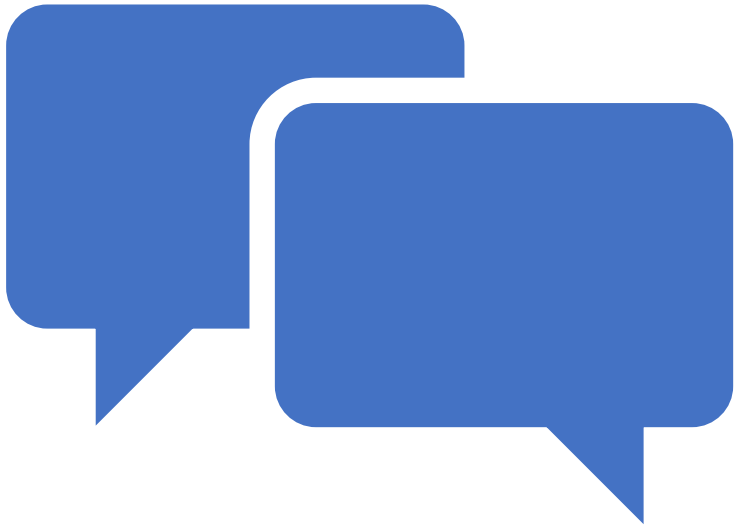
Think Again

Fall Term 2021

Class 6

Email and Website



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On Tap for Today

- Review
- Emotional vs. Rational
- Placebo Effect
- More Cognitive Biases
- Managing Cognitive Biases

Review

- Last week we began looking at cognitive biases, particularly the ones identified through the research of Daniel Kahneman and Amos Tversky.
- They are and were two brilliant and gifted researchers.
- Others have extended the reach of cognitive biases beyond where it should apply.
- Cognitive biases may show limitations of rational thought but not defects.

Review

- The brain does the best it can with the resources available to it.
- But over time, it has to evolve and adapt, just like every living thing.
- When we consider cognitive biases, ask yourselves three things:
  - Why does it work that way?
  - How can we use that knowledge positively?
  - Can we change it?

Emotional over Rational

- The question came up as to which was primary, emotions or rational thought.
- My answer was emotions.
- But that does not mean we are slaves to them.
- We can control our behaviors, but only with the realization that we want to. Called Executive Control.
- We can sometimes reprogram emotional responses to be in line with our rational desires.
- More on that towards the end of today's class.

Placebo Effect Working For You

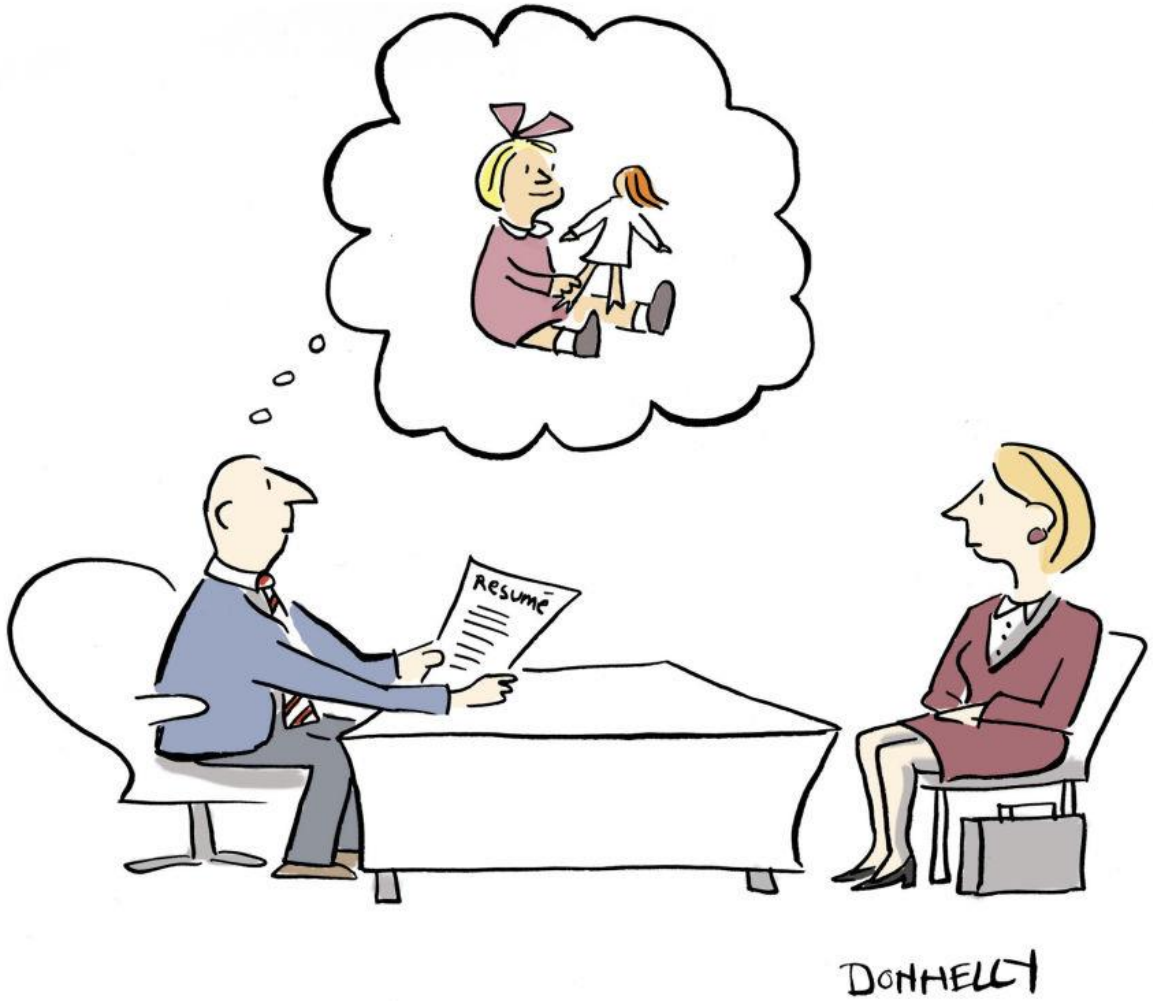
- You are thirsty and take a drink of water and feel immediate relief.
- It will be quite a while before the water reaches any useful place.
- It is quite adaptive since if you drank until there was actual benefit, you would drink way too much.
- Example of highly adaptive placebo effect.

