

Think Again

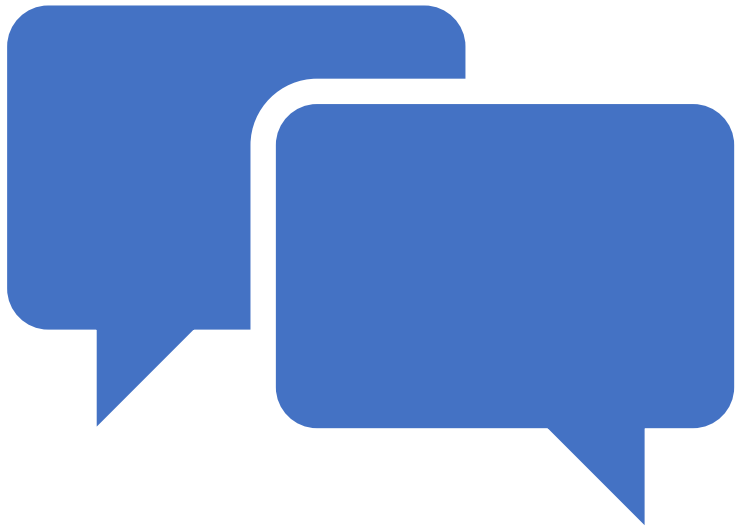
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Class 5

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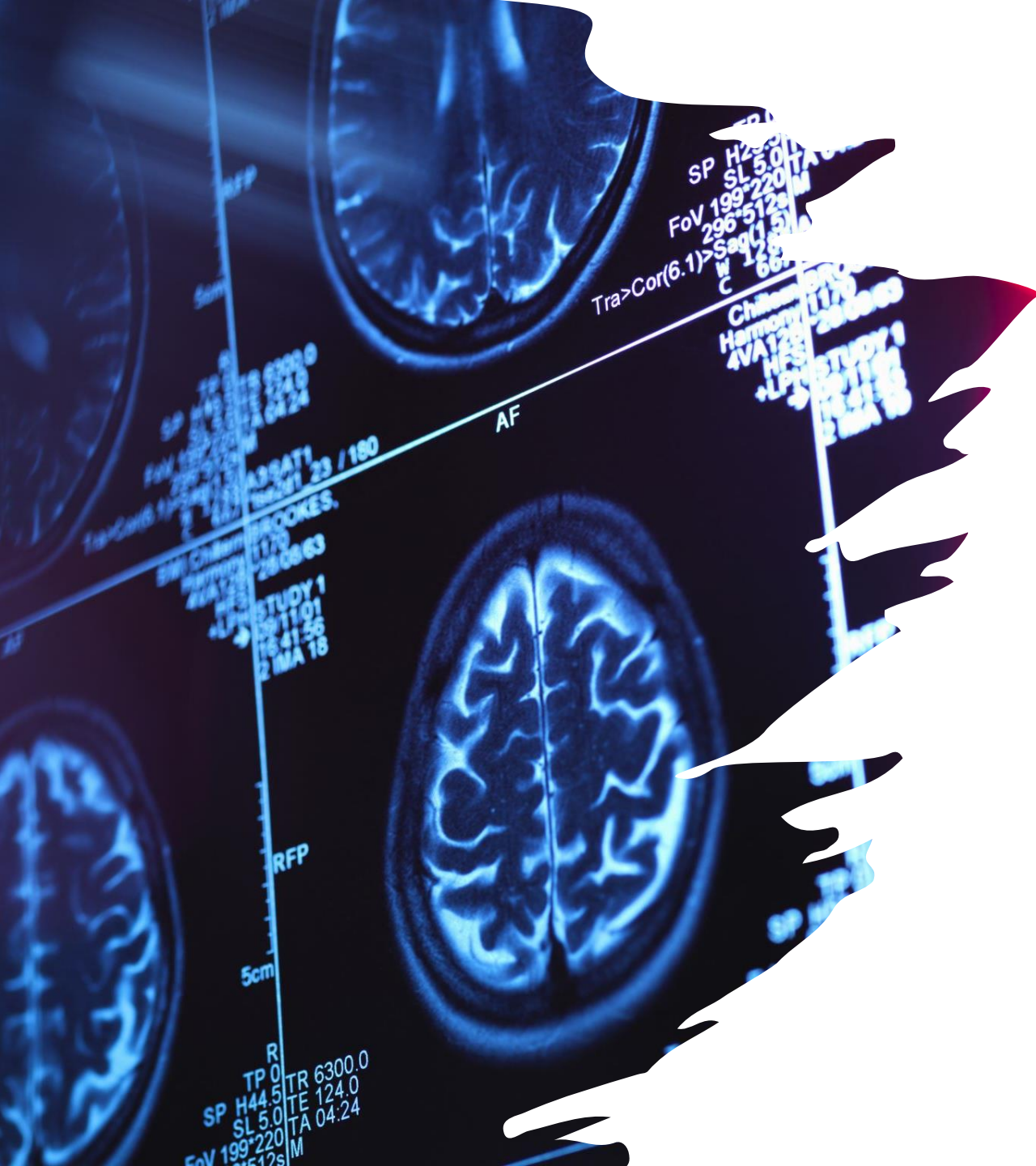
On Tap for Today

