



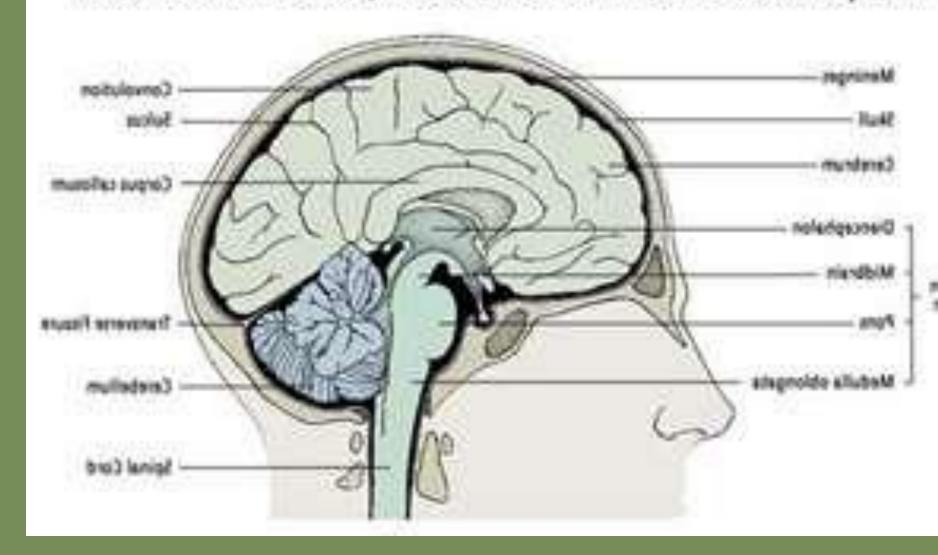
### Mind: Your Own Business!

Laura Mosqueda, M.D.
Chair and Professor of Family Medicine
Director of Geriatrics
University of California, Irvine School of Medicine

#### The Game Plan

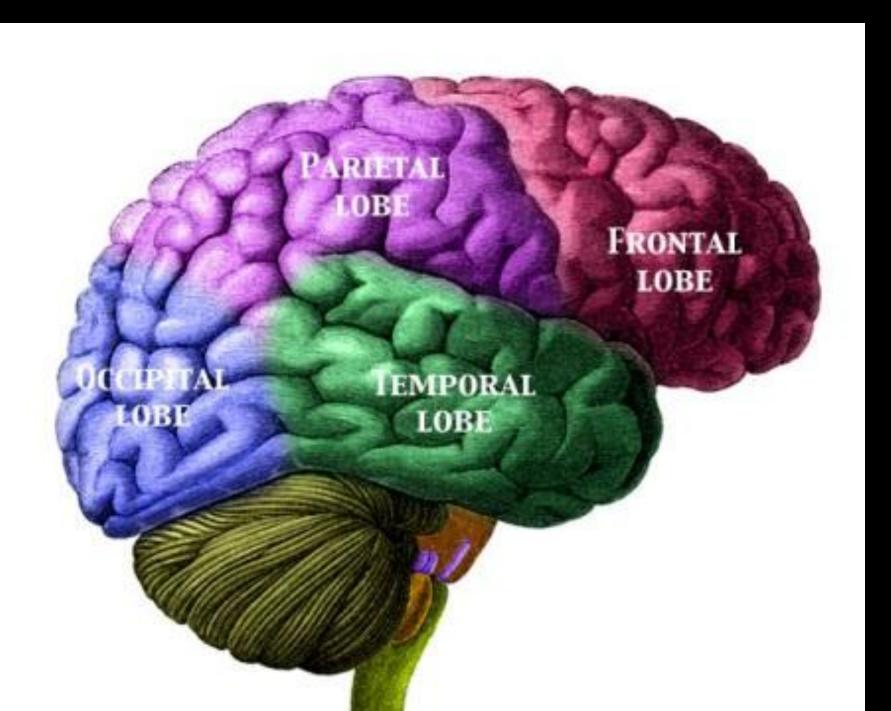
- We'll start by talking about the brain
- Will discuss what happens when things go wrong with the brain (like Alzheimer's Disease)
- Then we'll chat about the mind
- If we're lucky, we'll get to some tips about how to keep your brain and mind in good shape!