Placebo Effect Working Against You

- On a hot day, you drink ice water and feel better.
- When your body senses the cold, it responds defensively by heating up.
- Exactly the opposite of what you want.
- Similarly, a hot drink signals the body to cool off.
- It feels counterintuitive and easily fools our minds.

Stereotype Threat

- Feeling the threat of being stereotyped, people often get nervous and perform poorly.
- Referred to as stereotype threat.
- Often applies based on race, sex, accent, and other characteristics.
- Extremely common with older people in our culture.
- Stereotypes lead evaluators and supervisors to be harsher in assessing people with certain characteristics.
- But they also lead to actual adverse performance by those same people.


Resume
DONNELLY

Stereotype Threat Among Older People

- Professional Lit Review looked at studies of stereotype threat affecting older people. Paper
- Older people who showed sensitivity to age bias had the following outcomes.
- Performed worse on cognitive tests in doctor's offices.
- Drove faster and braked less when tested.
- Performed worse on physical tests.
- Felt unappreciated and more likely to quit jobs.

I Am Your Doctor and I am Here to Misdiagnose You

- How often do older people explain a symptom to a medical professional only to be told that it is age related?
- Similar misdiagnoses apply to overweight people, smokers, people of color, and women complaining about pain.
- Study after study shows that algorithms outperform medical personal who apply clinical assessments after reviewing the history.
- History is good for raising questions, not providing answers.
- Particularly harmful when people accept the misdiagnosis.

Anchoring

- During decision making, anchoring occurs when individuals use an initial piece of information to make subsequent judgments.
- Once an anchor is set, other judgments are made by adjusting away from that anchor, and there is a bias toward interpreting other information around the anchor.
- The anchor may be from memory or provided externally.
- Applies to a lesser extent but still applies when actual numbers are known.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COGNITIVE BIASES:
ANCHORING
Video

$1 Million or a Penny Doubled Every Day for 30 Days

- Intuitively most would take the $1 Million.
- After 30 days, the doubled penny would be worth approximately $5.4 Million.
- A linear progression would come to 60 cents.
- Exponential increases difficult to imagine.

Day 1: $0.01	Day 11: $10.24	Day 21: $10,485.76
Day 2: $0.02	Day 12: $20.48	Day 22: $20,971.52
Day 3: $0.04	Day 13: $40.96	Day 23: $41,943.04
Day 4: $0.08	Day 14: $81.92	Day 24: $83,886.08
Day 5: $0.16	Day 15: $163.84	Day 25: $167,772.16
Day 6: $0.32	Day 16: $327.68	Day 26: $335,544.32
Day 7: $0.64	Day 17: $655.36	Day 27: $671,088.64
Day 8: $1.28	Day 18: $1,310.72	Day 28: $1,342,177.28
Day 9: $2.56	Day 19: $2,621.44	Day 29: $2,684,354.56
Day 10: $5.12	Day 20: $5,242.88	Day 30: $5,368,709.12

Real Estate Sales Anchoring Tricks

- Real estate agencies knowing your price limitation is $400,000 will first show you house for $470,000. Intent is less to get you to exceed limit than to keep you as close to your limit as possible.

- My own experience with a real estate agent.

Kahneman and Tversky Experiment

- Subjects spun wheel with numbers 1 to 100 and were asked to estimate whether the percentage of African members of the UN was higher or lower than the number spun.
- Then asked to estimate actual percentage.
- Even though number spun was random, it strongly influenced the estimate.
- e.g. when spinning 10, estimate averaged 25% compared to 45% when spinning 60.

Framing Effect

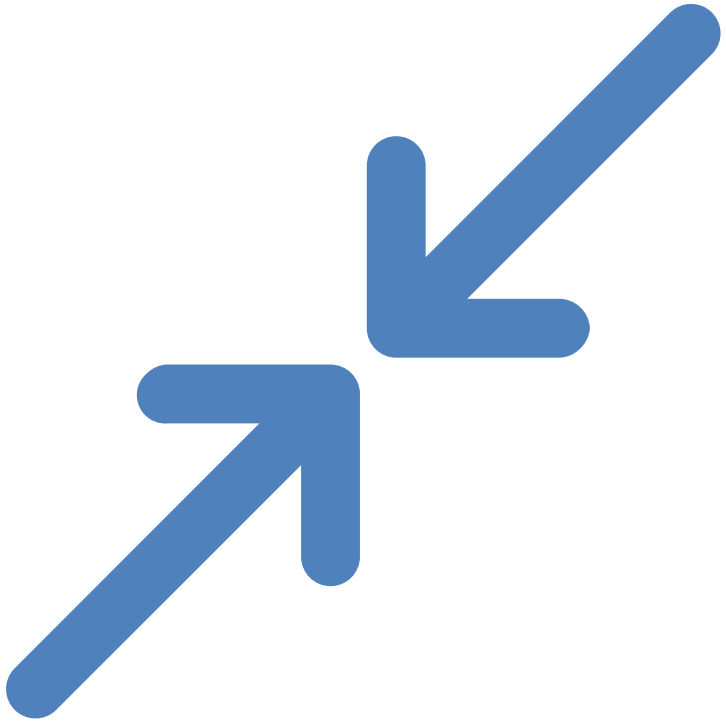
- Unjustified influences of formulation on beliefs and preferences
- Glass is half full or half empty.
- Whole milk is 4% fat but is often advertised as 96% fat free.
- Physical findings
  - Consistent with sexual abuse
  - Not inconsistent with sexual abuse

Kahneman and Tversky – 600 people will die without intervention.