- Review
- Brain Interventions
- COVID Brain
- Good or Bad
- Cognitive Biases (1)



Review

- Our brains react based on genetic and epigenetic considerations and learning.
- What is brought to conscious awareness is what our brains consider necessary.
- It can be what we label emotions or what we label rational thought.
- That which we call emotion precedes what we call rational.



Taking Control

- We can take conscious control over our brain waves.
- We can learn limited control over release of neurotransmitters.
- We can lessen or enhance extent of release.
- We can control how we respond to release.



Focusing on the Big Picture

- We can dig into the trillions of complexities in the brain and how things act and interact.
- It will always be a limited understanding.
- But we do not need to dig in the weeds.
- We can learn what works for us.
- Everything is interconnected so big picture changes will do the trick.

Are We Good Or Bad?

Let's Ask Nina Simone



Dr. Jekyll or Mr. Hyde

- Philosophers have long debated, “Are humans basically good or evil?”
- Brain research shows that almost all people are basically good when they are free to be themselves.
- Context, learning, and framing matter. Think about stepping on a spider, killing animals for sport or food, responding to people who are LGBTQ.
- External structures such as countries, corporations, and religion can also warp natural tendencies, positively or negatively.
- Brains are particularly sensitive to and reactive to threat or fear of loss.
- Those reactions may bring relief, but not joy or pleasure.

Feeling Real Good – What the Brain Likes

Positive social
interactions

Giving to
others

Gratitude

Gratitude


- Not only feels good but highly therapeutic
- Heavily used in meditation and relaxation techniques
- One of the most positive aspects of religion is the practice of gratitude – thanking God
- Feeling gratitude works whether it is directed to nature, family, other people, or a deity.

Giving to Others More Rewarding than Spending on Oneself

- Research shows that donating to others or doing volunteer work activates the same reward centers as exercise or eating foods we like.
- Spending on ourselves does not.
- When we spend on others, fMRI's show activity in the ventral tegmental area (VTA) where dopamine originates in the brain.
- Also shows activation of the subgenual cingulate, an area rich in serotonin transporters.
- Things are more complicated, but those measurements are meaningful. [Video](#)

Use It or Lose It

- Research showed an average of 38% reduction in memory capacity following retirement, controlling for age. [Study](#)
- In a study with participants randomly assigned to volunteer or not volunteer, those who volunteered experienced hippocampus growth while those who did not volunteer experienced hippocampus shrinkage.
- Impact was stronger in men than in women. [Study](#)



Listen to the Neurotransmitters

- Neurotransmitters influence or even direct our actions.
- Some motivate us to stop certain behaviors.
- Others motivate us to repeat other behaviors.
- When it comes to our relationship with living things, those that motivate us to want more, come from positive social interactions and altruism.
- That is who we are when we are not afraid and have not been taught differently.

UCSF Intervention

- It was a single proof of concept, not a research study.
- People have been working of physical interventions for depression for hundreds of years.
- They often work to some extent, fail in others, and sometimes have disastrous effects.
- It all started in 1848 when our old friend Phineas Gage had an iron rod pierce his brain, dramatically changing his personality.
- That led to the lobotomy.