The Major Portions of the Brain Include the Cerebrum, Cerebellum and Brain Stem



Face

Back



#### **Brain**

- Noun: An organ of soft nervous tissue contained in the skull of vertebrates, functioning as the coordinating center of sensation and intellect
- Verb: Hit (someone) hard on the head with an object

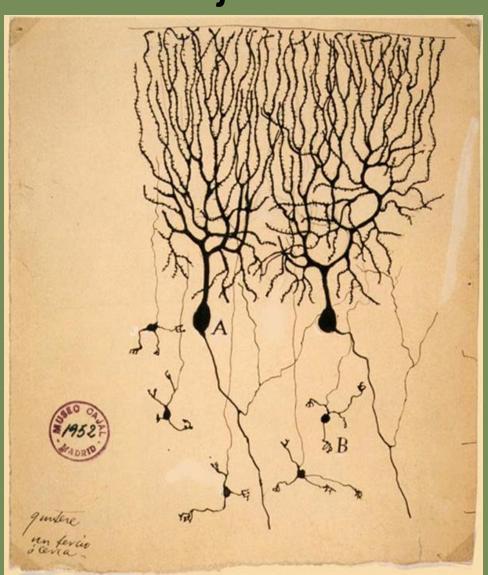
#### **Brain**

- An organ made of physical matter
- Contains electrical and chemical impulses
- Coordinates movements of the body
- Is the physical place where the mind resides

## Types of Cells in the Brain

- Neurons
  - The primary functional cells
  - Dendrites & Axons are the neurons' branches that conduct impulses to & from the cell
- Neuroglia
  - Atrocytes
  - Oligodendrocytes
  - Ependymal cells
- Microglia
- Endothelial cells

# Drawing by Santiago Ramon y Cajal 1899



#### **Brain Facts**

- 15,000,000,000,000 glial cells
- 1,000,000,000,000 neurons
- Average neuron has10,000 connections
  - These connections are how our cells communicate

#### Neurotransmitters

- Chemicals that allow brain cells to "talk" to each other or with other target cells.
- Synapse: the space between cells that the neurotransmitter traverses

With certain illnesses, such as Parkinson's Disease, there is a change in the balance of neurotransmitters.

# Types of Neurotransmitters (partial list)

- Acetylcholine
- Norepinephrine
- Dopamine
- Serotonin
- Aspartate
- Glycine
- Glutamate
- Gamma-amino butyric acid
- Histamine
- Enkephalin
- Vasoactive intestinal polypeptide
- Somatostatin
- Cholecystokinin
- Nitric oxide
- Zinc
- Cell adhesion molecules
- Carbon monoxide

# **Brain Ageing**

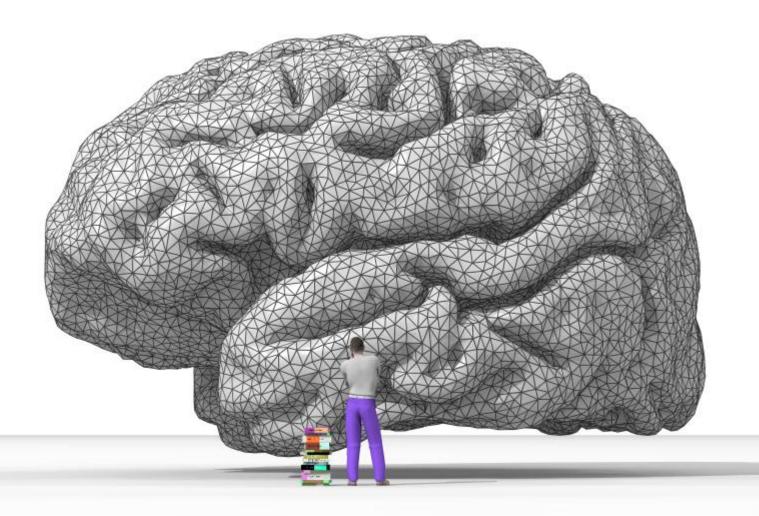
- All parts of our brain do not age equally
- Different areas of our brain change at different rates
- Different types of cells within our brains change at different rates