- Positive Frame - Program A: Program ensures 200 people saved. Program B: One-third probability all saved, two-third possibility none saved. Both expected outcome of 200 saved.
- Negative Frame - Program C: After implementation 400 will die. Program D: One-third probability no one will die, two-third probability 600 will die. Again expected outcome 200 saved.
- Difference is specific numbers vs. odds but A and C identical as are B and D.
- But 72% chose A over C and 78% chose D over B.

Other Example and How to Use

- To get people to adopt something, focus on the gain. To get them to reject, focus on the loss. Even when they are the same.
- Patients much more likely to undergo risky procedure when told 2/3 likelihood of survival vs. 1/3 likelihood of dying.
- How I used this knowledge.



University College London Framing Study
All showed consumer losses

- Actual Price – Linear per unit price (benchmark)
- Reference Pricing (shows another higher price)
- Drip Pricing (additional charges but need to click to see them) (greatest loss)
- Partitioned Pricing (additional charges seen at same time)
- Time Limited Offers (if leave page, price no longer good)
- Complex Pricing (such as 3 for 2)
- Baiting (advertised price subject to availability)

Drip Pricing Examples

- Ebay – lower price but higher shipping – consumers pay more when initial price is lower
- Airlines – base price, then tax, then add-ons (some regulation to make tax appear in base price)
- Free product – just pay shipping and handling
- Amazon now ranks comparable product prices based on total cost including shipping.

Framing Prices

- Given the choice of two items, one for $40 and the other for $50 with minor extra features, most people choose to pay $40.
- Add another option for $60 with additional minor features and most people choose to pay $50.
- The higher you set the top price, the more likely people are to choose the middle one.


Video

The More You Buy, the Less You Pay

- Or so we believe.
- At $1.50 a piece or a package of 3 for $5.00, more people would buy the package.
- 12 oz costs $2.00 and 24 oz costs $4.29, more people would buy the 24 oz package.
- People more likely to buy 2 if priced 2/$3.00 than if priced $1.50 each.

Complete the Word

- S O P

Complete the word

- S O P

Confirmatory Bias

- Tendency to search for, interpret, favor, and recall information in a way that confirms one's preexisting beliefs or hypotheses (Scott Plous)
- The initial attempt to *believe* is an automatic and necessary operation. Even a nonsensical statement will evoke initial belief. It has to.
- *Unbelieving* requires us to believe, then question, and then resolve and depending on the source, may have other negative emotional effects.
- Don’t think about a white bear.
- Why health and science studies are designed to be double blind.

Manifestations of Confirmatory Bias

- Seek out information that conforms to our beliefs – watch MSNBC or Fox News.
- Interpret information based on our belief – Colin Powell's death supports vaccination and anti-vaxxers.
- If there are enough dots, you can legitimately draw almost any picture.
- Exercise selective memory to support our beliefs
- Jump onto consistent input and find ways to disregard inconsistent input.
- Being wrong is just too onerous or even painful.

A Happy Person and an Unhappy Person Walk Into a Bar

- Actually, they walked to the bar together.
- Along the way they passed 12 people.
- 6 smiled and greeted them.
- 6 ignored them.
- When they got to the bar, the unhappy person commented on how unfriendly people are.
- The happy person noted how friendly people were.
- Enough dots to support any interpretation as there is in real life.

He Pointed a Cell Phone at Me

- Fear makes us hypersensitive to threatening objects, often to the point of seeing something that is not there.
- At night, in a violent area, it is natural to fear attack generally and gun violence specifically.
- Given a piece of the pattern, our brains fill in the rest, particularly when the amygdala is in charge. Reaching into one's pocket or holding any object provides enough of the pattern to have us see a gun. Also true for any loud noise perceived as a gunshot.
- The more afraid and the more conscious or subconscious racial biases exist, the less it takes to actually 'see' or 'hear' a gun. Looking at a video from a safe location or imagining the event in the absence of fear makes it appear irrational but it is not.
- Of course, out and out racism and lying also exist.

Overreaction Can Be the Norm

- Those suffering from PTSD share the same experience but often much more acute and requiring less of a trigger.
- Avoiding being shot by a gun requires immediate action and rational thought becomes a luxury.
- A car backfire or a single shot from one police officer, often sets up a barrage as an instinctive reaction that feeds on each additional shot.
- Remember, unlike vision, we are not very good at establishing the direction of sound, as an ambulance siren.