Lobotomy

- Severed the Prefrontal Lobe from the Thalamus.
- Primarily used on people acting out in uncontrollable manners.
- Reasonably effective but also destroyed much of what makes us human.
- Walter Freeman, an American neurologist and psychiatrist is well known as the “father of the lobotomy”, performing over 3000, starting in 1936.
- John F. Kennedy’s sister Rosemary was given a lobotomy by Dr. Freeman, ostensibly for acting out behavior, but more likely because of her interest in boys. For Dr. Freeman, lobotomy was the solution for all problems.
- Left her totally incapacitated and needing special care as long as she lived.
- Recorded cases of successful, and unsuccessful treatment of depression.

Electroconvulsive Therapy (ECT)

- Commonly referred to as shock therapy.
- Historically used for multiple conditions, one of which has been depression.
- Electrodes run electricity through the brain, creating a temporary seizure.
- High and frequent doses often created serious brain damage.
- More recently, lower, more targeted doses eliminated much of the damage.
- No one knows how it works but it sometimes does.

Deep Brain Stimulation (DBS)

- Electrical intervention quite common for those suffering epilepsy.
- Many have depression as a comorbidity.
- Scientists, while mapping electrical currents for epilepsy, were able to map those occurring during episodes of depression.
- Previous attempts had some success but with limitations.
- Had to provide continuous current and the circuits differed among individual patients.
- Intervention followed mapping depression related circuits and identification of brain wave biomarkers appearing before bouts of depression.
- Able to have device activate only when those biomarkers were evident.

Future of DBS

- Certainly a significant advancement in DBS and remarkably effective in the proof on concept case.
- Unknown how effective it would be generally, how long it will last, or possible side effects.
- Clearly better to prevent depression or fix the problem and this does not do this.
- Appears that psychedelics generally do.



COVID Brain

It is a real thing.

Cognitive Bias





Even I fall prey to
cognitive biases.

Why did I buy that
extended warranty on
my crepe maker?

Examples of Cognitive Biases

anchoring

The first thing you judge influences your judgment of all that follows.

Human minds are associative in nature, so the order in which we receive information helps determine the course of our judgments and perceptions.

Be especially mindful of this bias during financial negotiations such as houses, cars, and salaries. The initial price offered is proven to have a significant effect.

confirmation bias

You favor things that confirm your existing beliefs.

We are primed to see and agree with ideas that fit our preceptions and to ignore and dismiss information that conflicts with them.

Think of your ideas and beliefs as software you're actively trying to find problems with rather than things to be defended.

The first principle is that you must not fool yourself—and you are the wisest person to fool.

- Richard Feynman

backfire effect

When your core beliefs are challenged, it can cause you to believe even more strongly.

We can experience being wrong about some ideas as an attack upon our very selves, or our vital identity. This can lead to motivated reasoning which causes us to double down, despite disconfirming evidence.

"It ain't what you don't know that gets you into trouble. It's what you know for sure that just ain't so."

- Mark Twain

declinism

You remember the past as better than it was, and expect the future to be worse than it will likely be.

Despite living in the most peaceful and prosperous time in history, many people believe things are getting worse. The 24 hour news cycle, with its reporting of overly negative and violent events, may account for some of this effect.

Instead of relying on nostalgic impressions of how great things used to be, use measurable metrics such as life expectancy, levels of crime and violence, and prosperity statistics.

just world hypothesis

Your preference for a just world makes you presume that it exists.

A world in which people don't always get what they deserve, hard work doesn't always pay off, and injustices happens is an uncomfortable one that threatens our preferred narrative. However, it is also the reality.

A more just world requires understanding rather than blame. Remember that everyone has their own life story, we're all fallible, and bad things happen to good people.

sunk cost fallacy

You irrationally cling to things that have already cost you something.

When we invest our time, money, or emotion into something, it hurts us to let it go. This aversion to pain can distort our better judgment and cause us to make unwise investments.

To regain objectivity, ask yourself: had I not already invested something, would I still do so now? What would I counsel a friend to do if they were in the same situation?

dunning-kruger effect

The more you know, the less confident you're likely to be.

Because experts know just how much they don't know, they tend to underestimate their ability, but it's easy to be over confident when you have only a simple idea of how things are.

The whole problem with the world is that fools and fanatics are so certain of themselves, yet wiser people so full of doubts."

- Bertrand Russell

barnum effect

You see personal specifics in vague statements by filling in the gaps.

Because our minds are given to making connections, it's easy for us to take nebulous statements and find ways to interpret them so that they seem specific and personal.

Psychics, astrologers and others use this bias to make it seem like they're telling you something relevant. Consider how things might be interpreted to apply to anyone, not just you.

framing effect

You allow yourself to be unduly influenced by context and delivery.