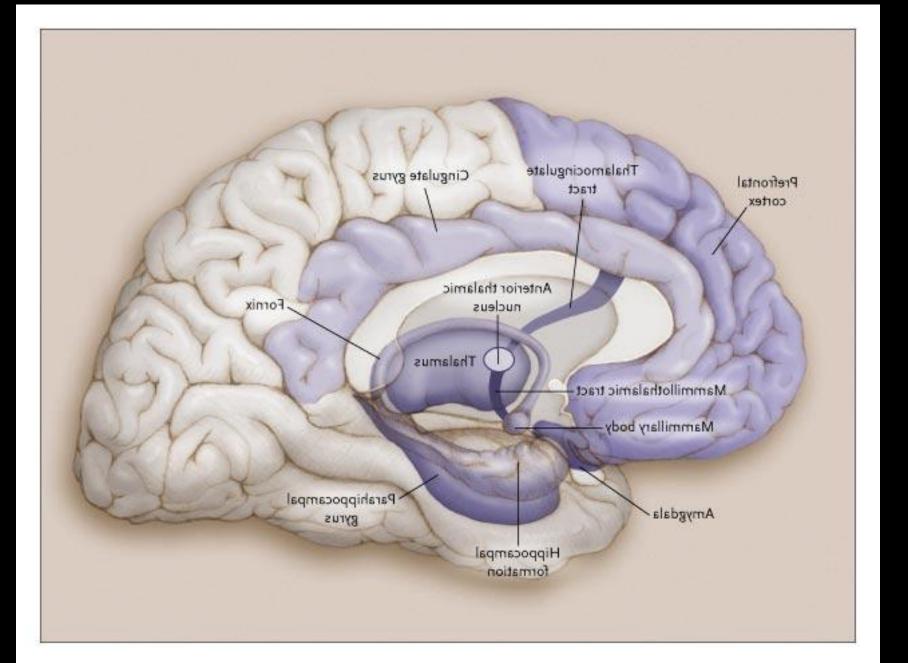
## Plasticity of the CNS

Our brains are shaped by internal and external stimuli

# The importance of life history on our brain

- If you've never learned a foreign language, it might be harder to do in retirement compared to someone who has been bilingual since childhood
- If you worked as a carpenter it might be easier for you to solve simple geometry problems than if you worked as a doctor