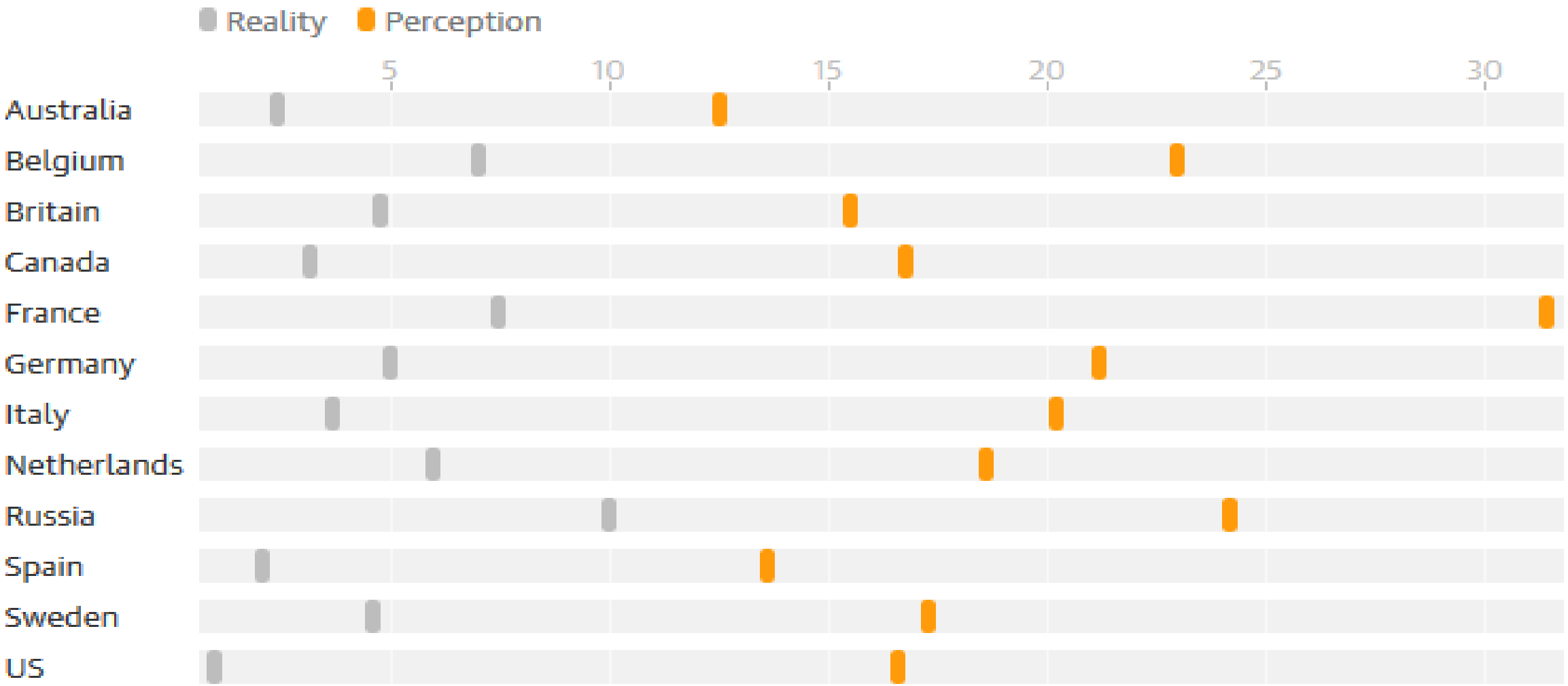
Racism as a Cognitive Bias

- Racism is rampant in our species and not surprising.
- Tribalism is an inherent attitude and often necessary to survival.
- If you are walking down a dark street and run into a stranger, a certain amount of fear can be a healthy, protective response.
- When the person is different than you or fits into a stereotype, that response can be exaggerated.
- Combination of tribalism, fear of the unknown, confirmatory bias, and the nature of the fear response reinforces biases.

Confirmatory Bias and Racism

- If you believe blacks are more prone to violence than whites, you will probably find a lot of evidentiary support.
- If a white man named Joe Smith assaults someone, the conclusion may be that he is a bad man.
- If a black man named Joe Smith assaults someone, the conclusion may be blacks are bad.
- We notice what we look for and particularly what we fear and disregard inconsistent evidence. A hundred black men acting nicely may evade our notice but one black man acting badly may leave an impression.

Estimates of Muslim Population



Availability Bias

- We are biased toward judging events' likelihood/frequency based on how easily we conjure up examples of the event occurring in the past.
- The **availability heuristic**, also known as **availability bias**, is a mental shortcut that relies on immediate examples that come to a given person's mind when evaluating a specific topic, concept, method or decision. (Kahneman)
- Slot machines set off loud noises when someone wins.
- Lottery ticket winners are drawn on TV and winners appear in the news.
- Airplane crashes, shark attacks, breakthrough COVID deaths make headlines.


Video


LIVE
breakyourownnews.com
CARGOSPOTTER/YOUTUBE
BREAKING NEWS
PLANE LANDS SAFELY IN MIAMI
22:52
NO CASUALTIES AMONG 154 PASSENGERS AND CREW MEMBERS


LIVE
breakyourownnews.com
MEGA
MILLIONS
LOSER
BREAKING NEWS
LOTTERY TICKET LOSES
22:58
CHAPEL HILL MAN BUYS LOSING LOTTERY TICKET FOR $10

Alief

- Term coined by Yale philosopher Tamar Gendler.
- Conscious or unconscious emotional responses to how things seem, even if we know what they really are
- Contrast with belief which in our minds are true.
- When we read a book or watch a movie, we have emotional responses to things that occur, realizing they are fiction.
- Psychologist Paul Rozen asked people to eat fudge in shape of dog feces or drink soup from a pristine brand-new bed pan.
- They knew the truth but had strong disgust reactions.