We all like to think that we think independently, but the truth is that all of us are, in fact, influenced by delivery, framing and subtle cues. This is why the ad industry is a thing, despite almost everyone believing they're not affected by advertising messages.

Only when we have the intellectual humility to accept the fact that we can be manipulated, can we hope to limit how much we are. Try to be mindful of how things are being put to you.

in-group bias

You unfairly favor those who belong to your group.

We presume that we're fair and impartial, but the truth is that we automatically favor those who are most like us, or belong to our groups.

Try to imagine yourself in the position of those in out-groups, whilst also attempting to be dispassionate when judging those who belong to your in-groups.

fundamental attribution error

You judge others on their character, but yourself on the situation.

If you haven't had a good night's sleep, you know why you're being a bit slow, but if you observe someone else being slow you don't have such knowledge and so might presume them to just be a slow person.

It's not only hard to view other's situations with charity, it's more objective too. Be mindful to also err on the side of taking personal responsibility rather than justifying and blaming.

halo effect

How much you like someone, or how attractive they are, influences your other judgments of them.

Our judgments are associative and automatic, and so if we want to be objective we need to consciously control for irrelevant influences. This is especially important in a professional setting.

If you notice that you're giving consistently high or low marks across the board, it's worth considering that your judgment may be suffering from the halo effect.

placebo effect

If you believe you're taking medicine it can sometimes 'work' even if it's fake.

The placebo effect can work for all that our mind influences (such as pain) but not so much for things like viruses or broken bones.

Homeopathy, acupuncture, and many other forms of natural 'medicine' have been proven to be no more effective than placebos. Keep a healthy body and bank balance by using evidence-based medicine from a qualified doctor.

bystander effect

You presume someone else is going to do something in an emergency situation.

When something terrible is happening in a public setting we can experience a kind of shock and mental paralysis that distracts us from a sense of personal responsibility. The problem is that everyone can experience the worst of individualism in a crowd.

If there's an emergency situation, presume to be the one who will help or call for help. Be the change you want to see in the world.

availability heuristic

Your judgments are influenced by what springs most easily to mind.

I can't seem to recall a powerful natural disaster. My memories are so faint that I can't seem to recall it. This is because the most recent events are the most available in our minds. This, in turn, can cause you to apply them too readily.

Try to gain different perspectives and relevant statistical information rather than relying purely on first judgments and emotive influences.

belief bias

If a conclusion supports your existing beliefs, you'll rationalize anything that supports it.

It's difficult for us to set aside our existing beliefs to consider the true merits of an argument. In practice this means that our ideas become impervious to criticism, and are perpetually reinforced.

A useful thing to ask is 'when and how did I get this belief?' We tend to automatically defend our ideas without ever really questioning them.

groupthink

You let the social dynamics of a group situation override the best outcomes.

Conformity can be uncomfortable and dangerous to one's social standing, and so often the most confident or loudest voices will determine group decisions.

Rather than openly contradicting others, seek to facilitate objective means of evaluation and critical thinking practices as a group activity.

optimism bias

You overestimate the likelihood of positive outcomes.

There can be benefits to a positive attitude, but it's unwise to allow such an attitude to adversely affect our ability to make rational judgments (they're not mutually exclusive).

If you make rational, realistic judgments you'll have a lot more to feel positive about.

reactance

You'd rather do the opposite of what someone is trying to make you do.

When we feel our liberty is being constrained, our inclination is to resist, however in doing so we can over-compensate.

Be careful not to lose objectivity when someone is being coercive/manipulative, or trying to force you to do something. Wisdom springs from reflection, not from reaction.

spotlight effect

You overestimate how much people notice how you look and act.

