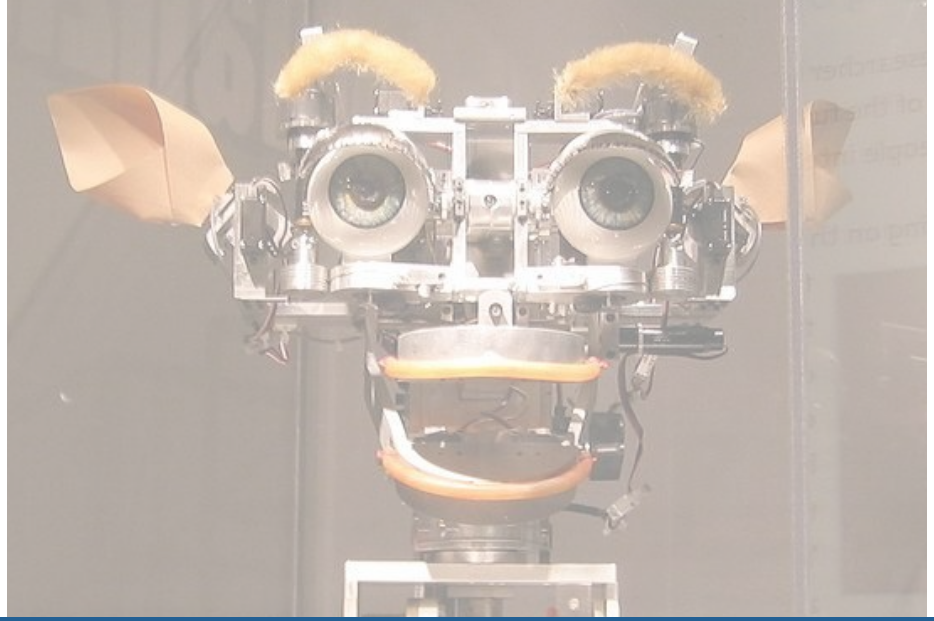


Seeing Through The Eyes of the Patient

Charlie Saccarelli, ABOM

Speaker Financial Disclosure Statement

Charlie Saccarelli is an owner and the president of Chadwick Optical.
He potentially makes money when you buy stuff from Chadwick Optical.
All relevant relationships have been mitigated.

This is Charlie’s Car.

2009 Nissan Versa

DISCLAIMER

- I am an optician presenting information for opticians to help opticians do what opticians do.
- What I am presenting is plenty accurate enough for that specific purpose.
- To many of the things I say, a vision scientist or physics professor might interrupt and say “well technically that’s not entirely correct because blahhhhhhhhhh”
- …that’s why they’re not invited.

ONE MORE THING

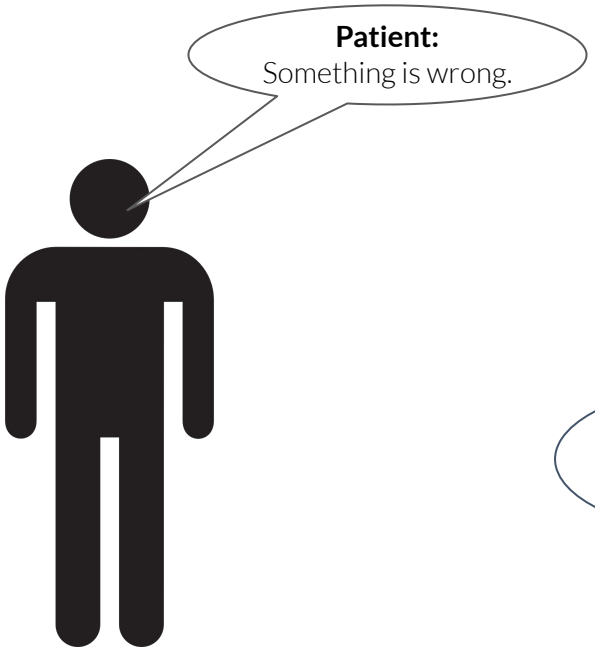
- You can take pictures of the slides if you want, but I'd rather you just pretend to pay attention to what I'm saying. It makes me feel so good.

- Email me at cbs@chadwickoptical.com, and I'm happy to share the entire presentation with you. Or text/What's App/whatever me at 267-374-5601

AGENDA

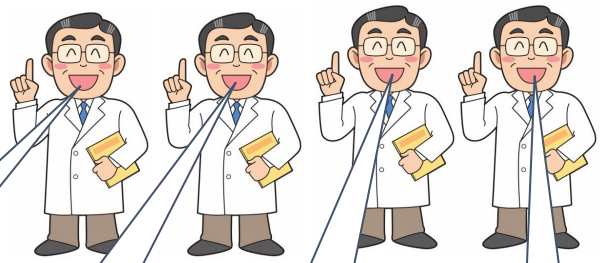
- Soapboxes
  - Why the healthcare system grinds my gears
  - Principles vs. Methods
- A Tour of YOUR Vision
- A Tour of the Visual System (as if we're robots because biology is gross)

MY PERSONAL CAMPAIGN AGAINST GASLIGHTING



This will probably be you someday.

PURVEYORS OF THE STANDARD OF CARE



The tests we ran look fine, so YOU must be fine.

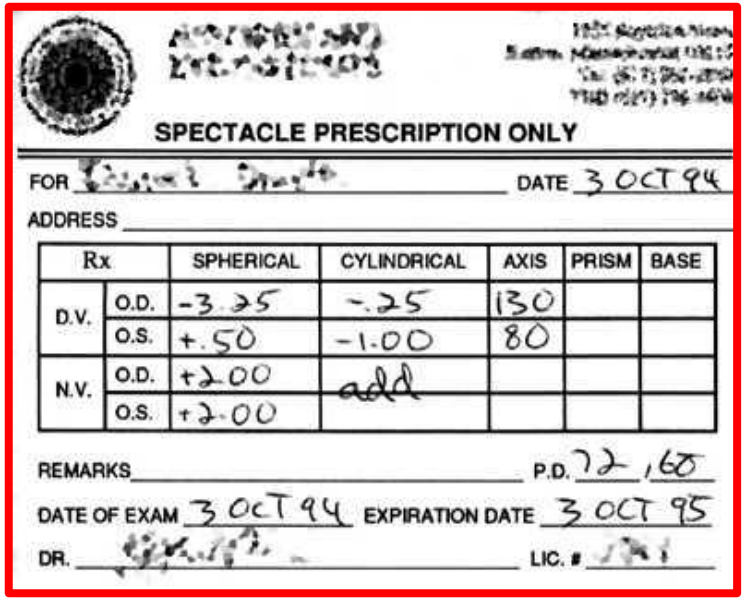
Great news! Your problem has a name! I did my job!

Your refraction is correct, so everything MUST be fine. You can see 20/20. What more do you want?

Your glasses meet ANSI standards, so everything MUST be fine.

Let's Exceed the Standard of Care

- **Vision** goes far beyond the refraction/diagnosis
- **"Understanding is love's other name"** - Thich Nhat Hanh
- Just keep trying to understand.
  - What is it like to have this condition?
  - What is it like to see through their eyes?
- Know the people in your area who specialize in that stuff so if you can't help them, you can introduce them to someone who can.



SPECTACLE PRESCRIPTION ONLY

FOR [redacted] DATE 3 OCT 94

ADDRESS

Rx		SPHERICAL	CYLINDRICAL	AXIS	PRISM	BASE
D.V.	O.D.	-3.25	-.25	130		
	O.S.	+.50	-1.00	80		
N.V.	O.D.	+2.00	add			
	O.S.	+2.00				

REMARKS P.D. 72, 60

DATE OF EXAM 3 OCT 94 EXPIRATION DATE 3 OCT 95

DR. [redacted] LIC. # [redacted]

“As to methods, there may be a million and then some, but principles are few. The man who grasps principles can successfully select his own methods. The man who tries methods, ignoring principles, is sure to have trouble.”

Methods

Principles

Method vs. Principle-Based Approach to Aniseikonia

RX #1:
OD: +5.00
OS: +2.00

RX #2:
OD: -5.00
OS: -2.00

Principle: Equalize Magnification

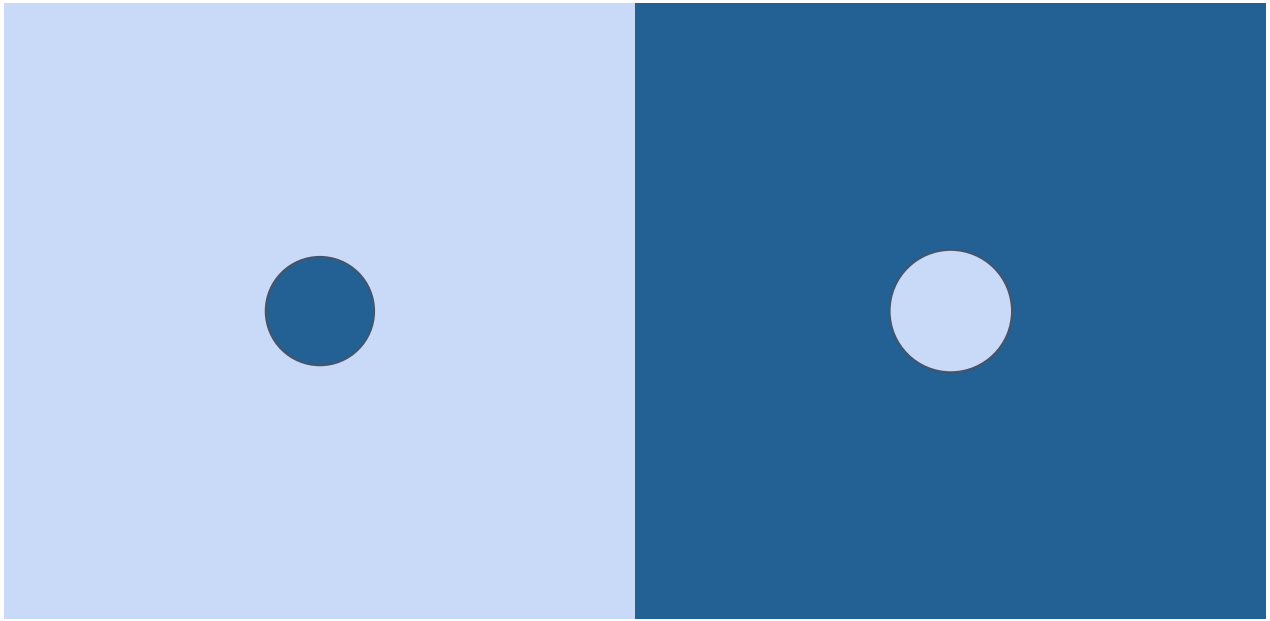
Method: Match Base Curve and Center Thickness

"As to methods, there may be a million and then some, but principles are few. The man who grasps principles can successfully select his own methods. The man who tries methods, ignoring principles, is sure to have trouble."