Video

Physical vs. Emotional

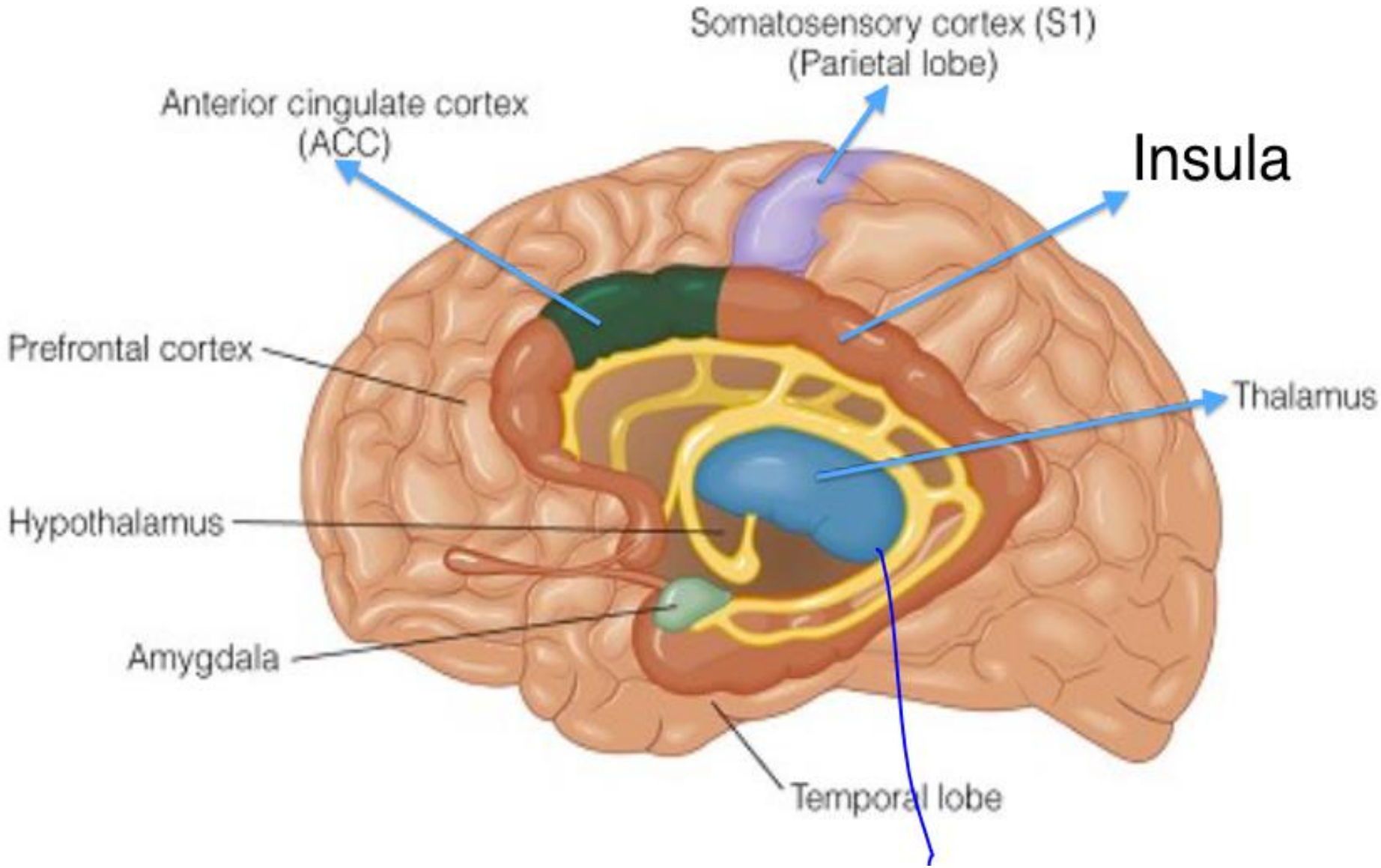
- We know that the brain does not think in emotional terms.
- Emotions are labels we put on our conscious awareness of neurotransmitters coursing through our brain.
- We think of physical and emotional awareness as being very different.
- They are to us but not to the brain.
- The same part reacts to both and our language reflects that.
- Think of warm or cold. Whether we use them in a physical or emotional sense, it is the same part of the brain.

Hot Coffee or Iced Coffee?

- Subjects were read neutral characteristics of a person and then asked to rate them on personality scales.
- On the elevator ride to the test area, with no idea that it was part of the experiment, half were asked to hold a cup of hot coffee and half a cup of iced coffee, ostensibly to allow the staff person to write down names.
- Those who held the hot coffee rated the person higher on personal warmth scales than those who held the iced coffee.
- There were not differences in how they rated the person on characteristics unrelated to personal warmth. Study

Keep or Share?

- Second experiment asked people to evaluate a therapeutic pack.
- Half were hot and half were cold, with experimenters blind as to which was which.
- To thank them, they were offered the choice of a gift certificate for themselves or one that would be given to another.
- Those who held hot pack more likely to give.
- Study – includes comprehensive background on issues.


Somatosensory cortex (S1)
(Parietal lobe)
Anterior cingulate cortex
(ACC)
Insula
Prefrontal cortex
Thalamus
Hypothalamus
Amygdala
Temporal lobe

Insula

- Processes emotions and ambiguity related to emotions.
- Also processes physical feelings of hot and cold.
- Anterior Insular Cortex has spindle cells just as the ACC does – only in humans, higher apes, and cetaceans
- Does not change what we feel, similar to lower brain functioning animals, but rather how we perceive and process it.
- Coffee and ice drink – our processing makes the difference.

How Can a Pencil Change Our Mood?

- Holding a pencil in your mouth the long way or by the end in your teeth creates the facial expression of smiling.
- Holding a pencil at the end with your lips creates the facial expression of frowning.
- Could be example of Priming Effect
- The former found the same Far Side cartoons funnier than the latter – Study
- Study results replicated by Kahneman.

Reciprocal Links

- Kahneman calls them Reciprocal Links –being happy makes you smile and smiling makes you happy.
- Notice what happens when you say Yes or No.
- Which facilitates smiling and which facilitates frowning?
- Try saying both with pencil in both positions – appears to apply across multiple languages.
- Try smiling when you are upset, angry, sad, or scared.

