were related but was intrigued!



Selwyn Super, OD
Optometrist, University of
Johannesburg, South Africa
Clinical researcher at SCCO
Visiting Scholar, Dept of
Neuropsychology, UCLA
Assistant Research
Professor, USC

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We have known for years that vision's purpose is to understand our environment.

The fundamental reason for having vision is that a person can get meaning out of the world he must inhabit.

- A.M. Skeffington

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“Vision is the primary medium of thought.”

Rudolph Arnheim, PhD
Psychology of Art,
Harvard University
Visual Thinking, p. 18



Thinking and Upside-Down Butterflies

Spatial thinking, rooted in perception of space *and* action in it, is the FOUNDATION for all thought.

Tversky, B. (2019). *Mind in Motion: How Action Shapes Thought*. NY: Basic Books.



Barbara Tversky, Ph.D, Professor Emeritus, Stanford University

How Vision Loss Can Affect the Brain

Association of Vision Impairment With Cognitive Decline Across Multiple Domains in Older Adults

JAMA Ophthalmology, 7-2021



New York Times,

Science Times section, 9-7-21

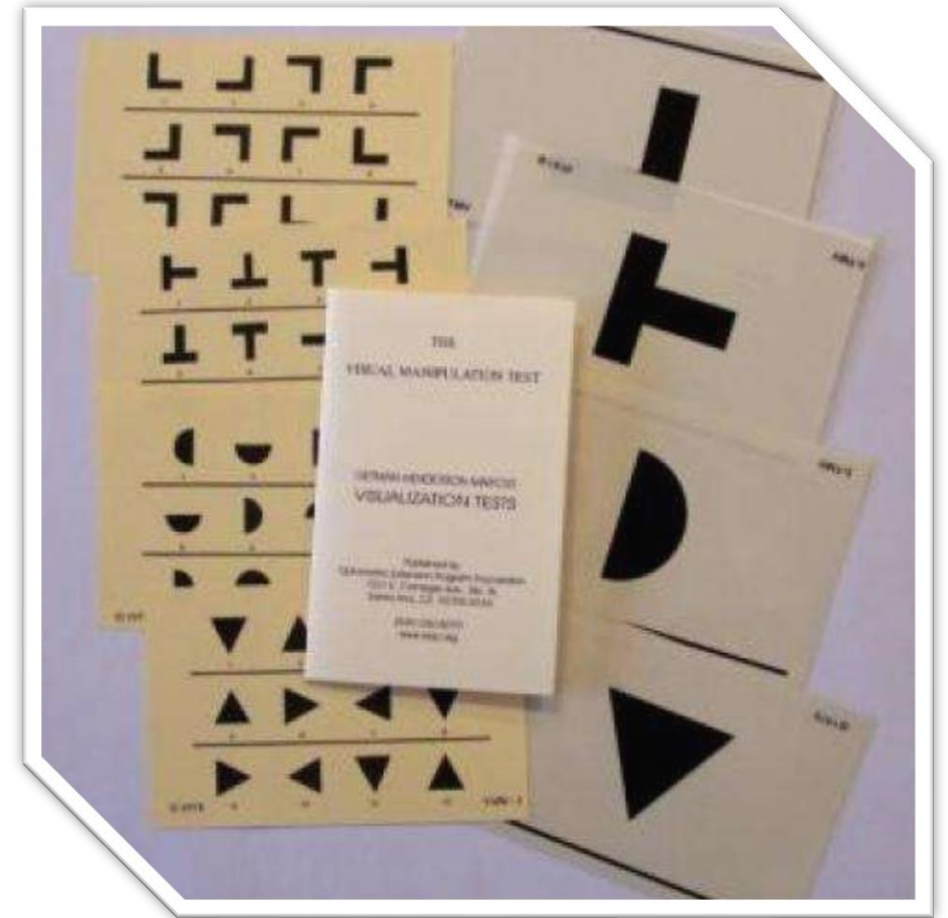
by Jane Brody

Thinking & Upside-Down Butterflies

- I began to probe stereo with an RDS butterfly presented upside down.
- A small number of patients could correctly identify - some very quickly, others slowly.
- What does it mean if the patient correctly identifies the butterfly as upside-down???
- We were already probing and training image reversals. Just cool or actually meaningful?