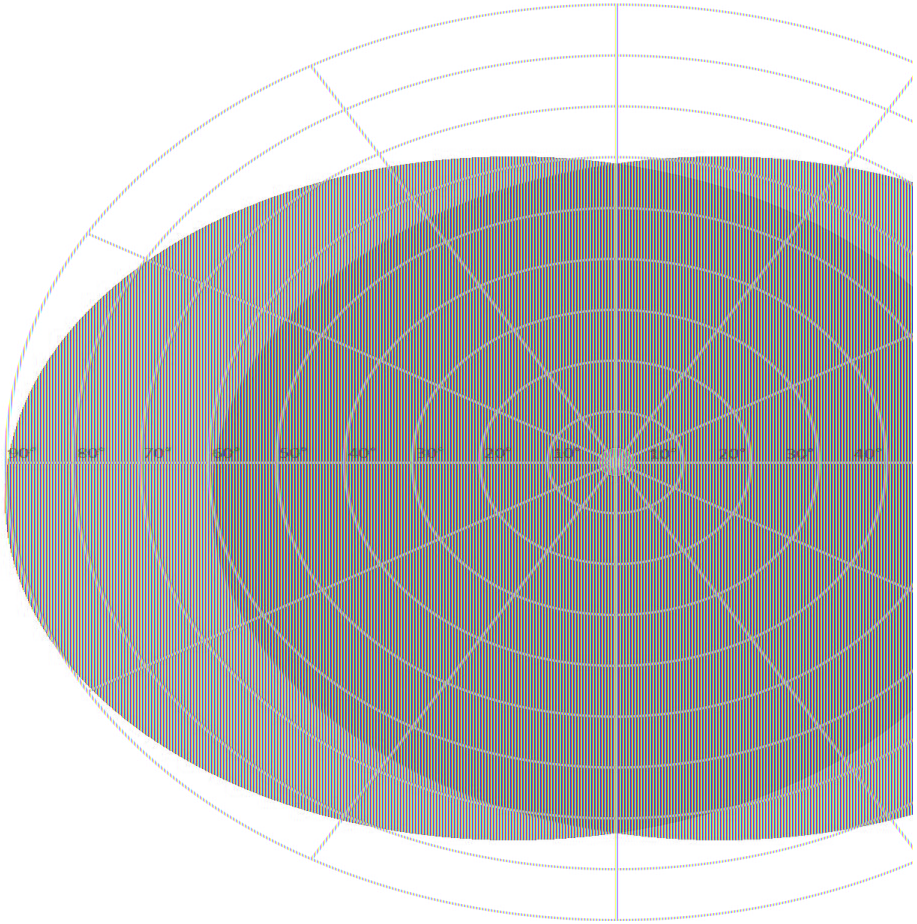
A Tour of Your Vision

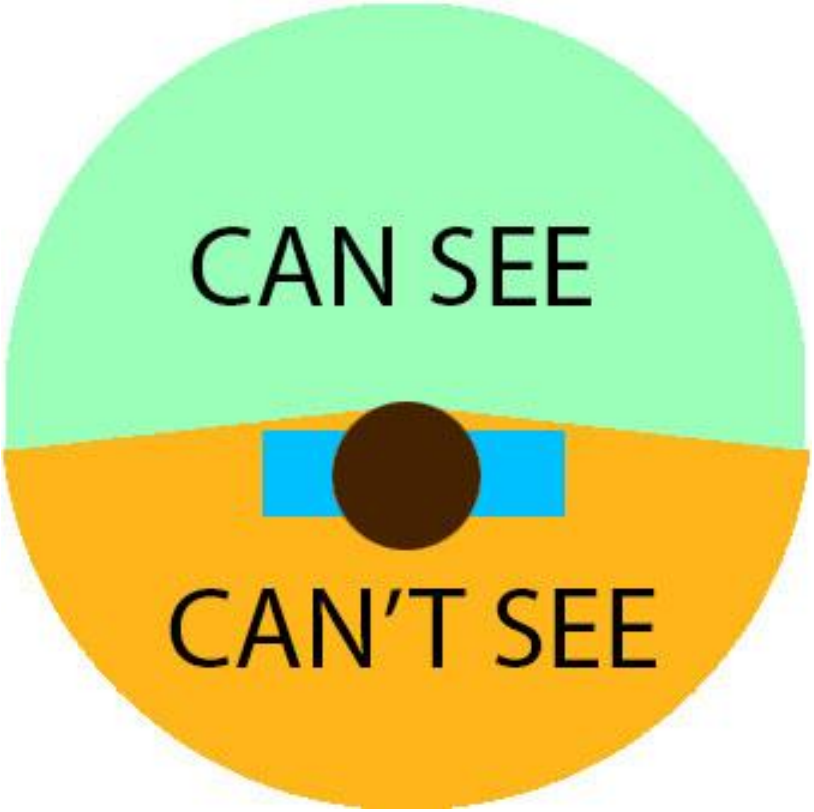
- Physiological Blind Spot Test
- Visual Field
- What is a Degree?
- Visual Acuity
- Vision & Balance

PHYSIOLOGICAL BLIND SPOT



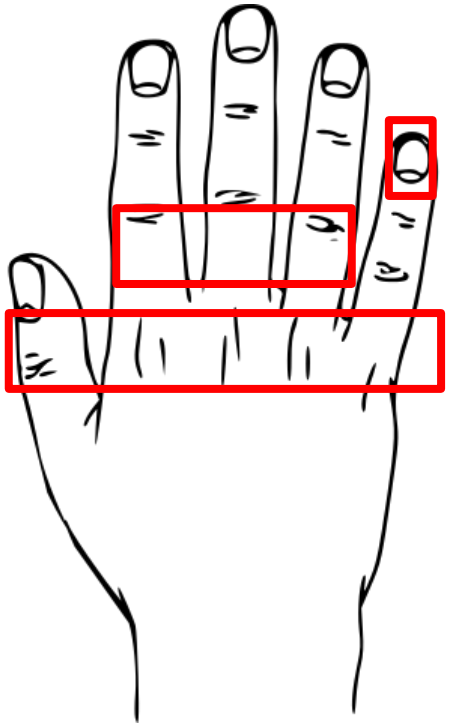
VISUAL FIELD





APPROXIMATION OF A DEGREE

At Arms Length



1 degree

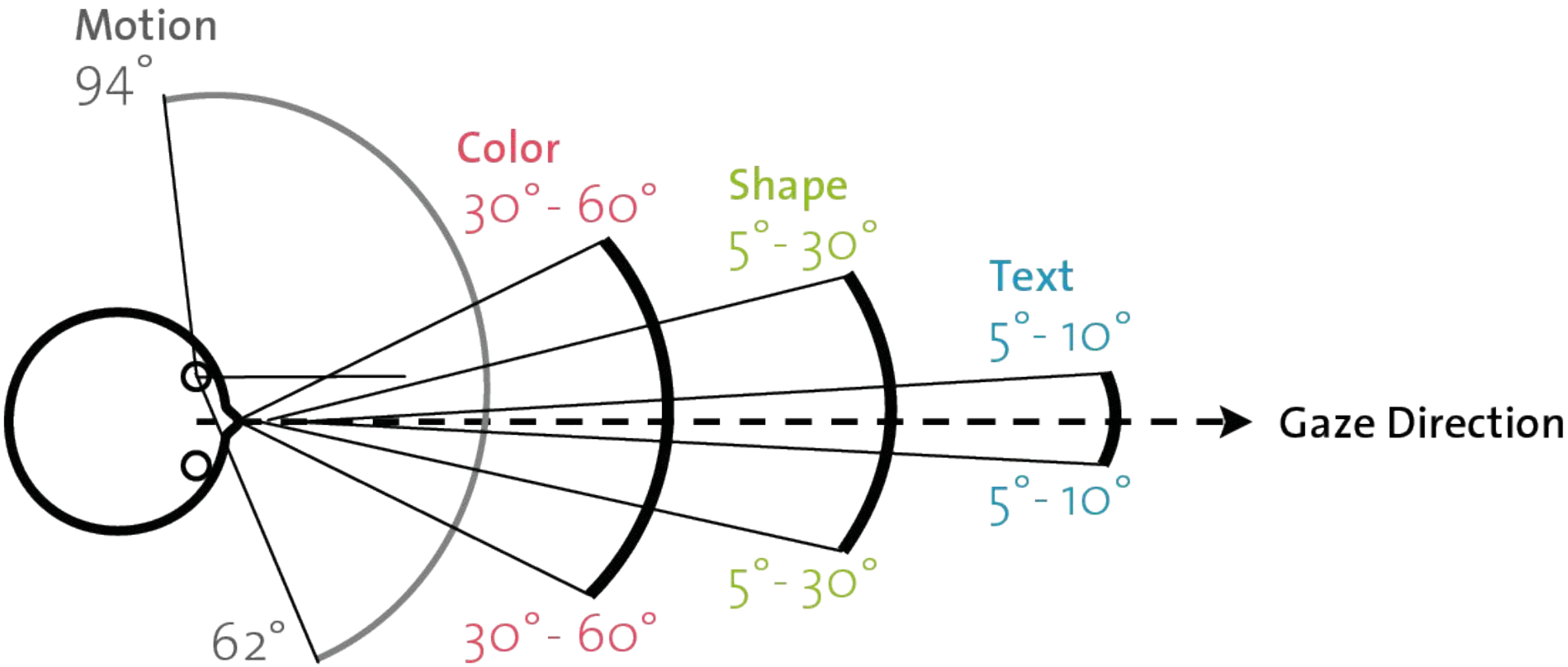
5 degrees

10 degrees

How many degrees of your 190° visual field is capable of 20/20 vision?

