

Disabilities

05-499/899 Fall 2024

Celebrating Accessibility

<https://cmu-05-499.github.io>

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Questions about Disability

- Definitions matter
- Is it a thing you are, or a thing you have?
- Can anyone else tell?
- How long have you been disabled and how long will it last?
- What functions does it impact?
- How did you get it?
- What are the odds that you get it?
- Do you have more than one?

Person-First vs. Identity-First Language

Person-first language



"I am a person with autism"

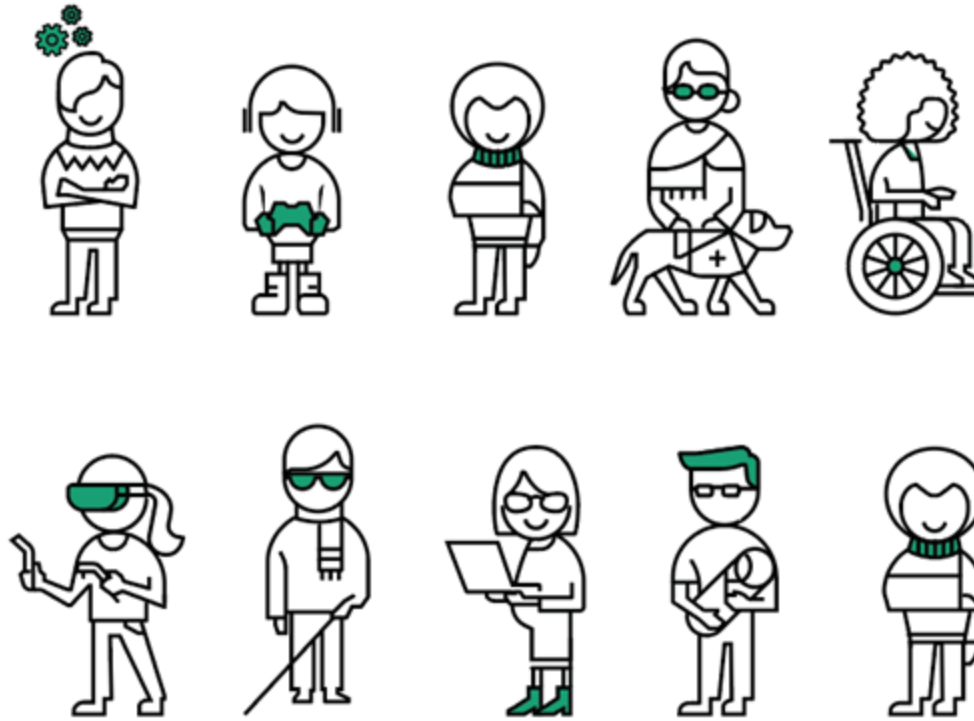
Identity-first language



"I am autistic"

Visible and Invisible Disabilities

- Some disabilities are easy to identify. Some are not.



Disabilities vary by time



Permanent



Temporary



Situational

Disabilities vary by time



Progressive



Dynamic

5 Basic Human Senses

1. Touch
 - Touch, pressure, pain, vibration, texture, temperature
2. Smell
 - Fragrant, woody, minty, sweet, chemical, toasted, lemon, fruity, pungent, decayed
3. Taste
 - Sweet, sour, bitter, salt, spicy, umami
4. Visual
 - Color, contrast, shape, form, movement
5. Sound
 - Volume, pitch, distance, direction, rhythm

There are more!

6. Vestibular

- Balance and Movement

7. Proprioception

- Where your body is in space
- Smooth movement

8. Interoception

- Internal body and emotional states
- Hunger, fullness, thirst, urination, defecation, temperature, pain, heartbeat, tension, sadness, joy, anxiety

Human Motor Functionality

- Lower Body
 - Walking, Running, Jogging, Skipping, Kicking
 - Kneeling, Sitting, Thrusting, Jumping, Dancing
- Upper Body
 - Grasping, Reaching, Holding, Touching, Throwing
 - Using Tools, Twisting bottle caps, Doing up buttons, Using scissors, Brush hair, Brush teeth, Use utensils,
 - Holding pencil, Drawing, Writing
- Head
 - Speaking, Turning Head, Moving Eyes, Emoting