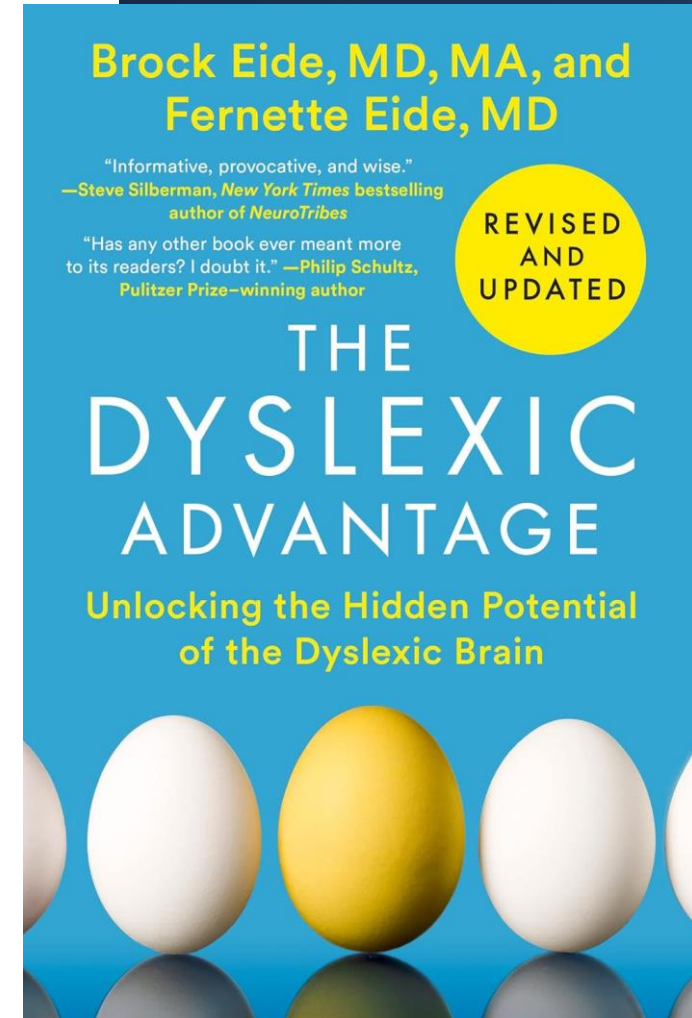
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- Getman's Visual Manipulation Test.
- Dr. Hillier's Matrix Cubes
- Merrill Bowen's Geo-Boards.



Thinking and Upside-Down Butterflies

- I read with great interest Drs. Eide THE DYSLEXIC ADVANTAGE and the dyslexic brain's styles of learning.
- I began to notice a number of people who correctly guessed the upside butterfly had decoding issues.
- I was aware of “Multiple IQ” theory which proposed 8 to 9 different kinds of learning.



Vision and Multiple Intelligence Theory



Visual-Spatial

$$x^2 + y^2 = z^2$$



Linguistic-Verbal



Interpersonal



Intrapersonal



Logical-Mathematical



Musical



Bodily-Kinesthetic



Naturalistic

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Green Flags for Conversation/History

- Arts and crafts
- Drawing
- LOVES LOVES Legos (except in presence of poor oculomotor)
- LOVES LOVES video games like Minecraft
- Interested in Rubic's Cubes
- Likes to tear things apart
- Makes connections easily - "pattern reader" - I say, "I would love you on my team counting blue-jays!"
- Very good problem solver
- Sounded smart at a young age. Rich visual imagery aids receptive and expressive language.
- May be a family trait, one or both parents has same characteristics.

(Most (all?) dyslexics with high spatial IQ. Easy to diagnose, a different topic of discussion.)

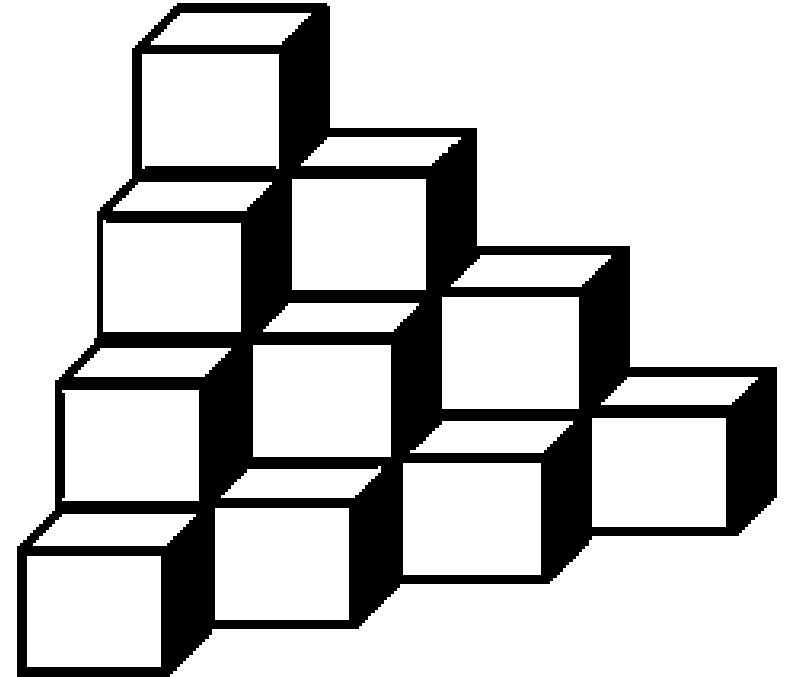
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- **Today when I hear, “It’s a butterfly upside down,” I assume the child (or adult) is gifted in spatial (non-verbal) IQ.**
- **I ask the patient, “What are you really good at?”**
- **I listen for a strong desire to be creative in some way.**

Thinking & Upside Down Butterflies.