~1-2 degrees
0.004% of the visual field

VISUAL ACUITY WITHIN VISUAL FIELD



Balance and Your Vision

- Stand up
- Stand on one leg
- Close your eyes

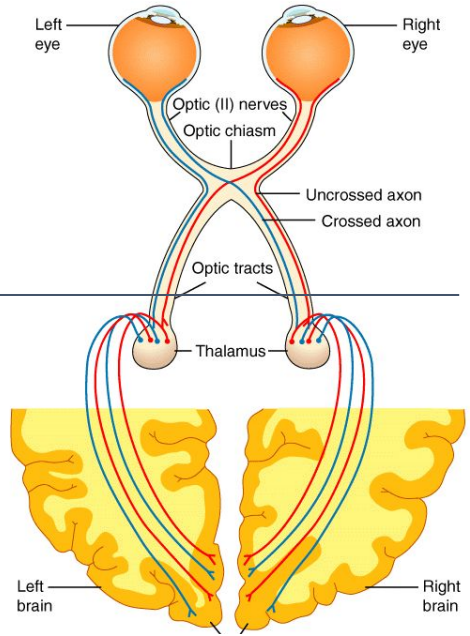
All the Stuff that Makes That Happen

The Data Transmission System

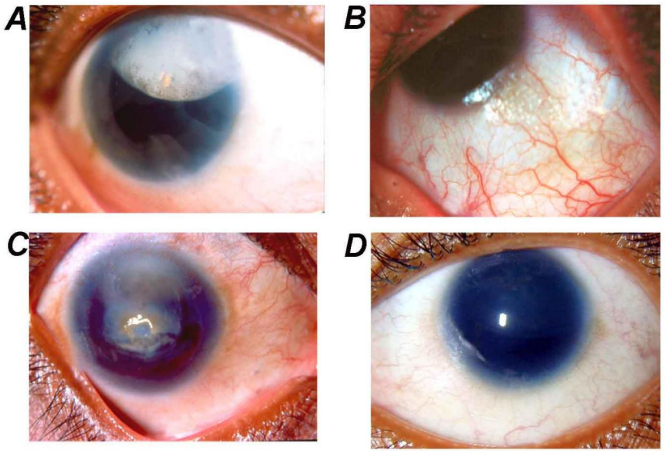
- Cornea
- Iris/Pupil
- Lens
- Retina

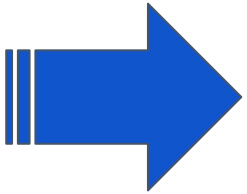
The Data Processing System

- Optic Nerve
- Visual Cortex
- The Rest of the Brain

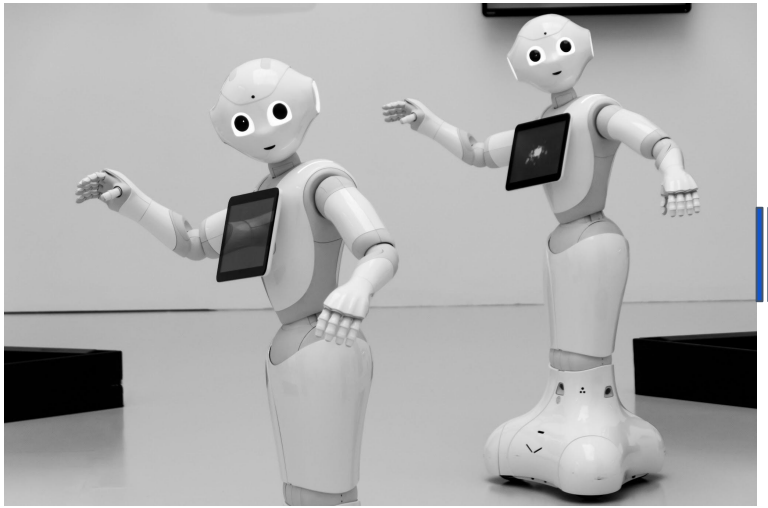


OPINION - HUMAN ANATOMY AND BIOLOGY IS GROSS





LET'S PRETEND WE'RE PERFECT AND FLAWLESS ROBOTS



ROBOT EQUIVALENCIES

Cornea - Magnifying Glass (Collects and Focuses Light)

Iris/Pupil - Shutter/Aperture (Controls incoming light)

Lens - Zoom/Auto-focus

Retina - Projection Screen

Optic Nerve - HDMI Cable

Visual Cortex - Graphics Card

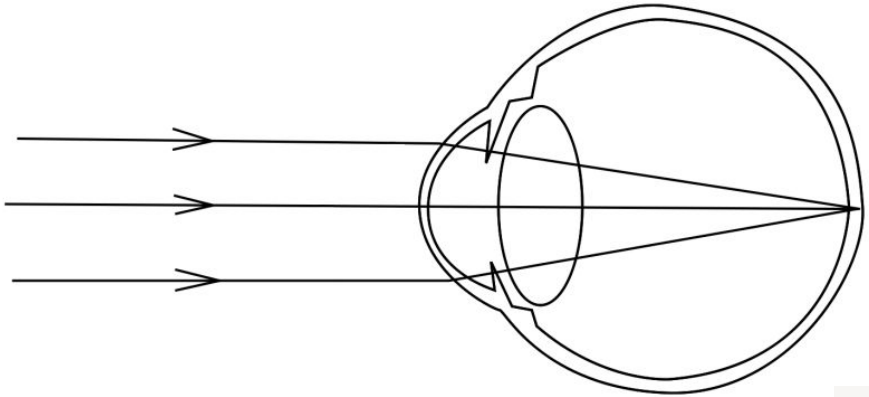
Rest of the Brain - Motherboard

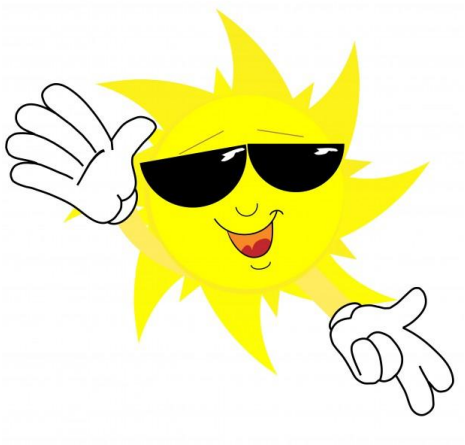
BORING - THE IRIS AND THE PUPIL (Shutter/Aperture)

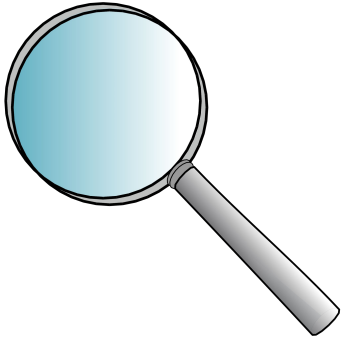
- The iris is a very beautiful sphincter
- The pupil is the iris-hole

The sphincter contracts and relaxes to optimize light input for conditions.

WHAT WOULD HAPPEN IF THE EYE ACTUALLY WORKED LIKE THIS?



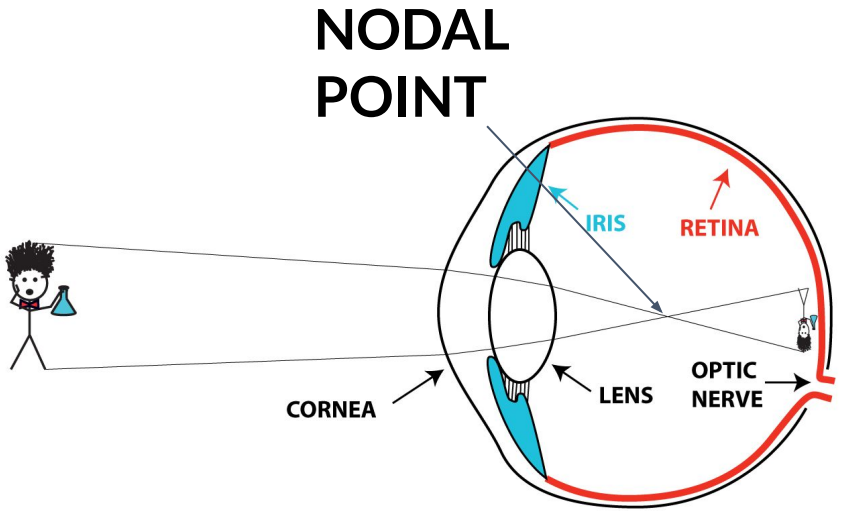




NODAL POINT

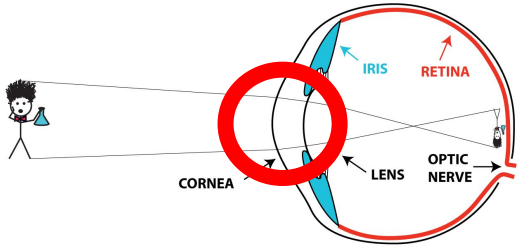
The point where all incoming rays of light need to cross to form the clearest possible image on the retina.

ONLY THE NODAL POINT CAN PREVENT RETINA FIRES!



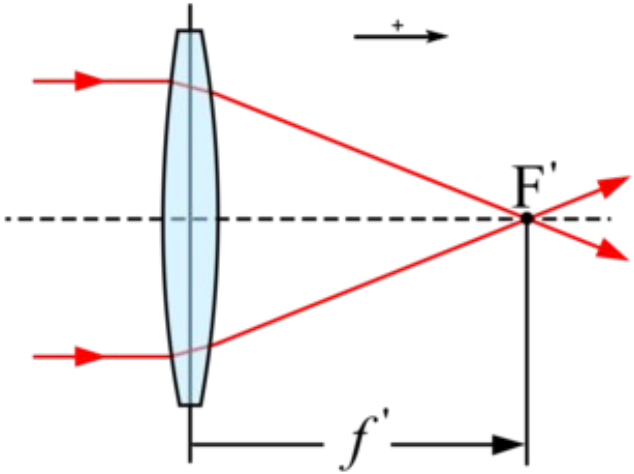
THE CORNEA (Magnifying Glass)

43 diopters of power



Focal Length = 1/43 of a meter

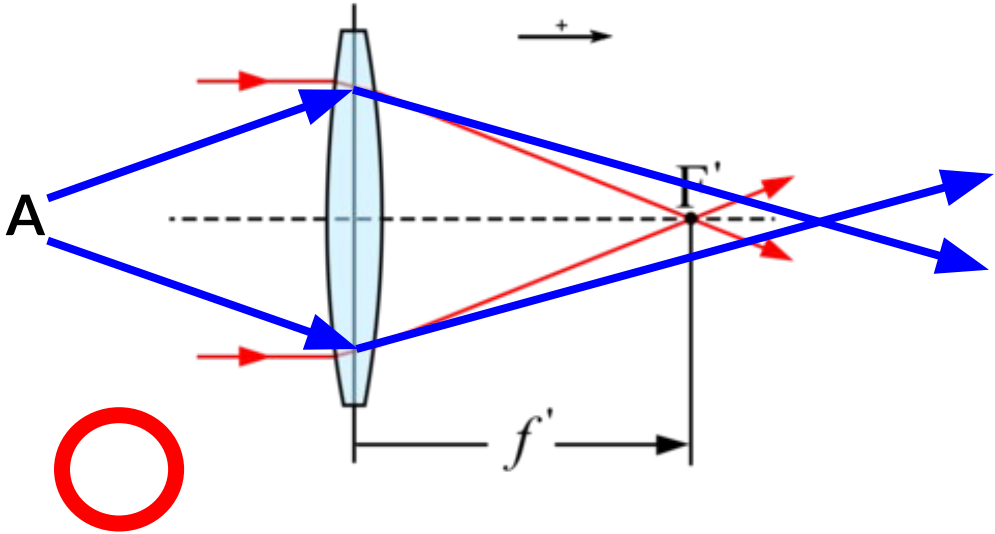
- 2.32 cm/0.91 inches



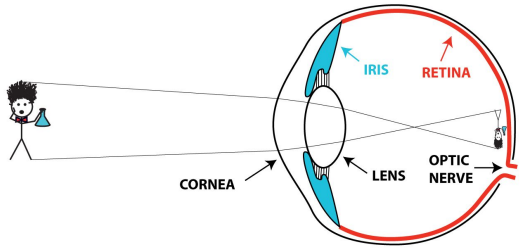
- The distance at which PARALLEL rays of light cross/converge
- Implication - Rays are coming from optical infinity (aka 20 feet or beyond)

WHAT IF WE WANT TO FOCUS ON SOMETHING CLOSE?

- What if the origin is up close?
- How would that appear?