Kinds of Disability

1. See

- Blind
- Cataract
- Distracted Driver

2. Hear

- Deaf
- Ear infection
- Bartender

3. Speak

- Mute
- Laryngitis
- Heavy accent

4. Move

- Paralysis
- Arm injury
- New parent holding a baby

5. Think

- Down's Syndrome
- Concussion
- Driving a car with the radio on

6. Chronic Illness

- Muscular dystrophy
- Heart disease
- Seasonal affective disorder

Disabilities often co-occur

- 1 of 34 US children are diagnosed with Autism
 - 50-70% of autistic people also diagnosed with ADHD
- Deaf-blind (45,000 – 50,000 individuals in the USA)
- Parkinson's Disease (1 million people in USA)
 - Affects Mobility + Cognition + Speech
- Aging
 - Everyone will get this one.
 - Affects Vision + Hearing + Cognition + Mobility
 - Often comes with Chronic Illness

Participation Activity

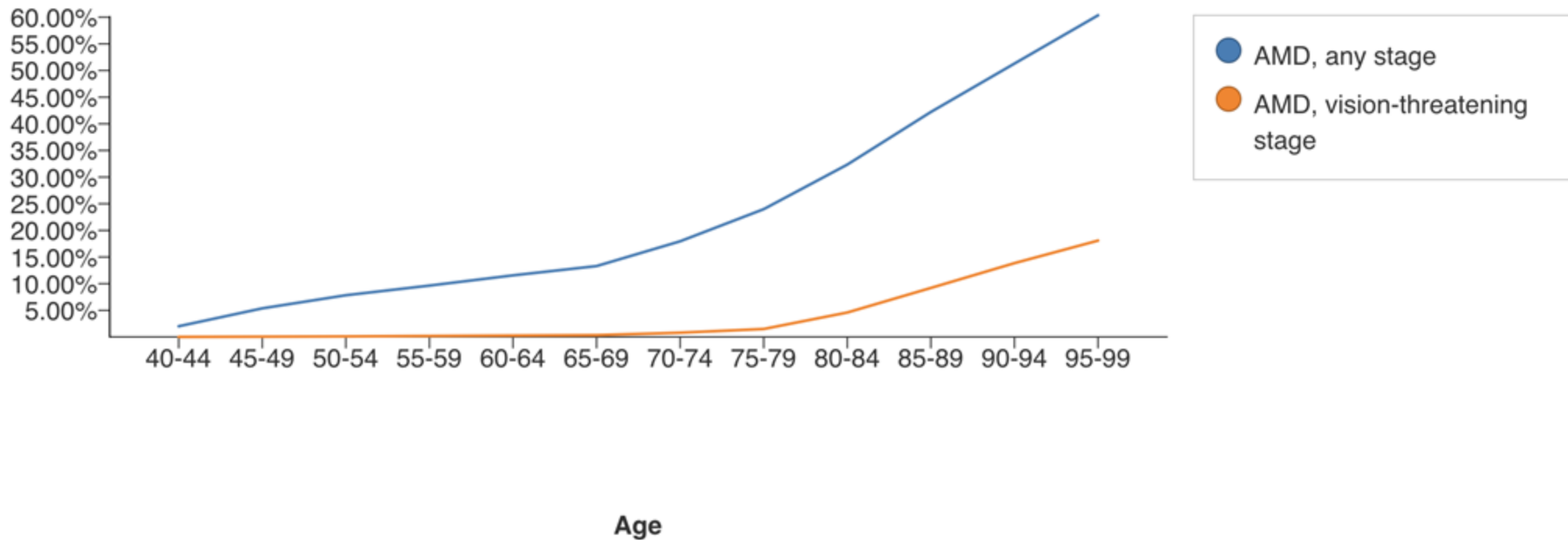
- Write your Andrew ID on a piece of paper.
- Consider the question: [Is Aging a Disability?](#)
 - Write down 2 reasons yes and 2 reasons no
- Turn in your paper as you leave.