Virginia Tech Dept of engineering first year “weed out” course where students have to duplicate a structure but mentally rotate and “see” it from a different perspective.

Ability to visualize and mentally rotate objects has a direct effect on higher level problem solving.



Thinking & Upside-Down Butterflies

Common Emotional Behaviors

- Loves novelty, easily bored
- Can be manipulative
- Often dislikes doing new things
- If low motor abilities (e.g. retained early reflexes, poor vision-vestibular integration, bilaterality deficits, etc.), then often explosive with “thin skinned” temper. (Worthy of another discussion!)
- May have otherwise unexplained anxiety from a young age.

Talking to the Patient

I assure parent (patient) that's it not psychiatric, it's physiological ("in the body").

Perpetual fight/flight!

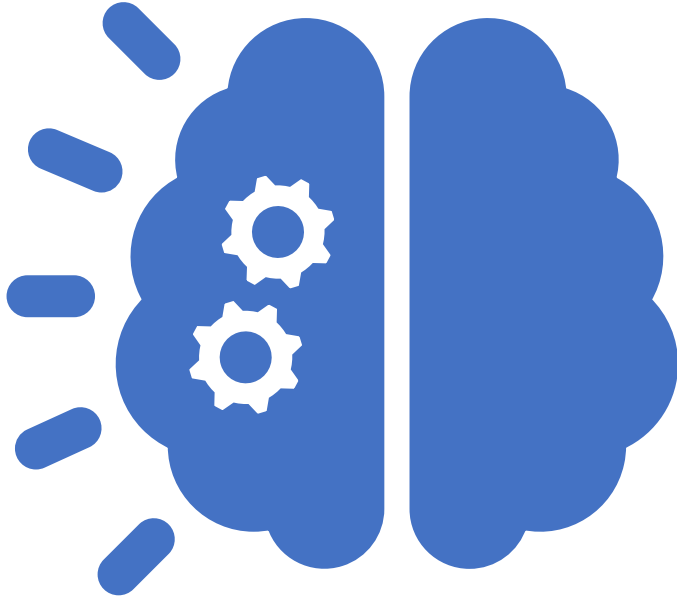
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Implications for Vision Therapy in the Therapy Room

- Watch out for boredom. Keep the patient moving and engaged!
- Use of YPs, esp. 15-20 pd helpful. Will need to change direction frequently (every 1-2min).
- Can be feisty, uncooperative. Find ways to see through challenging behavior!
- Since does not like new situations generally, may need to start activity with low loading, then turn up heat as progresses.

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Patient/Parent Discussion



- We see with our brains! Fundamental aspect of vision is visual imagery (or visualization or visual imaging).
- We know people with rich imagery tend to do smart things and usually sound smart.
- Spatial IQ is a prize, a giftedness, and can be developed.

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Google “spatial intelligence” and look for parenting articles which teach how to develop this gift.

Do not view it as less than academic (linguistic) intelligence.

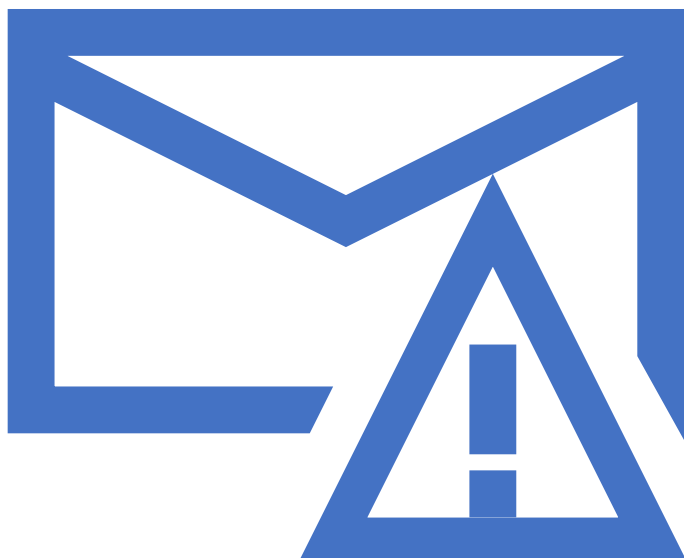
Don't consider the art, the building, etc. to be just a “nice hobby”!



Questions for Discussion

- All of us a deep understanding of how vision relates to learning, but do you consider spatial IQ as a critical aspect of a patient's learning style and behavior?
- Do you think in terms of giftedness and helping patients develop that?
- I believe making this connection can enrich their life!





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