The cornea is a one-trick pony. We need more than that. We need some auto-focus ability



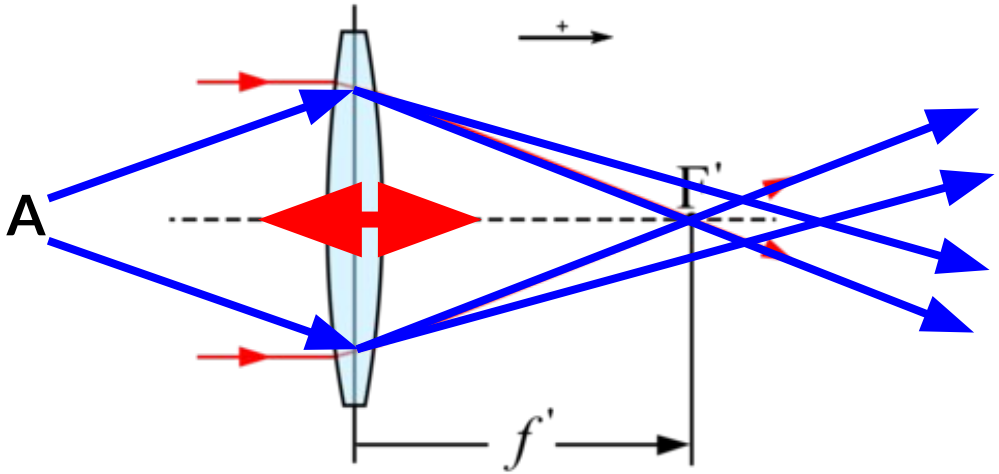
THE CRYSTALLINE LENS (Zoom/Auto-focus)

Changes from 17-21 diopters of power

Focal Length = ~1/17 - 1/21 of a meter

- adjustable from 4.7 - 5.8 cm

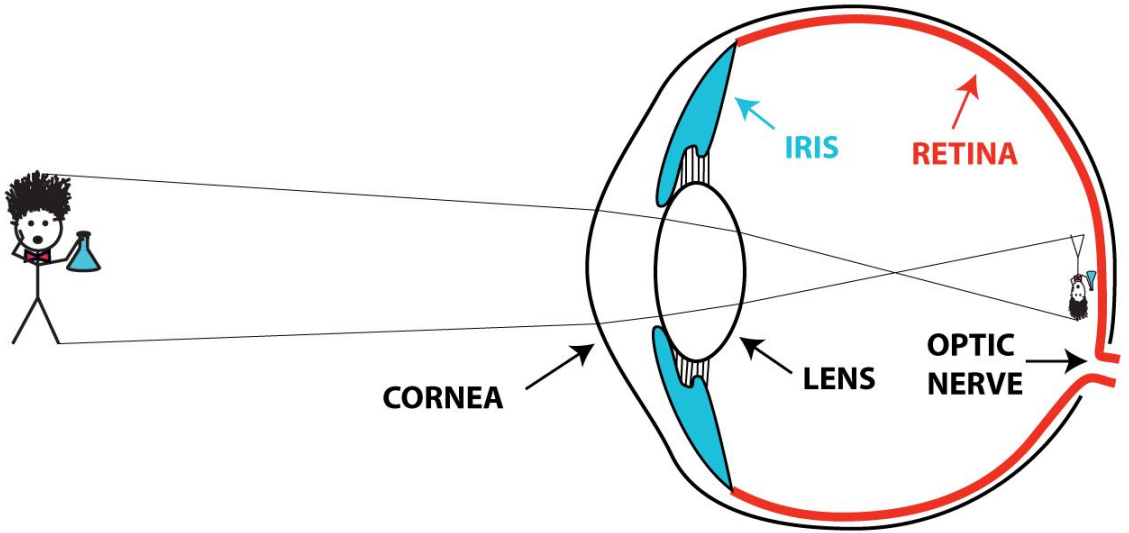
LENS CHANGES SHAPE



SHORTENS FOCUS

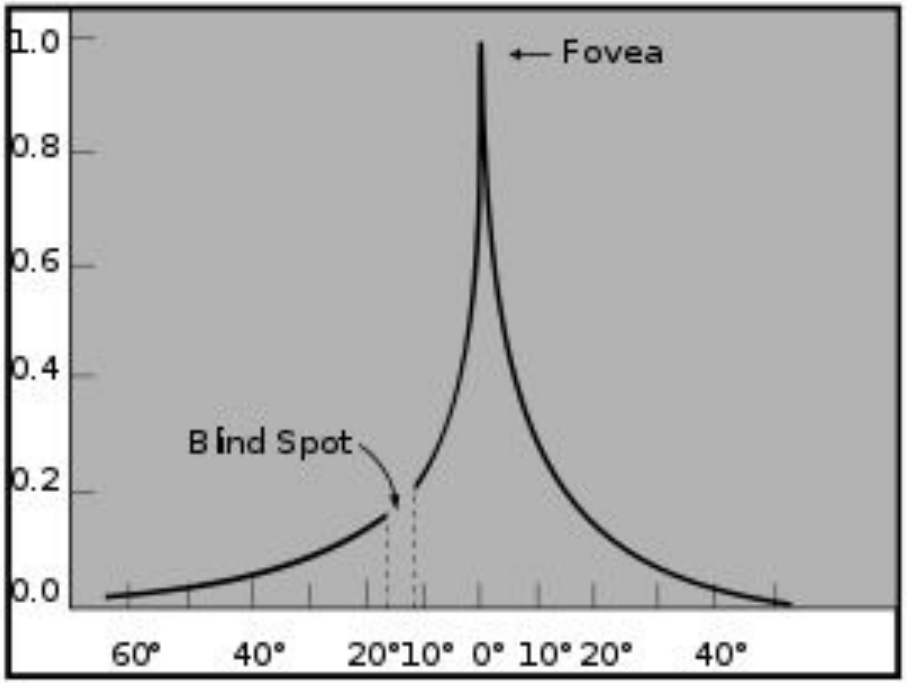
DYNAMIC DUO - CORNEA & CRYSTALLINE LENS

- Allows us to focus from optical infinity to right in front of our noses.
- All light passes through the nodal point, creating a clear image on the retina



THE RETINA - THE COLLECTOR OF ALL THE THINGS(Projector)

- Optimized Data Collection
- Wherever your eyes are directed is where the most data is collected

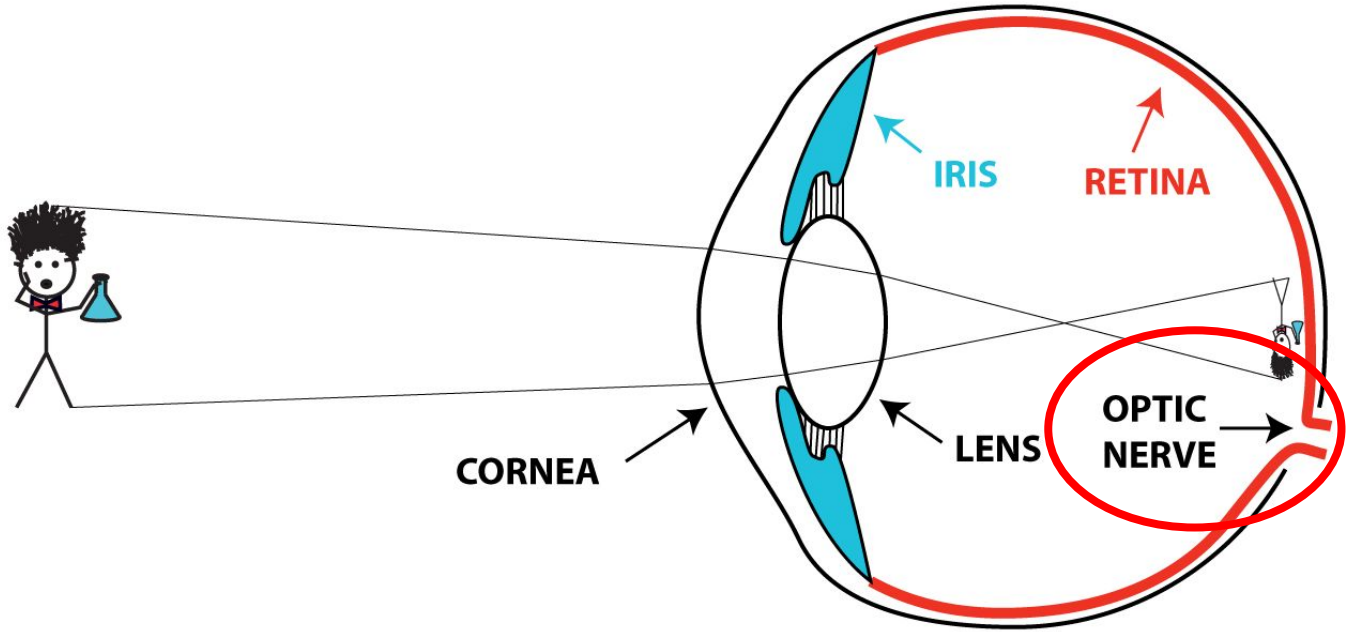


How We See

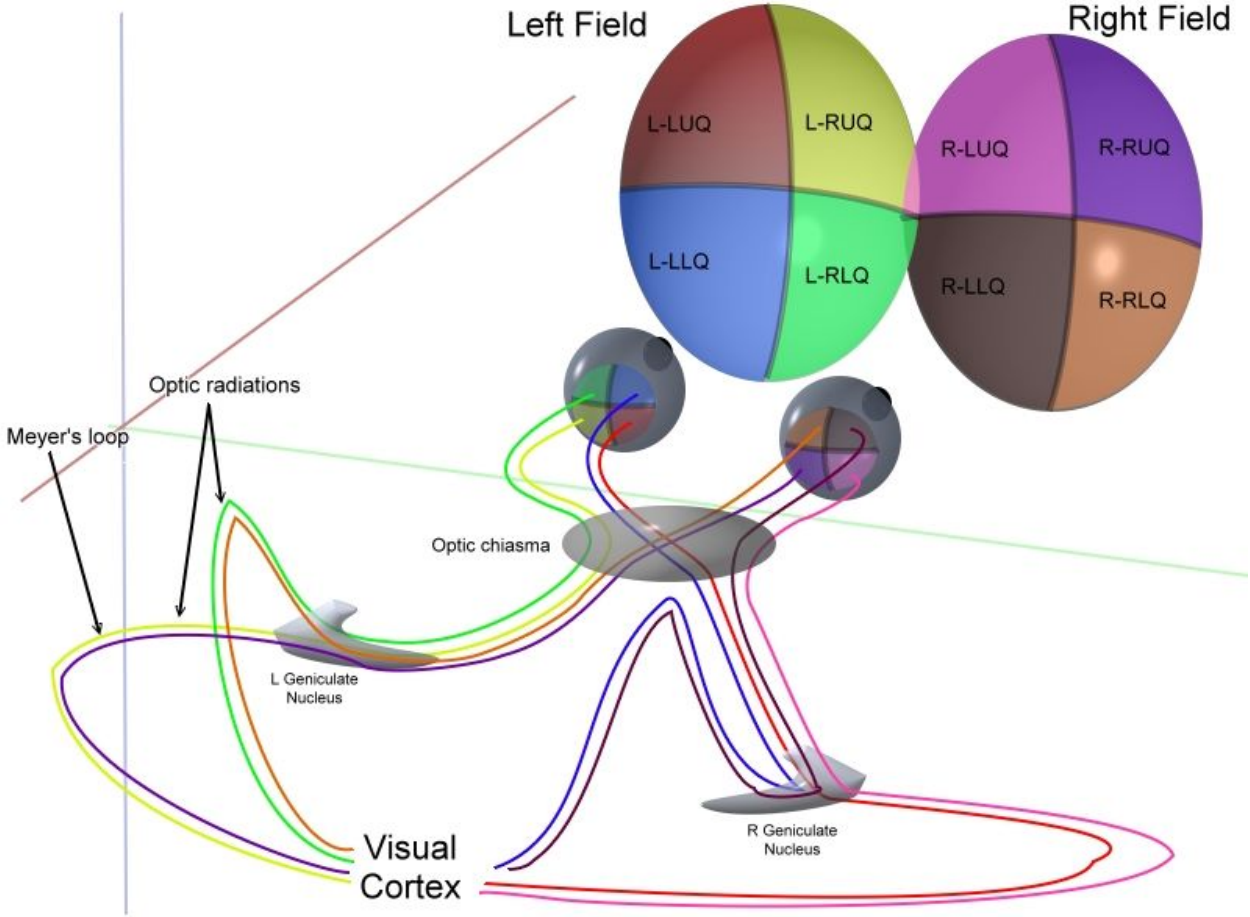
It's not a picture

We focus on various areas within a scene to create a picture in our minds using these little snapshots

WHAT IS THE PHYSIOLOGICAL BLIND SPOT?