Vision Disabilities

- Labels: Blind, visually impaired, low-vision, color blind, night blind, loss of depth perception, lazy eye, four eyes
- Definitions
 - Visual acuity loss: $< 20/40$ (corrected)
 - Blindness: $< 20/200$ (corrected)
- Prevalence: 2% people in the USA (7 million)
 - 1 million are blind

Vision Loss Prevalence

Figure 1. Prevalence (Percentage of US Resident Population) with Vision Loss or Blindness (Best Corrected Visual Acuity 20/40 Or Worse), by Age Group (in years)



Causes of Vision Loss

- Permanent
 - Refractive errors (myopia, hyperopia)
 - Anophthalmia (born without eyes)
 - Retinoblastoma
- Temporary
 - Migraine
 - Keratitis
 - Conjunctivitis
 - Eye strain
 - Corneal abrasion
 - Detached retina
 - Stroke
- Situational
 - Sudden bright light or darkness
- Progressive
 - Diabetic retinopathy
 - Glaucoma
 - Age-related macular degeneration
 - Amblyopia (lazy eye)
 - Cataracts
 - Retinosis pigmentosa
 - Trachoma

Kinds of Vision Loss

What it might look like

Adapted from

<https://www.lighthouseguild.org>



BLURRY VISION
(CATARACT)



CENTER VISION LOSS
(MACULAR DEGENERATION)



SIDE VISION LOSS
(GLAUCOMA)



COMBINATION LOSS
(DIABETIC RETINOPATHY)



GLARE PROBLEM



CONTRAST PROBLEM

Famous People with Vision Impairments

Stevie Wonder



Claude Monet



Hearing Disabilities

- Labels: Deaf, deaf, hard of hearing
- Definitions:
 - deaf: auditory sense channel is unavailable
 - hard of hearing: auditory sensing is limited (threshold > 20 dB)
 - ASL: American Sign Language – a visual language most used by people who are born deaf.
 - Deaf: people who are immersed in the (sign) language and culture of deafness
- Prevalence:
 - 0.25% of USA children born with hearing loss
 - 5% of all people on Earth have hearing loss (WHO)
 - 15% of USA adults over 18 have difficulty hearing.
- Hearing loss increases with age

Causes of Hearing Loss

- Permanent
 - Damage to inner ear
 - Cancer
 - Tinnitus
 - Genetics
 - In utero (rubella, cytomegalovirus)
 - Birth asphyxia
 - Neurological
- Temporary
 - Earwax
 - Ear infection
 - Ruptured eardrum
- Situational
 - Attending a rock concert
 - Noisy restaurant
- Progressive
 - Otosclerosis
 - Age-related degeneration
 - Genetic hearing loss

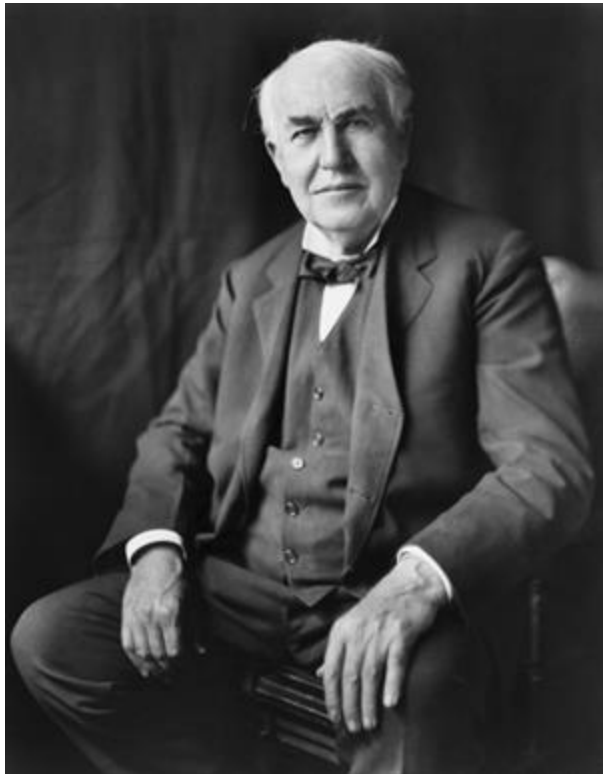
Kinds of Hearing Loss

- Conductive: Sound prevented from passing through the outer ear or middle ear.
- Sensorineural: Damage to the inner ear
- Mixed: Both conductive and sensorineural

- Usually qualified as loss X pitch (frequency)
 - Mild
 - Severe
 - Profound

Famous People with Hearing Impairments

Thomas Edison



Nyle DiMarco



Cognition

- Labels: Intellectual developmental disorder, autism, ADHD, dyslexia, dyscalculia, cerebral palsy, Tourette's, low IQ, dementia, learning disability
- There are many different kinds of disabilities here.