### Alzheimer's Disease



# Early AD

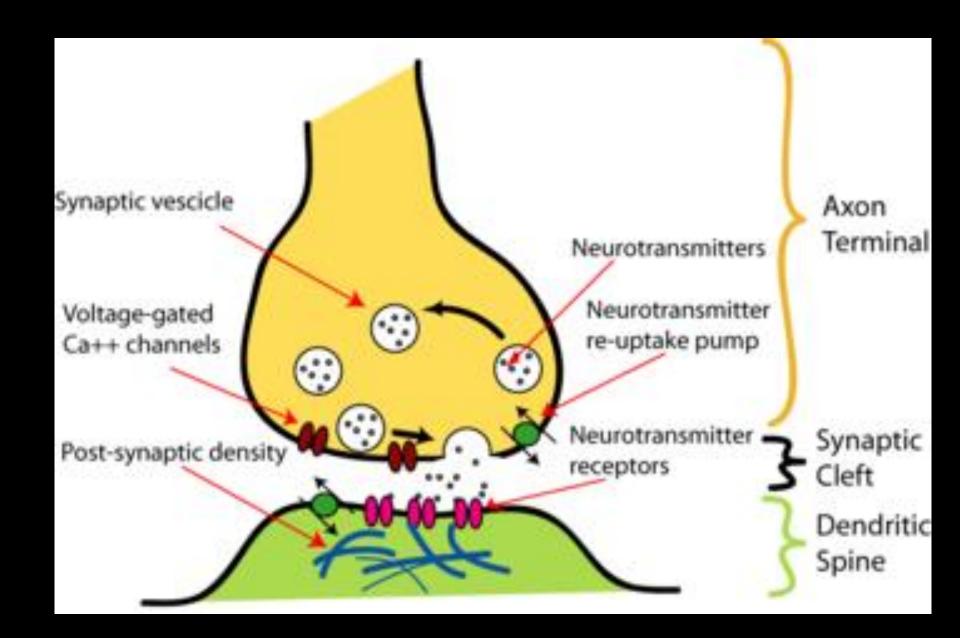


### Mild/Mod AD

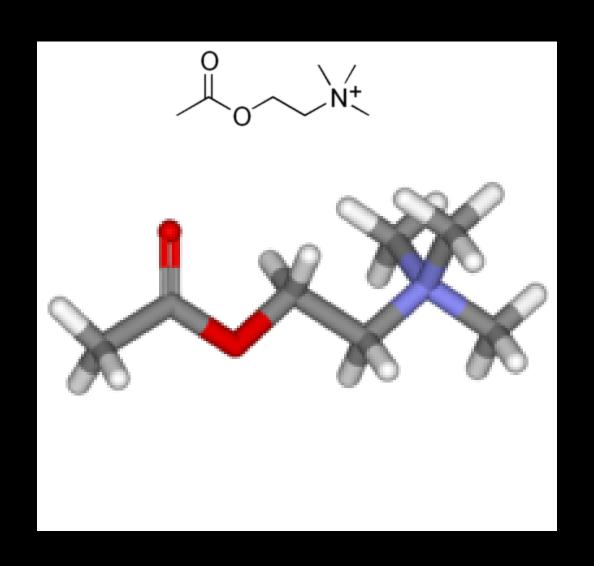


## Severe AD

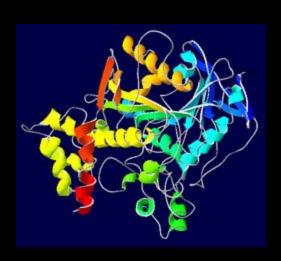


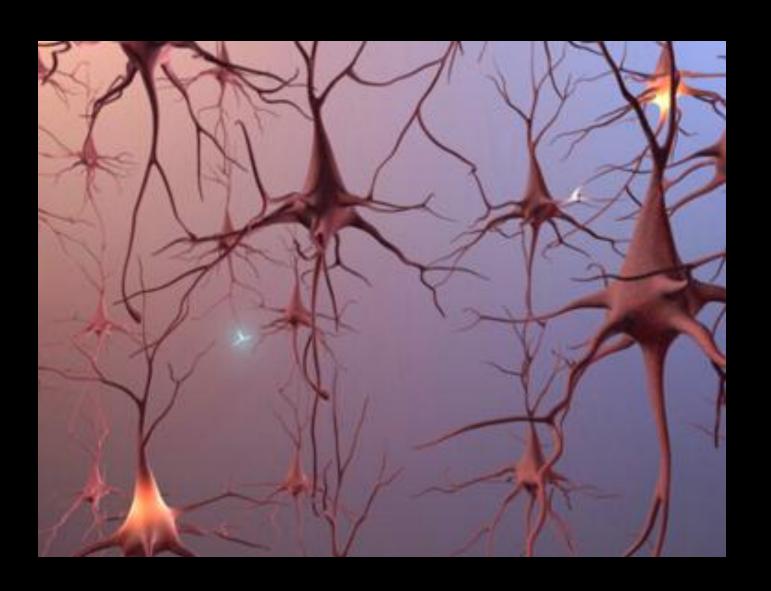


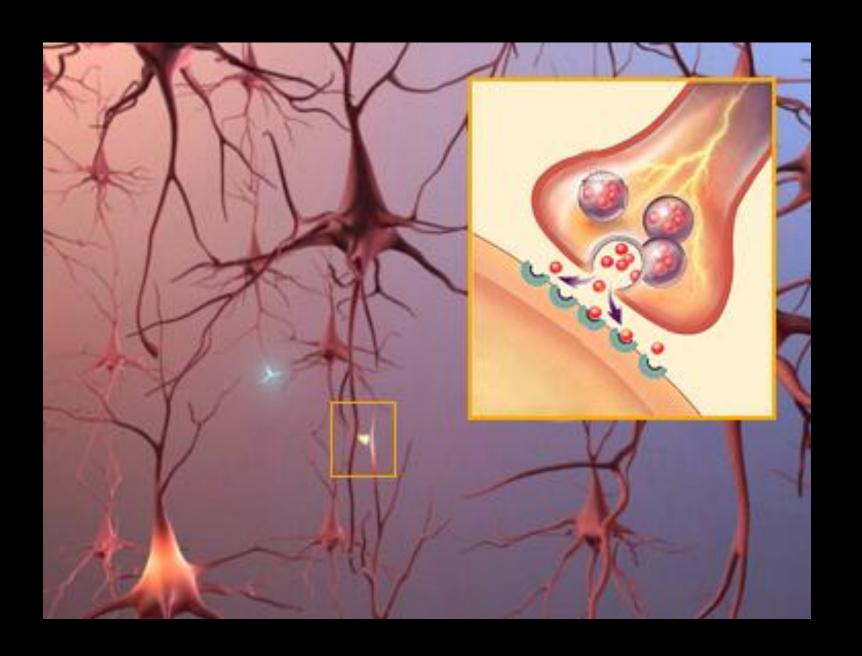
# Acetylcholine

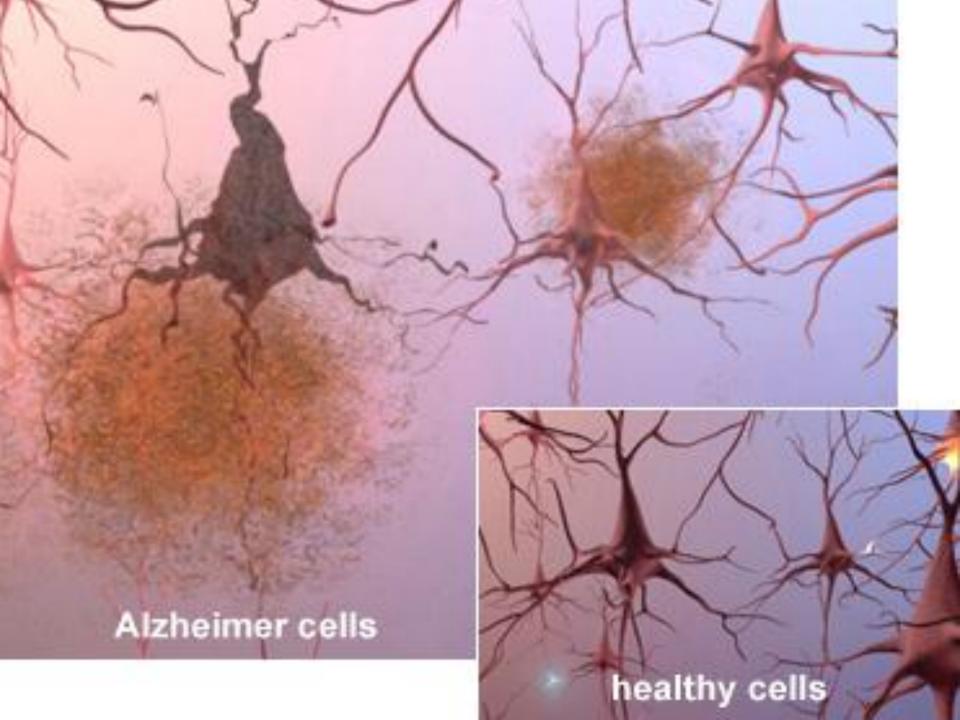


# Acetylcholinesterase



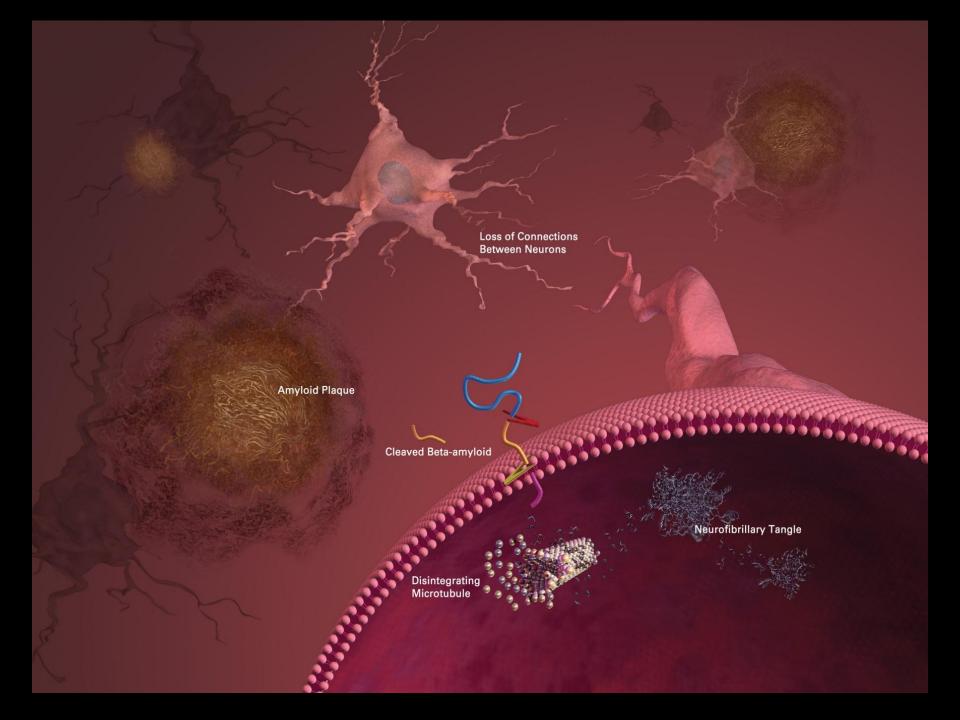






# Beta Amyloid Plaques





#### Diseases of the Brain

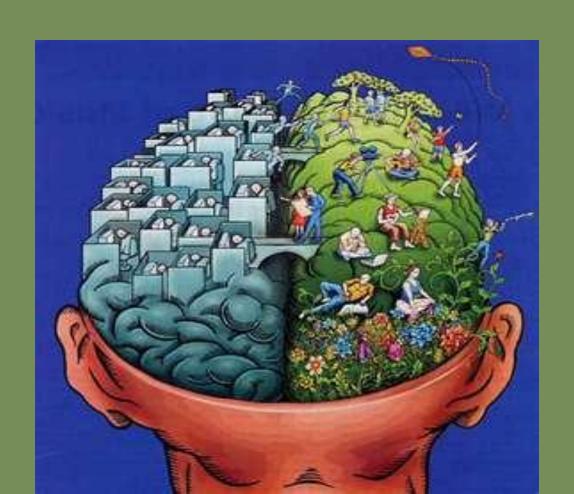
- Alzheimer's disease
- Parkinson's disease
- Stroke

#### Diseases of the Brain

- Alzheimer's disease
- Parkinson's disease
- Stroke

 Understanding their pathology at the microscopic and chemical levels helps us toward prevention, intervention, and healing.

# Whew! We made it through the brain. Now it's on to the mind.



#### Mind

- The awareness of consciousness
- Inner, subjective experience
- The faculty of thinking, reasoning, and applying knowledge

#### Mind

#### Noun:

- The element of a person that enables them to be aware of the world and their experiences, to think, and to feel