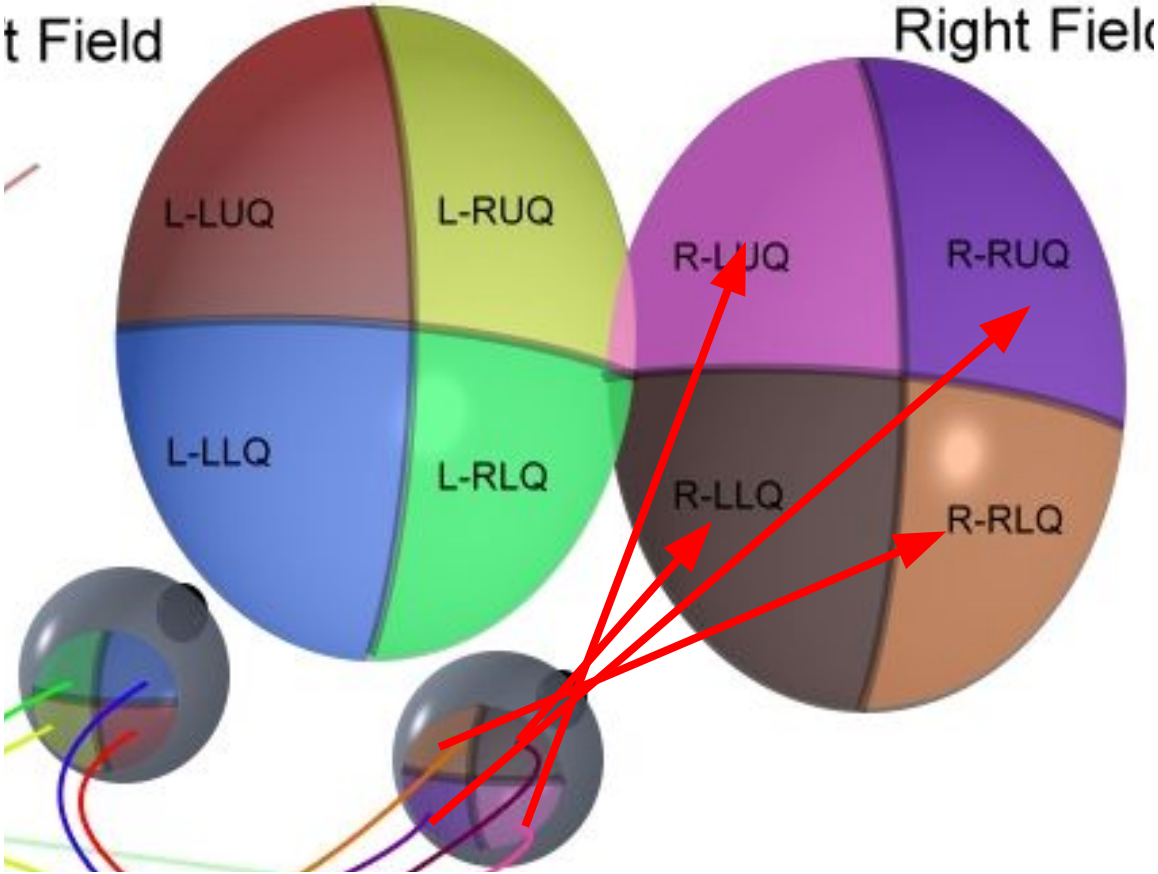


OPTIC NERVE - HDMI Cable



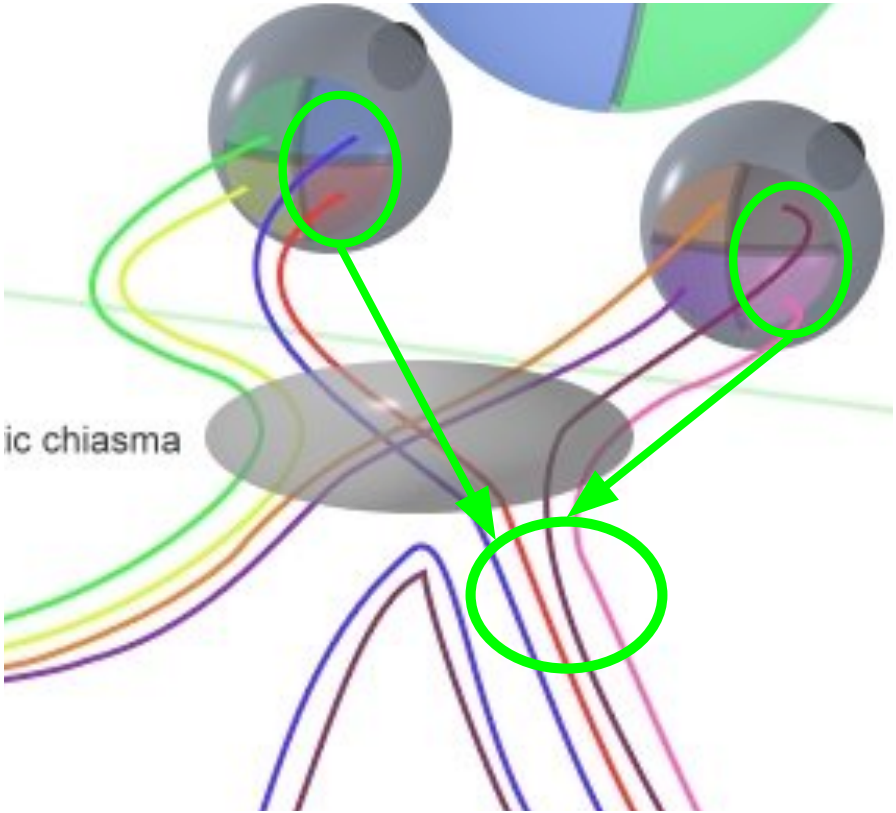
IMPORTANT POINT #1

- It's all flipped.
- It's transmitted as quadrants
- Are you sure we're not robots?



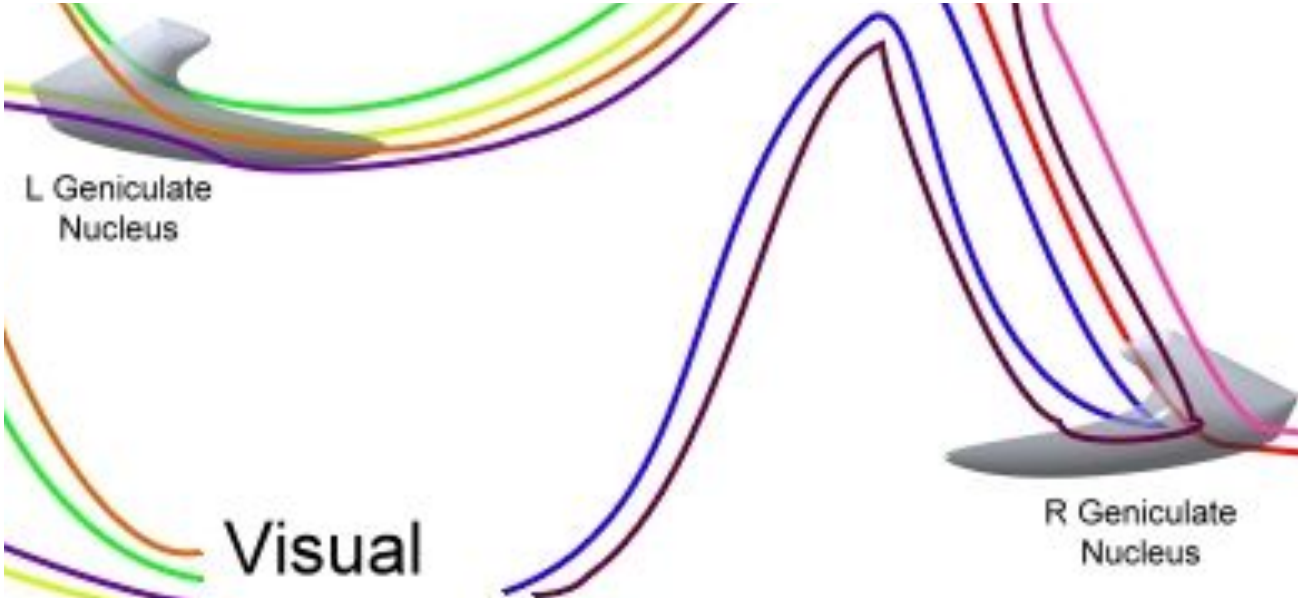
IMPORTANT POINT #2

- The cables get sorted out at the optic chiasm
- The right side data is now on the left side of the brain
- The left side data is now on the right side of the brain



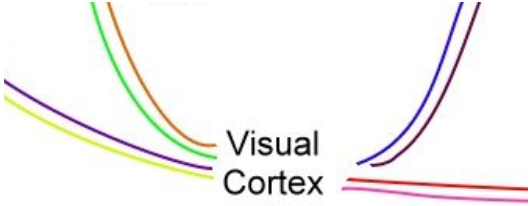
IMPORTANT POINT #3 (Weird Motherboard Stuff)

- About ⅓ of the data transmitted gets dropped off at the Lateral Geniculate Nucleus, never to be “seen”



IMPORTANT POINT #4

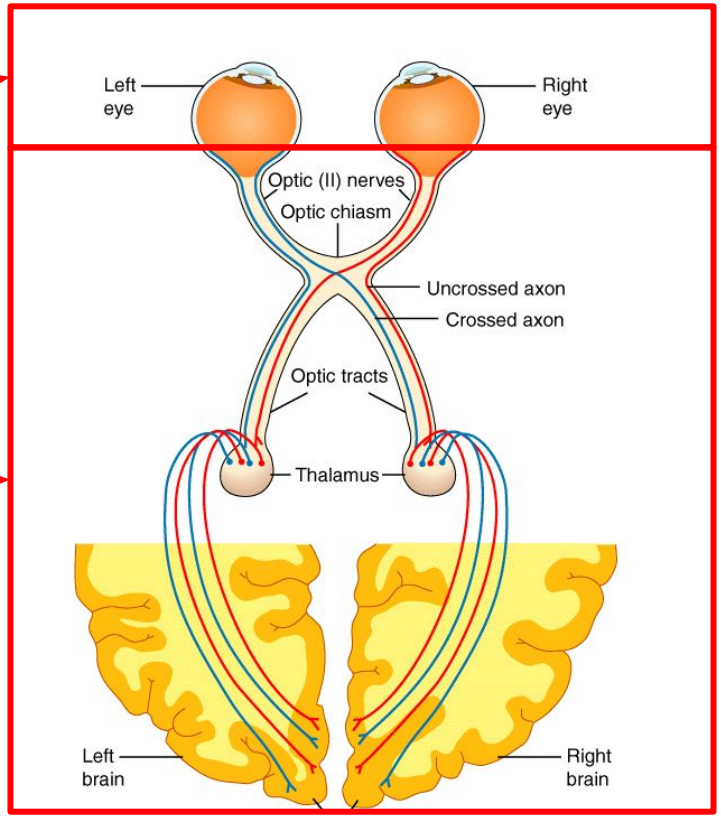
- Two separate images are delivered to the visual cortex
- How many of me do you see?