Sources of Cognitive Biases and Possible Solutions

- Architectural – inherent and unchangeable
  - – Accept limitation and control behavior
- Cognitive Limitations – differ among people
  - – Training or consultation
- Emotionally Driven – brain structure or experience
  - – Relaxation and Rational Analysis
- Association by Exposure – learned – internal and external
  - – Unlearning of Relearning

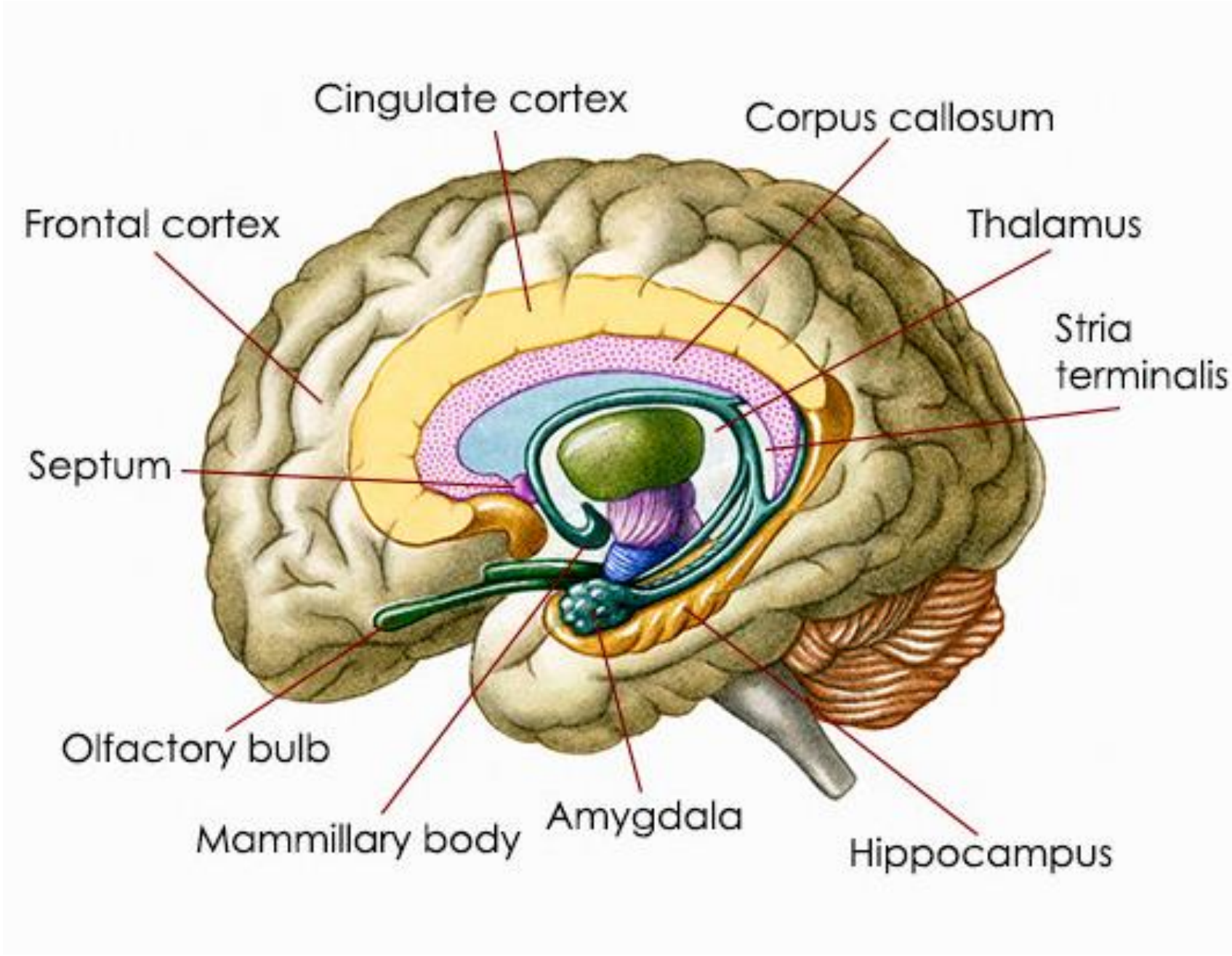
Managing Cognitive Biases

- Our learned responses, although generally useful, may be incorrect in some instances.
- We are unaware of the mental process that led us to feel as we did.
- If asked, we will attribute conscious, reasoned, and often unintentionally fabricated explanations for our responses.
- Sometimes, we can relearn our response through exposure or training.
- Other times, even when relearning is either unwise, beyond our capability, or not yet complete, we can change our behaviors.
- Knowing when and how to change outcomes can be extremely valuable.
- Double blind research is a method for managing known cognitive bias, particularly confirmation bias.


Video
G.I. JOE
001
01 August

Find Your Own Solution

- Accept that cognitive biases exist
- Appreciate that they serve valuable functions
- Assess whether they are destructive or counterproductive in any given situation
- Try different methods to create change
- My own attempts
  - VBAR
  - Yes If instead of No Because
  - No Problems, only Solutions


Cingulate cortex
Corpus callosum
Frontal cortex
Thalamus
Stria terminalis
Septum
Olfactory bulb
Mammillary body
Amygdala
Hippocampus

Amygdala

- almond-shape set of neurons located deep in the brain's medial temporal lobe (subcortical)
- key role in the processing of emotions
- In humans and other animals linked to both fear responses and pleasure.
- Its size is positively correlated with aggressive behavior across species.
- Conditions such as anxiety, autism, depression, post-traumatic stress disorder, and phobias are suspected of being linked to abnormal functioning of the amygdala, owing to damage, developmental problems, or neurotransmitter imbalance.

Anterior Cingulate Cortex (1)

- detects and monitors errors, evaluates the degree of the error, and then suggests an appropriate form of action
- involved in rational cognitive functions, such as reward anticipation, decision-making, empathy, impulse control, and emotion.
- The ACC seems to be especially involved when effort is needed to carry out a task such as in early learning and problem-solving.