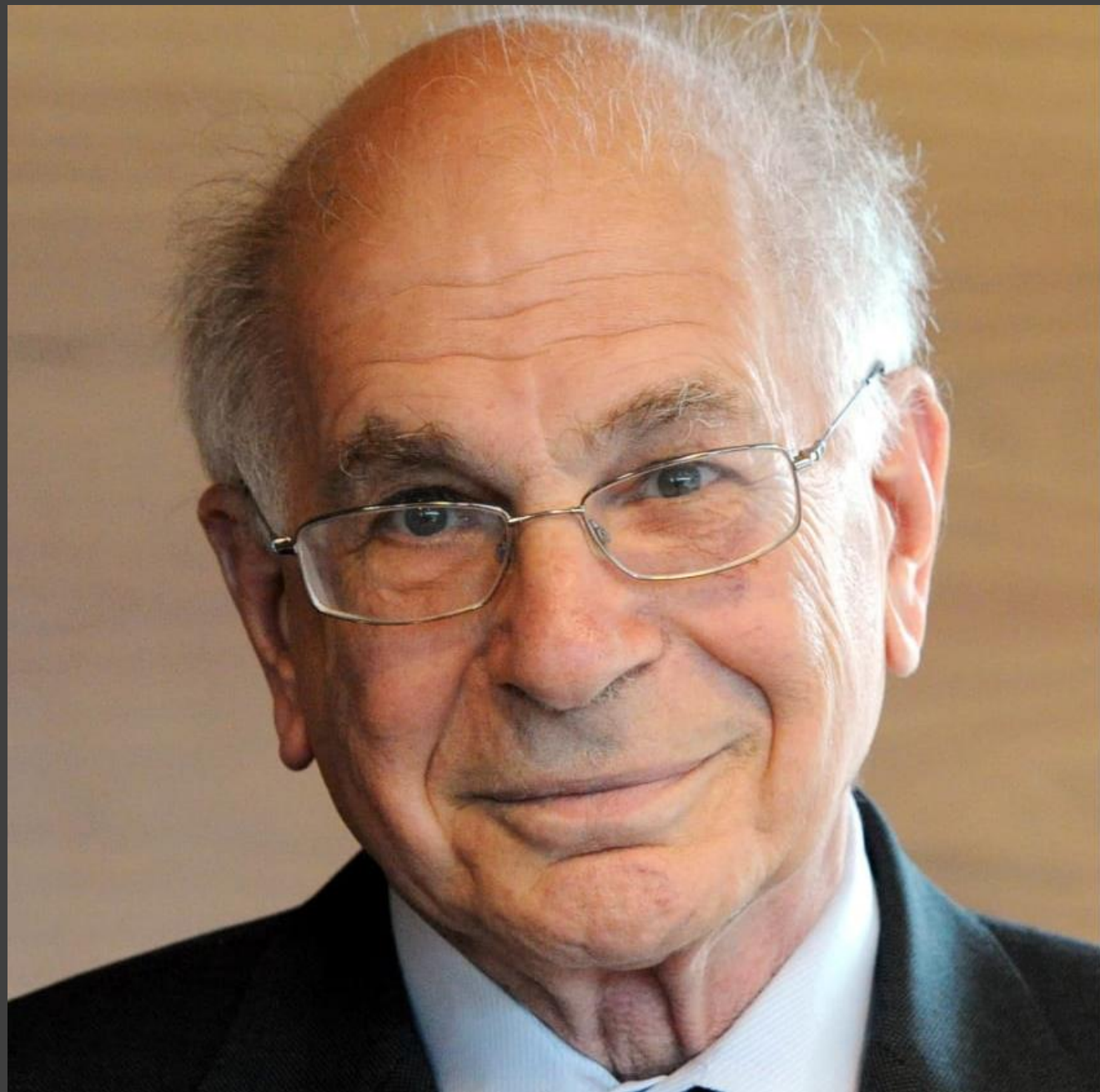
Most people are much more concerned about themselves than they are about you. Absent overt prejudice, people generally want to like and get along with you as it gives them validation too.

Instead of worrying about how you're being judged, consider how you make others feel. They'll remember this much more, and you'll make the world a better place.

24 cognitive biases stuffing up your thinking

Daniel Kahneman

- Psychologist who won the Nobel Prize in Economics for his work showing people do not act rationally when making economic decisions.
- No one has ever figured out why economists think of themselves as scientists and thought otherwise for 300 years, in the absence of empirical evidence.
- Created the field of Behavioral Economics and the concept of Cognitive Biases.



THINKING,
FAST AND SLOW



DANIEL
KAHNEMAN

An illustration on a dark background showing a row of five lightbulbs hanging from above. A white hand silhouette is shown reaching from the right, holding a yellow lightbulb. The hand is positioned as if about to place the yellow bulb into the fourth socket from the left. The other four sockets are empty.