TYPE OF ISSUES VS. HOW WE PERCEIVE THEM

CAN SEE THEM

CAN'T SEE THEM



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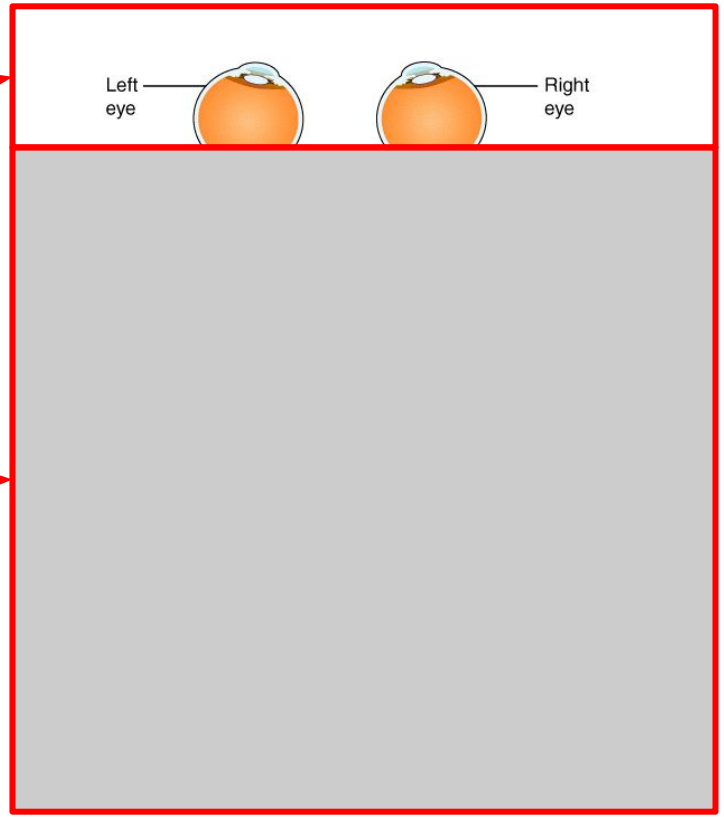
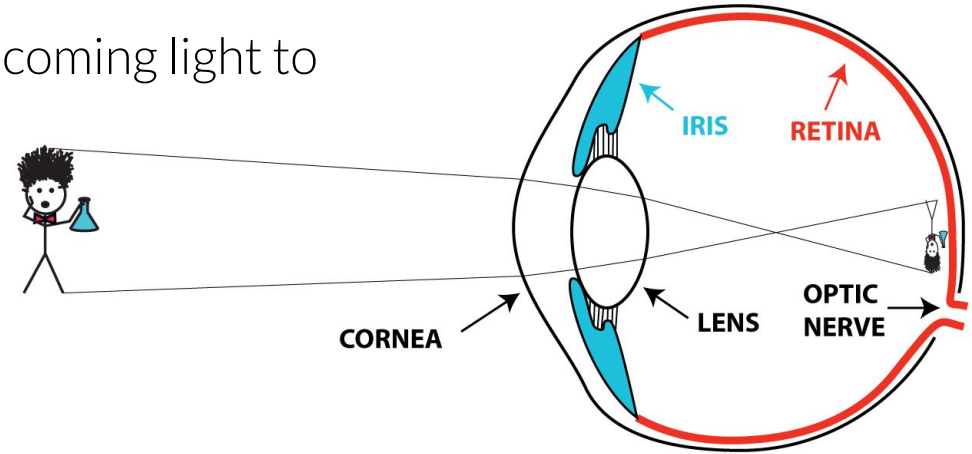


MYOPIA, HYPEROPIA, ASTIGMATISM

The cornea/lens don't focus in a way that produces a clear image on the retina

Latent hyperopia - Patient IS farsighted, but the lens focuses at distance to create a clear image

Glasses or contacts adjust the incoming light to focus a clear image on the retina

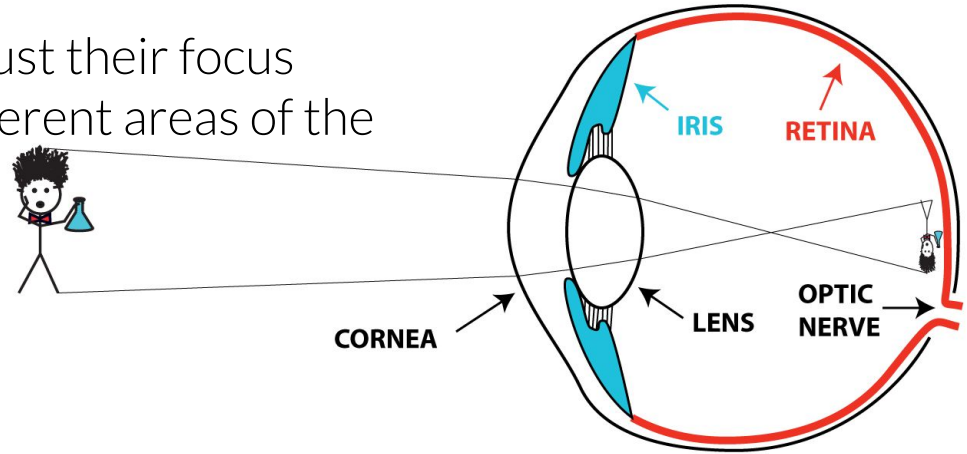


PRESBYOPIA

The range WAS 17-21 diopters of power, but can't get all the way to 21 diopters anymore.

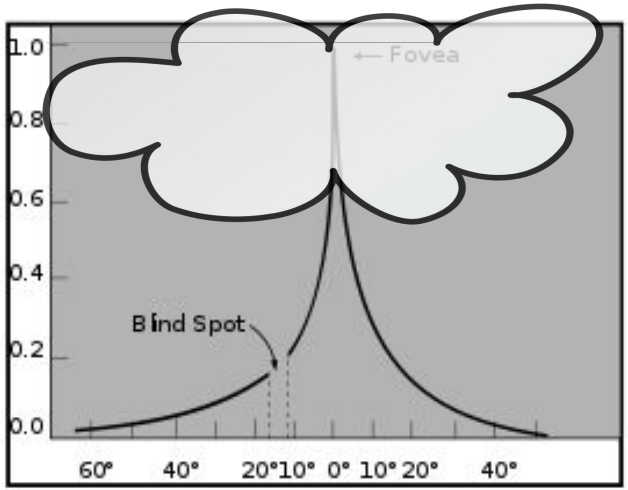
The lens loses its focusing power, resulting in the inability to adjust focus for near.

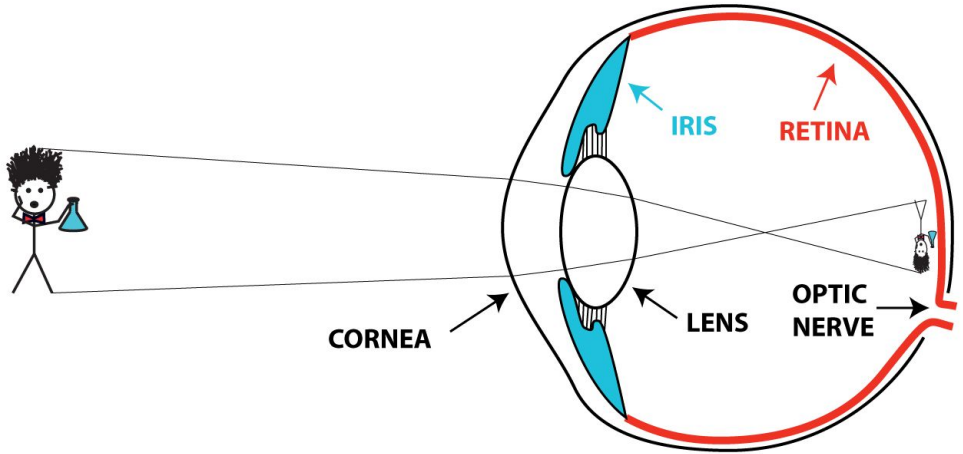
Multifocals allow the user to adjust their focus manually by looking through different areas of the lens.