Anterior Cingulate Cortex (2)

- Typical task that activates ACC eliciting some form of conflict within the participant that can potentially result in an error.
- ACC is unique in its abundance of specialized relatively large neurons called spindle cells.
- Only found in highly intelligent species such as great apes, cetaceans, and elephants.
- Allows fast processing over large areas of large brains requiring multiple components.
- Evolutionary advance - not require larger brain or more brain surface.

Prefrontal Cortex

- Most significant change in brains of recent homo sapiens (compare Neanderthal flattened forehead to homo sapiens)
- Abstract thinking, planning, mediating between conflicting thoughts
- Regulating behavior, controlling emotions
- Active, working memory

Brain Activity Reflects Choices

- Conform to the frame – choose sure thing and avoid loss – amygdala lights up (emotions)
- Not conform to frame – anterior cingulate cortex lights up (conflict and self-control)
- Most rational of subjects – prefrontal cortex lights up (reasoning) – little or no emotional or conflict responses
- Evolutionary progression from Amygdala to Prefrontal Cortex mediated by the ACC

Cognitive Bias and Cognitive Ability

- Stanovich and West conducted a number of studies to determine whether susceptibility to a so-called cognitive bias was related to cognitive ability (intelligence).
- About half were.
- If it relates to intelligence, is it really a cognitive bias?