Prevalence of Cognition Disabilities in the USA

- IDD: 8.5%
- Autism: 3%
- ADHD: 9.4%
- Dyslexia: 15%
- Dyscalculia: 3-6%
- Dementia: 0.7%
- Tourette's: 0.6%
- Cerebral Palsy: 0.15%

Causes of Cognitive Disabilities

- Permanent
 - Genetics
 - Exposure to alcohol in utero
 - Infections during pregnancy
 - Lack of oxygen during birth
 - Traumatic brain injury
 - Stroke
- Temporary
 - Concussion
 - Drugs
- Situational
 - Distracted driving
- Progressive
 - Age
 - Heart disease
 - Parkinson's
 - Alzheimer's
 - Diabetes

Kinds of Cognitive Disability

- Practical Skills:
 - Taking care of oneself and handling everyday life skills
- Conceptual Skills:
 - Difficulty remembering things, using language, using numbers, making good decisions
- Social Skills:
 - Difficulty communicating with others

Famous People with Cognitive Differences

Temple Grandin



Greta Thunberg



Speech

- Labels: Mute, Dysarthric speech, speech impediment, aphasia, stutterer, cleft palate, laryngitis
- Prevalence:
 - 5% of children have a speech impairment
 - 5% of children stutter for 6 months or more. 1% stutter long-term.

Causes of Speech Disabilities

- Permanent
 - Genetics
 - Traumatic brain injury
 - Dementia
 - Stroke
 - Dysarthria
 - Cancer
 - Hearing loss
- Temporary
 - Vocal cord damage
- Situational
 - Chewing
- Progressive
 - Huntington's
 - Parkinson's
 - ALS
- Dynamic
 - Selective Mutism
 - Shock/Surprise

Kinds of Speech Disability

- Disfluency: Altered flow of a person's speech
- Orofacial myofunctional: Using or moving your face, mouth, tongue muscles
- Speech sound: Ability to produce clear sounds
- Voice: Quality of your vocal sounds

Famous People with Speech Impediments

Ed Sheeran



Elvis



Mobility or Motor

- Labels: Mobility impairment, Person who uses a wheelchair, prosthetic user, amputee, Motor Impairment
- Definitions: Motor skills involve motor, sensory, and cognitive abilities.
 - **Fine Motor Control (Dexterity)** - small muscle movements often the hands and fingers.
 - **Gross Motor Control (Mobility)** - typically refers to the larger muscle groups including the legs and impact walking and more generalized movement of the body
 - **Range of Motion** - required for different tasks may be vastly different
 - **Resolution** - granularity of the movement or control requirement
 - **Strength** - force required to activate a control or perform a movement
 - **Endurance** - ability to sustain a force and repeat it over time
 - **Reliability** - how effectively can the movement be reproduced over time

Prevalence of Mobility Disabilities

Causes of Mobility Disabilities

- Permanent
 - Physical injury
 - Drug use in utero
 - Cerebral palsy
 - Traumatic brain injury
- Temporary
 - Broken limb
- Situational
 - New baby
- Progressive
 - Multiple sclerosis
 - Peripheral neuropathy
 - Repetitive stress injury
- Dynamic