CATARACT

The crystalline lens clouds up, and visual acuity is gradually reduced as the cloud gets thicker



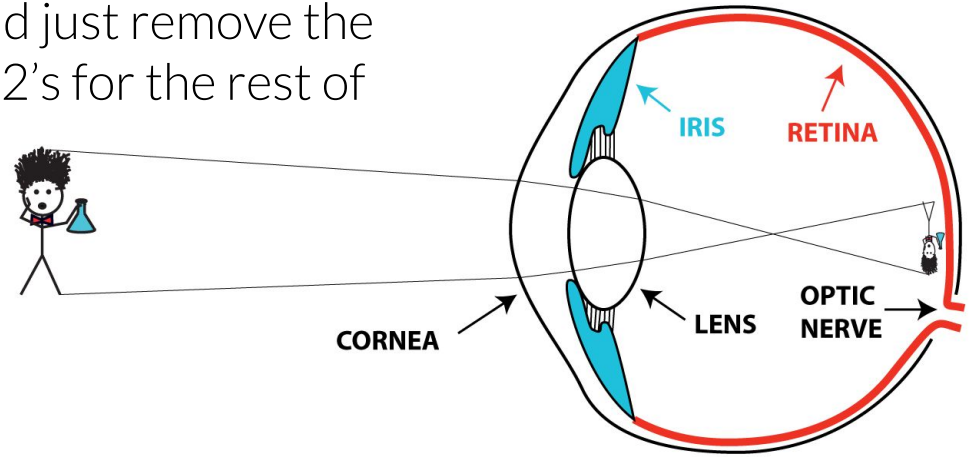


CATARACT

The crystalline lens clouds up, and visual acuity is gradually reduced as the cloud gets thicker

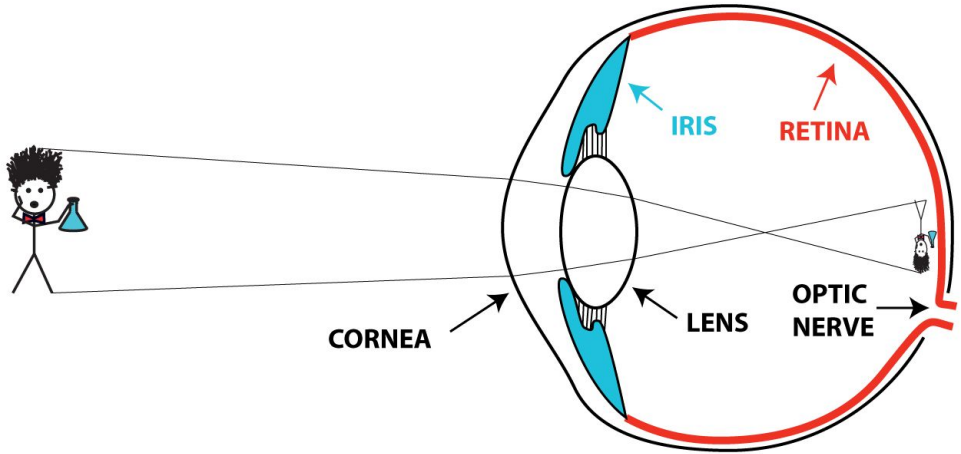
Cataract Surgery removes the lens and replaces it with an intraocular lens.

Back in the day the surgery would just remove the lens and patients would wear +12's for the rest of their lives.



FLOATERS

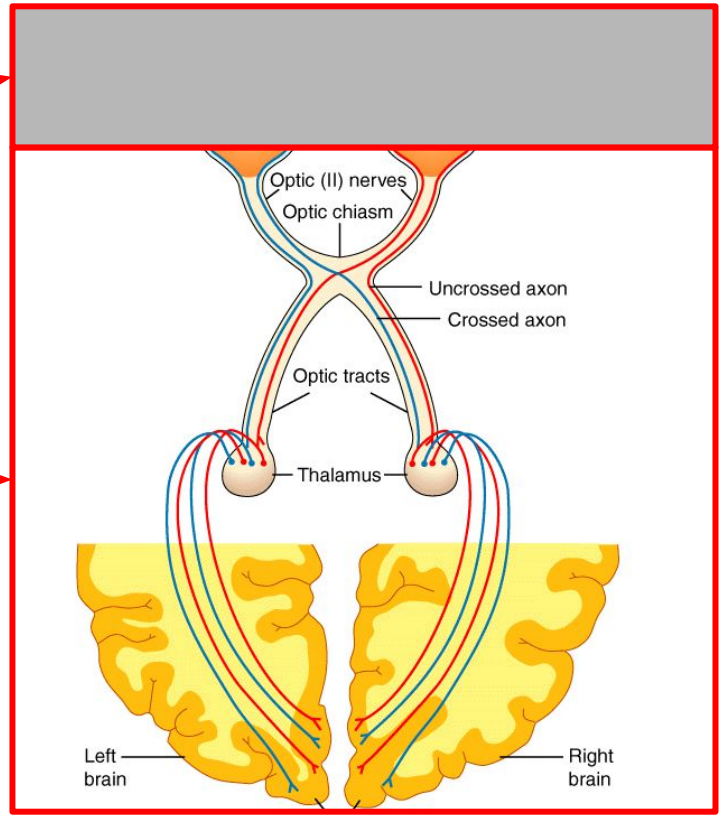
Years of life choices leave their remnants in your vitreous and their shadow projects onto the retina



TYPE OF ISSUES VS. HOW WE PERCEIVE THEM

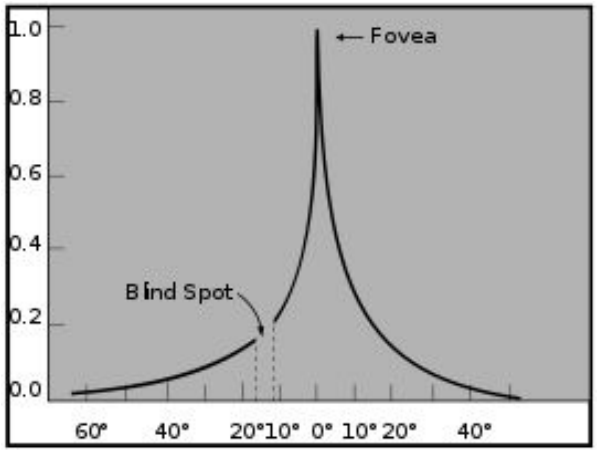
CAN SEE THEM

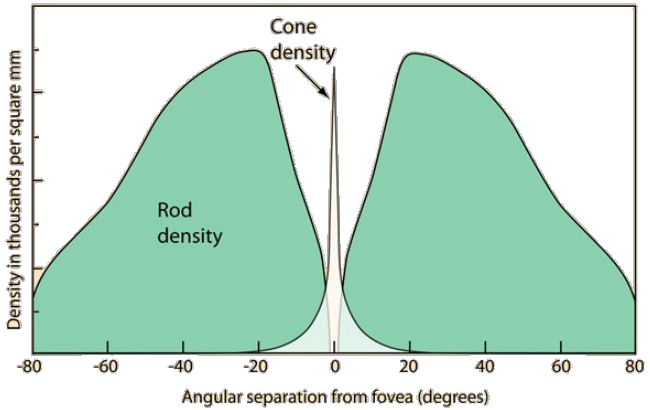
CAN'T SEE THEM

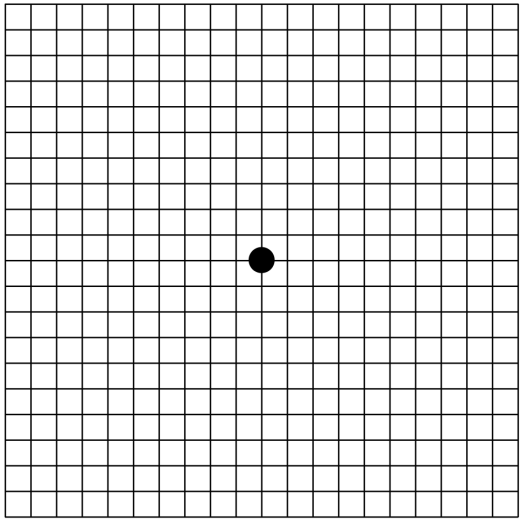


DATA TRANSMISSION ERRORS - MACULA

Decimal	Snellen
1.0	20/20
0.8	20/25
0.6	20/32
0.4	20/50
0.2	20/100
0.1	20/200







DATA TRANSMISSION ERRORS - PERIPHERAL VISION

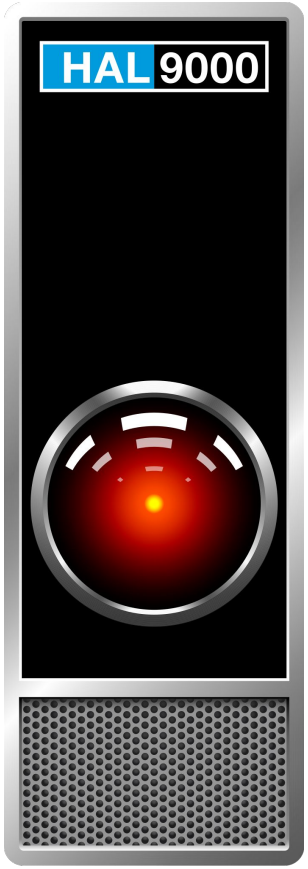
- Retinitis Pigmentosa
- Glaucoma
- Diabetic Retinopathy

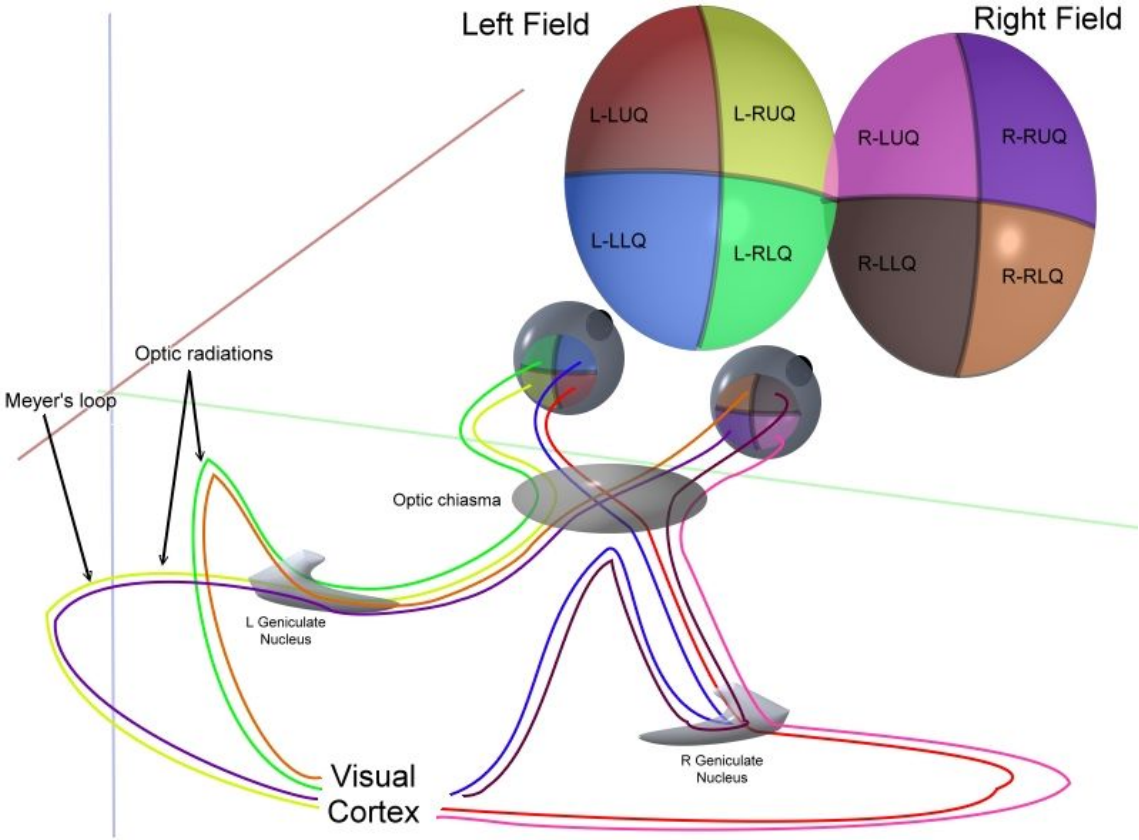
How would these conditions be perceived by the patient?