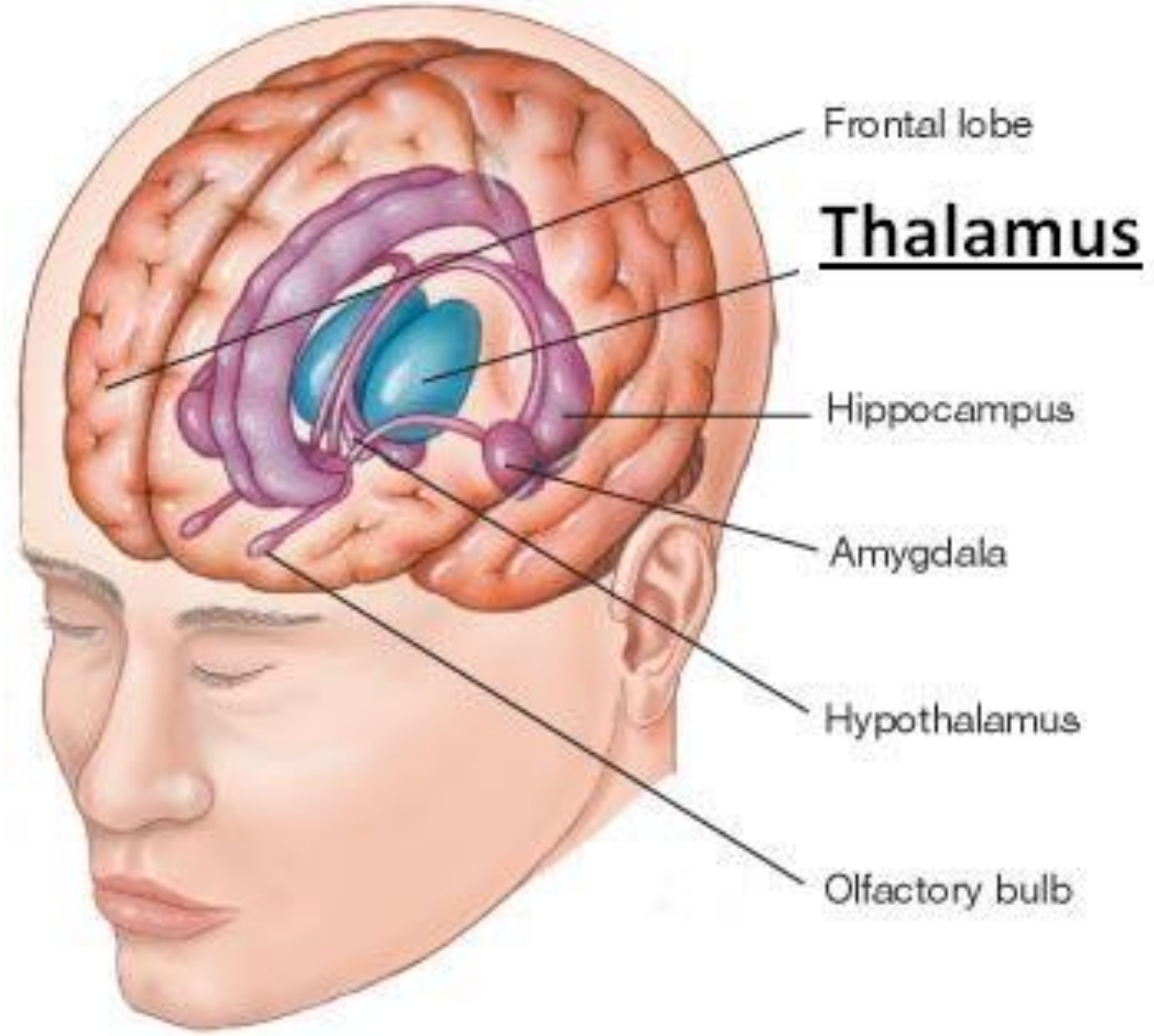
Relates to Cognitive Ability

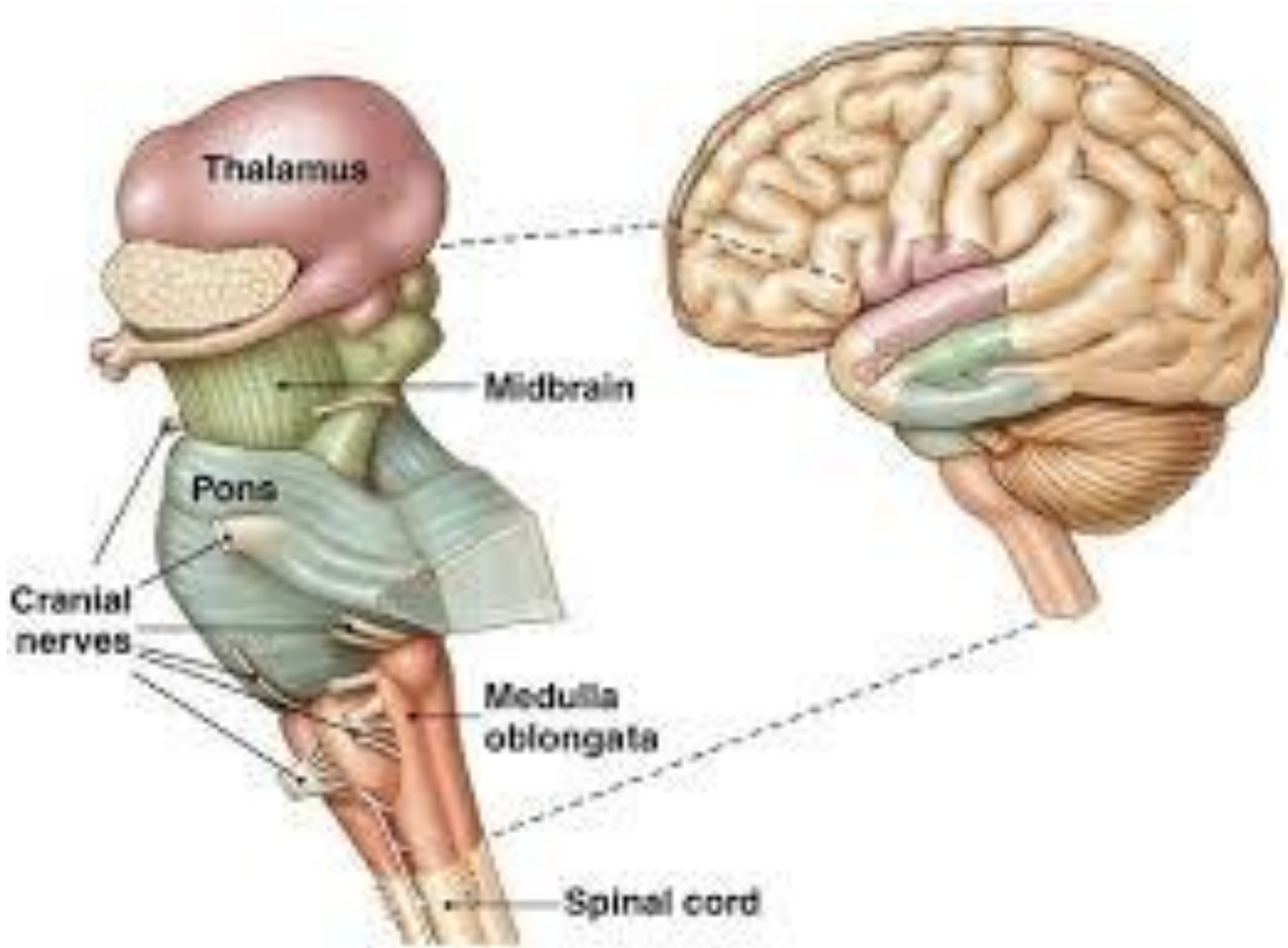
- Denominator Neglect – example - get $10 if you pick a white marble and can choose bag with 1 in 10 white or 8 in 100. Denominator neglect would make 8 chances seem more likely than 1 but odds of success are reduced from 10% to 8%.
- Probabilistic Reasoning – example - predict number on down side of 10 dealt cards when told 7 cards have number 1 and 3 cards have number 2 on the down side Most participants choose a strategy of predicting which 7 are 1 card and which 3 are 2 cards, even though a winning strategy is to predict 1-card status for all 10 cards.

Does not Relate to Cognitive Ability

- Myside Bias - people evaluate evidence, generate evidence, and test hypotheses in a manner biased toward their own prior opinions and attitudes
- Anchoring – example – asked whether there are more or less than 65 (or 12) African countries in the United Nations and then asked how many, those where 65 used averaged 45.2 and those where 12 used averaged 14.4.
- Sunk Cost Bias - more willing to drive an extra 10 minutes to save $10 on a $30 calculator than they would to save $10 on a $250 jacket, even though $10 savings is exactly the same.

Thalamus


Frontal lobe
Thalamus
Hippocampus
Amygdala
Hypothalamus
Olfactory bulb


Thalamus
Midbrain
Pons
Cranial nerves
Medulla oblongata
Spinal cord

Thalamus – In Control But Can Learn

- Sensory input enters the thalamus.
- The thalamus directs responses based on the way the brain is structured and its experience.
- When not sure what to do, looks to the cortex for programing and direction.
- That includes conscious capacity to direct programing.

Thalamus

- Thalamus serves as relay station between sensory organs and in both directions with much more information going from cortex to thalamus.
- Regulates arousal, awareness, sleep, wakefulness
- Also connects to the hippocampus (memory)
- Sends signal simultaneously to the amygdala for potential bypass. If the amygdala perceives a threat, it sends chemicals to the cortex preventing it from acting consciously

Cortex to Thalamus to Cortex (1) (theory based on evidence but not proven)

- Cortex makes predictions based on past experience and tells Thalamus what to expect.
- Sensory input (olfaction to a lesser degree) enters Thalamus.
- If Thalamus experiences what it expects, goes no further.
- If inconsistent, goes to cortex for new prediction and to amygdala in case of emergency.

Cortex to Thalamus to Cortex (2)

- Continuous loops at higher cortical layers until Thalamus decides prediction works
- Conscious awareness of surroundings occurs only when sensory input violates expectations since cortex not notified if consistent
- Smells go directly to the Olfactory Nerve for unknown reasons, possibly because it was the first of the senses developed or possibly because of increased connection with danger.