Kinds of Mobility Disabilities

- Gross motor skills
- Fine motor skills
- Paralysis
- Limb Differences

Famous People with Mobility Impairments

Franklin D. Roosevelt



Judith Heumann

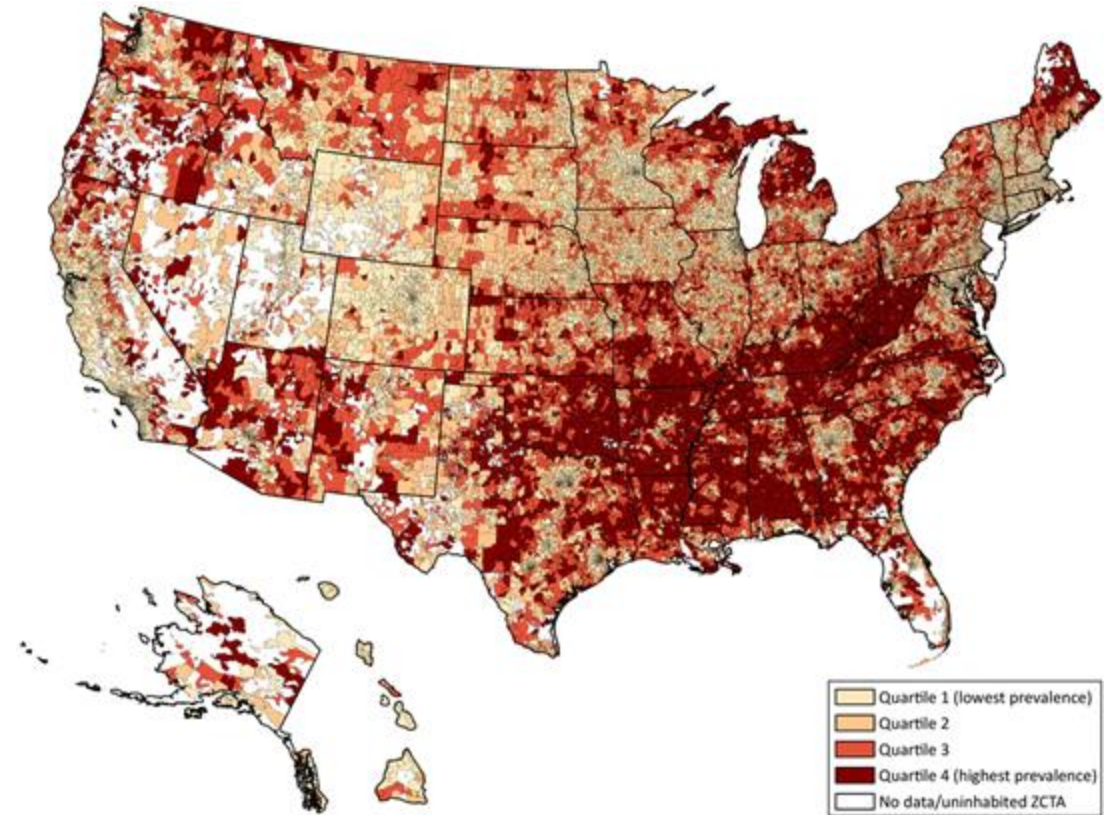


Chronic Illness

- Labels: Chronically ill, chronic health conditions
- Definition:
 - Range of conditions and diagnoses that impact functioning and are not expected to go away or be immediately fatal.
 - Symptoms alter one's daily life.
- Prevalence:
 - 24.6% of US adults have 1 of 10 specific chronic conditions.
 - 27.2% of US adults have 2 or more of 10 specific chronic conditions.
 - Chronic conditions: hypertension, coronary heart disease, stroke, diabetes, cancer, arthritis, hepatitis, kidney failure, asthma, emphysema.

Prevalence of Chronic Illness

- Geographic distribution of chronic illness is *not* random.
- Chronic illness in the Southeast correlates strongly with decades of social and economic policies (e.g. low minimum wage, non-expansion of Medicaid), concentrated poverty, lack of access to affordable healthcare.