A COUPLE MORE DATA TRANSMISSION ERRORS

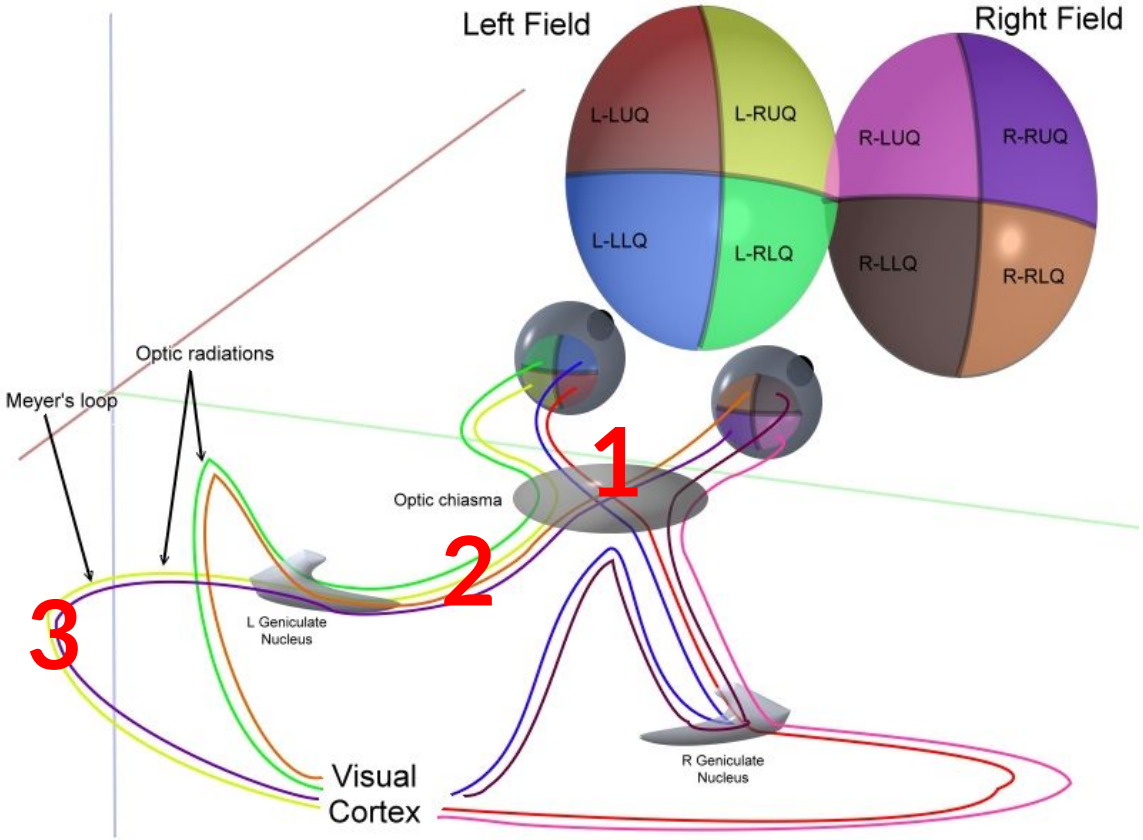
- Retinal Detachment
- Optic Neuropathy (swelling of optic nerve)

DATA PROCESSING ERRORS POST-RETINA



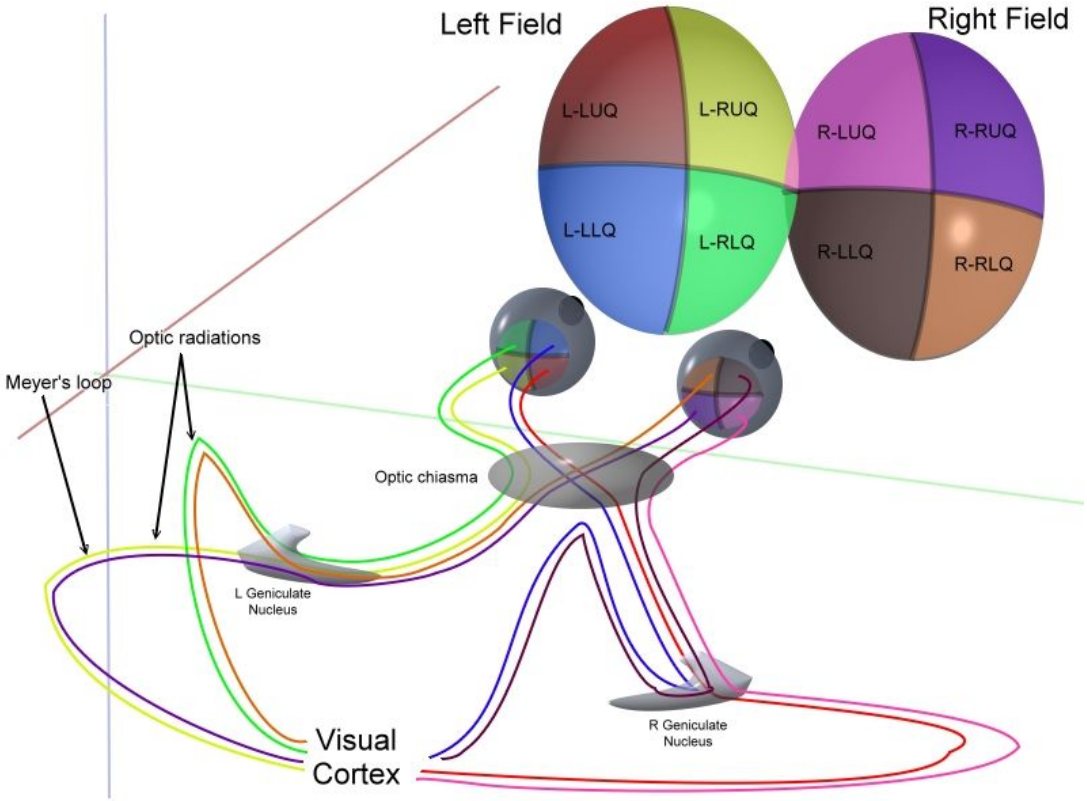


STROKE/TBI RELATED VISUAL FIELD LOSS



POST-CONCUSSIVE ISSUES

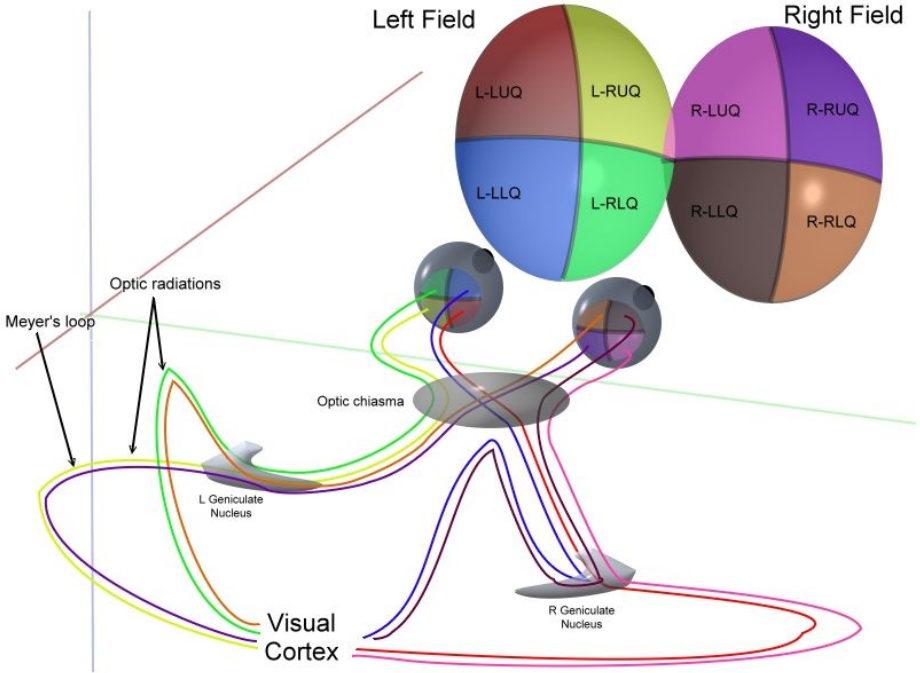
Balance Issues
Binocular Vision Issues

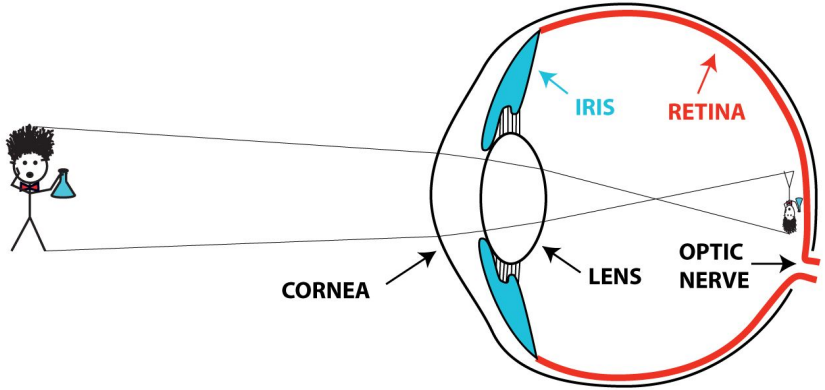


Simulation of How the Brain Works without the eye's data

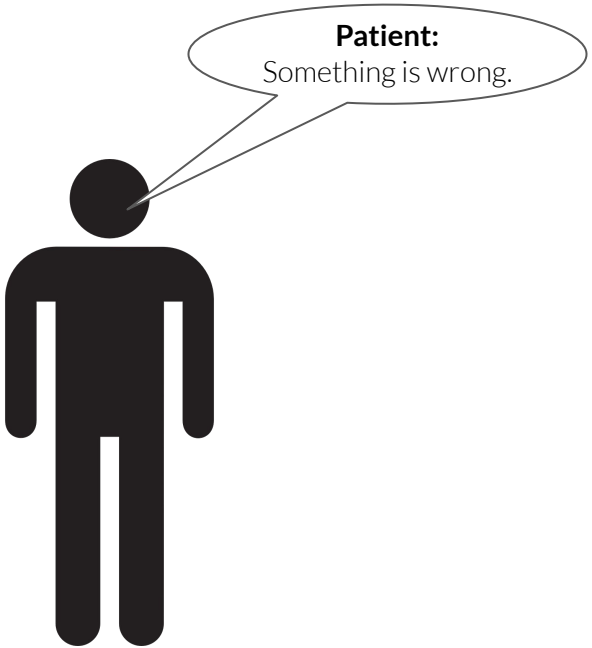
Fill in the blanks

There's a whole lot more going on than we typically consider.





Consider the possibility that this doesn't tell the whole story.



SPECTACLE PRESCRIPTION ONLY

FOR [redacted] DATE 3 OCT 94

ADDRESS

Rx		SPHERICAL	CYLINDRICAL	AXIS	PRISM	BASE
D.V.	O.D.	-3.25	-.25	130		
	O.S.	+.50	-1.00	80		
N.V.	O.D.	+2.00	add			
	O.S.	+2.00				

REMARKS P.D. 72, 60

DATE OF EXAM 3 OCT 94 EXPIRATION DATE 3 OCT 95

DR. [redacted] LIC. # [redacted]

Questions?
Comments?
Uncontrollable Emotions?