Heuristic

- **Heuristic** – an approach to problem solving, learning, or discovery that employs a practical method not guaranteed to be optimal or perfect, but sufficient for the immediate goals.
- **Intuitive Heuristic** – Concept developed by Kahneman and Tversky applying heuristics to human thinking. It is a heuristic we apply intuitively without conscious thought. It is the tendency to, “when faced with a difficult question, to answer an easier one instead, often without noticing the substitution”.

Application to Cognitive Biases

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- What we call cognitive biases, or what Kahneman calls intuitive heuristics, are effective and efficient shortcuts that serve us well, except when they do not.
 - We perform better because we have them; we would not want to lose them.
 - We run into trouble when we deny them or create false narratives to explain our choices.
 - Politics is a prime example where emotional, subconscious decisions are believed to be rationally developed.

How Many Cognitive Biases are there?



- We tend to bundle multiple types of behaviors under the term cognitive bias.
- Wikipedia lists hundreds and categorizes them by type. [Article](#)
- Many overlap and many are probably not cognitive biases with little general agreement.
- Every mistake we make or response without adequate thought is not a cognitive bias.

Reasons for Cognitive Biases

- Survival Instinct – fear of loss
- Efficiency – fill in the blanks – bicycle or \$17.99
 - Speed
 - Save energy
- Past experience and exposure
- Some are primarily one reason, others combination

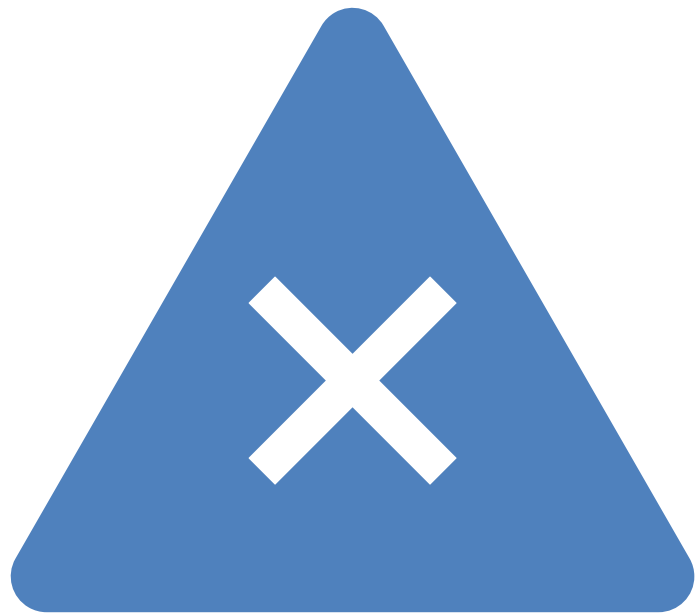
Expected Outcome or Value

- Sum of the values of each possible occurrence times the probability of that occurrence
- Example – 20% chance stock will gain \$500, 40% chance stock will remain the same, 30% chance stock will lose \$80, 10% chance stock will lose \$200
- $.2 \times 500 = 100$
 $.4 \times 0 = 0$
 $.3 \times -80 = -24$
 $.1 \times -200 = -20$
 $100 + 0 - 24 - 20 = 56$ Expected Outcome gain of \$56



Prospect Theory

- Kahneman and Tversky forever changed economics.
- Previous theory – Utility Theory assumed economic choice based on weighted probabilities – Expected Outcomes
- Paper led to major overhaul of economics and created Behavioral Economics
- Research showed people violated that principle in three ways
 - Certainty Effect – prefer certainty even if outcome likely to be less
 - Reflection Effect – more likely to accept risk to avoid loss over risk to increase gain even if outcomes are identical
 - Isolation Effect – ignoring common components and choosing between remaining components



If We Were Rational

- People would be indifferent between options with the same expected outcomes.
- People would choose the option with the greatest expected outcome when the potential gains and losses were in the same general range.
- Kahneman showed that we do not.

Loss v. Gain

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- Generally fear of loss creates more powerful emotional reaction in Amygdala than potential for gain.
 - Think of hunting – if you miss your prey, you can try again.
 - If you get killed trying, no more chances.
 - Fear of loss may create immediate emotional response that eliminates opportunity for rational thought.
 - PTSD creates assumption of impending loss and need for vigilance and immediate response.