https://www.cdc.gov/pcd/issues/2024/23_0267.htm

Causes of Chronic Illness

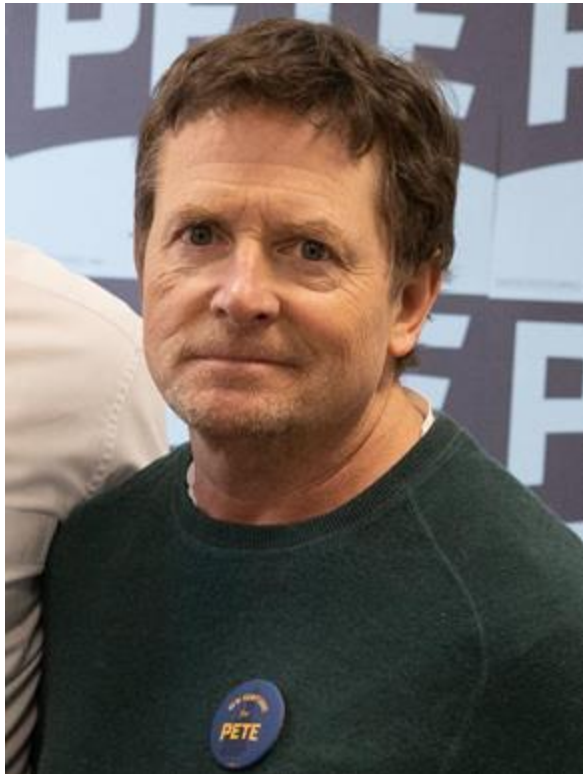
- Diseases
 - Parkinson's
 - ALS
 - Chronic Fatigue Syndrome
 - Multiple Sclerosis
- Life
 - Diet
 - Exercise
 - Stress
 - Mental Health
 - Access to healthcare

Attributes of Chronic Illness as a Disability

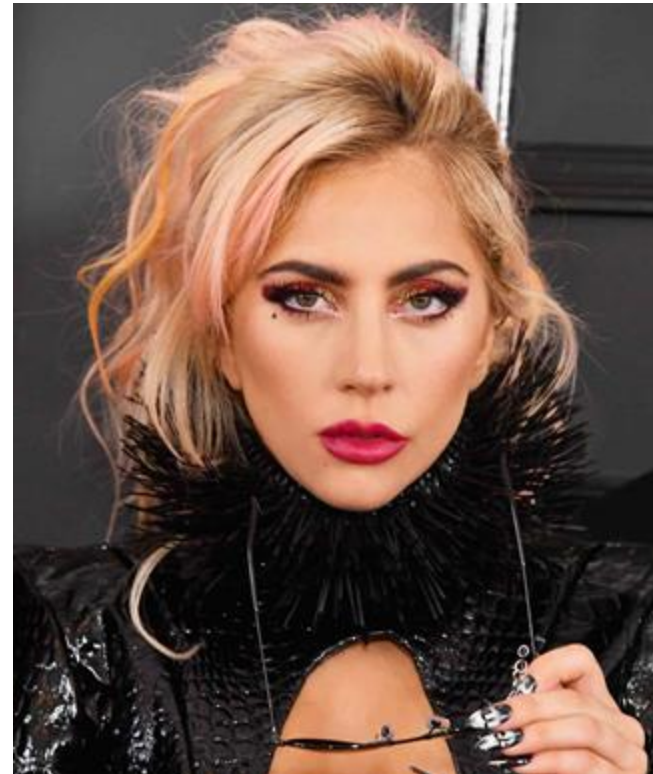
- Causes physical impairments
 - Pain, fatigue, discomfort, dizziness, nausea,
- Causes mental impairments
 - Disbelieved, cautious, vigilant about controlling symptoms,
- High variability in ability, often dynamic from day to day
- Impairments change after performing particular activities
 - Sometimes the choice to partake is worth the consequences.
 - e.g. eating a large dinner despite expected GI symptoms

Famous People with Chronic Illnesses

Michael J. Fox



Lady Gaga



Some co-occurring disabilities

- Deaf-Blind
- Parkinson's
- ALS
- AuDHD (Autism + ADHD)

Famous People with co-occurring disabilities

Helen Keller
Deaf-Blind



Haben Girma
Deaf-Blind



Famous People with co-occurring disabilities

Stephen Hawking
ALS



Lou Gherig
ALS



Famous People with co-occurring disabilities

Eminem
Autism + ADHD



Wentworth Miller
Autism + ADHD



Participation Activity Redux

- Find your paper about aging.
- Did you change your mind about whether [Aging is a Disability?](#)
 - If yes, please write down your new thoughts.
- Once you've finished writing down your answers, pair up with a neighbor and discuss your answers with them.
- Share your answers with the class.

- Turn in your paper as you leave.