- the faculty of consciousness

#### Verb:

- Be distressed, annoyed, or worried by
- Become aware of or noticed

# Mind over matter: a quick experiment

## The Young

- May be fast and agile but lack experience and skill
- Tend to focus on personal advancement rather than broader community
- Physical resilience is greater than emotional resilience

#### The Old

- Normal aging is associated with slowed cognitive processing, memory impairment and difficulty concentrating.
- Barring dementia, however, knowledge continues to grow.
- Experts whether musicians, chess players or scientists – often reach peaks in their advanced years.

#### The Old

- vocabularies are larger
- knowledge about the world is greater
- more likely to change attitudes in light of new information
- better able to take the perspective of younger people than younger people are able to adopt perspectives of the old

#### The Old

- Presented with cultural and economic disputes over resources, older people generate more even-handed and acceptable solutions than younger counterparts
- regulate their emotions better, avoiding extreme highs and lows.
- Greater understanding of the world coupled with emotional balance and improved perspective is, for many, the definition of wisdom.... But not all old people are wise

#### Wisdom

- Curiosity/Interest in the World
- Love of Learning
- Critical Thinking
- Ingenuity
- Social Intelligence
- Perspective

### **AGEING**

#### SAGEING

- Adaptation
- Compensation for slow, insidious changes

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- Adaptation
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- Examples
  - Arthur Rubenstein
  - Square dancing

## Tips for Healthy Brains and Minds

- Stay engaged
- Learn new things
- Do old things differently
- Eat a diet high in vegetables and fruits
- Exercise your body
- Help other people, especially when you're feeling a little blue

#### Transcendence

- Appreciation of beauty and excellence
- Gratitude
- Hope
- Spirituality
- Forgiveness
- Humor
- Zest

Some people without brains do an awful lot of talking.

Scarecrow

Wizard of Oz