Kahneman Framing Example 1 - Fear of Loss

- Scenario 1 – gamble 10% to win \$95 and 90% chance to lose \$5
- Scenario 2 – pay \$5 for 10% chance to win \$100 and 90% chance to win nothing
- Expected outcome the same - \$5 gain
- In fact the scenarios are identical, just worded differently.
- People overwhelmingly reject Scenario 1 and choose Scenario 2.
- Paying for something is okay, losing is not.

Kahneman Framing Example 2

- Original Scenarios, accept or spin wheel to change outcome
 - 1 – Given \$50, keep \$20
 - 2 – Given \$50, lose \$30
- Choice of keeping what you have or gambling where expected outcome stays the same in both scenarios - \$20
- Much more likely to gamble in Scenario 2. We tend to keep a sure thing but to gamble when we perceive loss.
- Basis for Kahneman's Nobel Prize in Economics
- Groundbreaking work for Richard Thaler's Nobel Prize

Insurance

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- Pure insurance is always a bad deal based on expected outcomes alone.
 - Tax impact may change equation for some products and others may be required (homeowners when mortgage).
 - Total payout significantly less than payments because of administrative costs, profits, and possible moral hazards.
 - May choose acceptable loss over unacceptable risk such as life, home, auto, or liability insurance.

Other Insurance Options often based on Cognitive Biases

- Trip cancellation insurance, particularly if travel often. Compounded by moral hazard.
- Extended warranties.
- Auto rental insurance even when covered by credit card and own insurance. Often encouraged by telling renter their rates will not be affected by accident.

Ambiguity Effect

- Generally same as Certainty Effect - Linked to fear of loss
- People will generally choose a known option over a more variable one even if the variable one is likely to be more favorable.
- Example – choosing fixed rate 30-year mortgages over variable mortgages even though variable rate mortgages usually offer significant savings and the average length of owning a house is 7 years. (Present low interest rate environment changes the calculation but principle applied when rates were higher.)

Richard Thaler Nobel Prize

- Extension of Kahneman's work
- Distinction between irrational and conservation of rational energy
- Nudge theory – opting in versus opting out – organ donations – pension contributions - [link](#)
- Critical consideration is conservation of energy and capacity



Examples of Cognitive Biases

(Experiments Do Not Often Replicate Well and specific examples are often challenged.)



Association

- Association – If two things are juxtaposed and we like one, we tend to like the other and vice versa.
- Used frequently in advertising – celebrities (also adds familiarity), attractive or sexy women or men, happy scenes
- Consider happy scenes in drug ads.
- Conversely, if we do not like one, we tend to dislike the other.
- Why pampers are usually not near food
- Political ads showing opponent with disliked person or event.

Effect of Red

- Men more willing to help woman in red dress rather than white.
- Athletic teams in red play more aggressively and seen as more powerful by opponent.
- Waitresses wearing red get more tips.
- But students studying in red perform worse.
- Women also seem to prefer men in red but less pronounced.
- Theorized to be related to to sexual availability – estrogen levels rise dilating blood vessels.
- But some research to the contrary.



Color Effects

- Applies to more than framing
- Food colors prevalent because it impacts consumer choice
- Color may affect perceived taste more than taste buds
- White wine colored red routinely fools top wine experts in taste tests where they use adjectives related to red wine

Priming Effect

- An implicit memory effect in which exposure to one stimulus influences the response to another stimulus.
- Florida Effect
 - 2 groups of students make sentence out of 5 jumbled words
 - One group included one or more words associated with the elderly
 - Florida, forgetful, bald, gray, wrinkle
 - Sent to do a different experiment down the hall
 - Those primed with elderly words walked significantly more slowly
 - Double Priming - No conscious awareness of elderly or use of word

Similar Experiment Using Words Related to Money

- Subjects given money primed task such as 5 words - high, a, salary, desk, paying – and told to create 4-word phrase.
- Obvious one was “a high paying salary”.
- Other subjects given words unrelated to money.
- All were given a task that measured independence and perseverance and then one measuring altruism.
- Money primed subjects were more independent and persevered longer.
- But were also more selfish, less likely to share.

Subconscious Effects on Our Opinions of Ourselves and Others (Priming?)

- Test taking with or without coversheet listing sex or race – women and blacks do worse if they list.
- Bankers are less altruistic if they list their profession before starting the experiment.
- Neutral expressions – black men and white women – angry vs. happy
- Self pay at coffee station when picture of eyes on wall above coffee pot
- Women with dilated eyes more attractive to men (eyes dilate during sex).
- Hunger – Israeli Parole Board