Mental Malware

Inside the Supervillain's Psychological Playbook

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October 10, 2025

CornCon Cybersecurity Conference • Davenport, IA

“The human mind remains one of the most mysterious and fascinating frontiers of modern science. Exploring that frontier yields useful knowledge as well as insights about ourselves.”

Dr. Peter Vishton

Associate Professor of Psychological Sciences

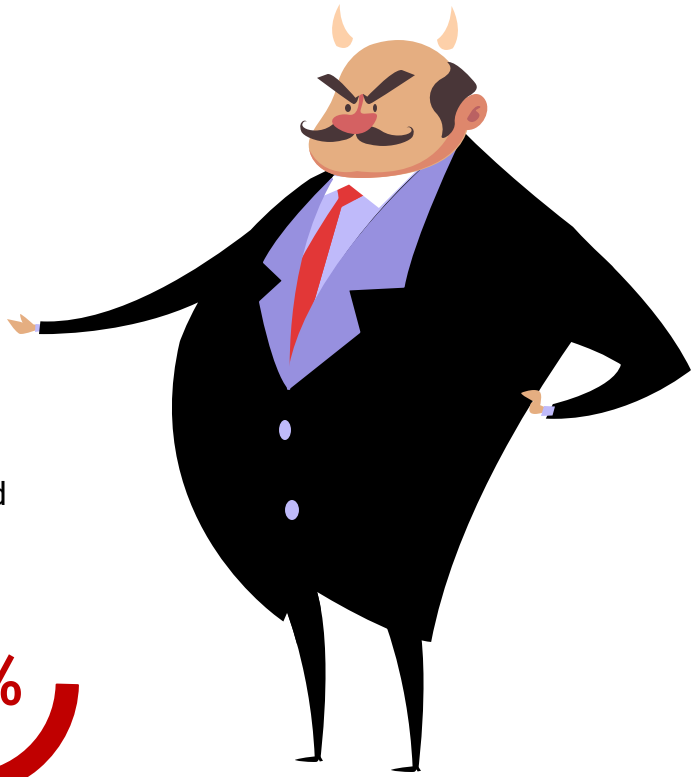
College of William & Mary

Milgrim Experiment

Milgrim's Obedience Experiment

Inspiration

Inspired by the Holocaust and Nuremberg Trials, Milgrim wanted to **understand why ordinary people would commit atrocities under orders**



Setup

A ***learning experiment*** with a 'random' assignment of *Teacher* and *Learner,* ***where the Learner was always an actor***

Shock machine with switches labeled from **15 volts to 450 volts** and descriptions including ***Slight Shock*** to ***Danger: Severe Shock*** and ***XXX***

A **single authority figure**, another actor in a **white lab coat**, calmly prompted the Teacher with lines like "The experiment requires that you continue."

Impact

% of participants that delivered the maximum 450-volt shock *despite thinking they were harming the Learner!*

Cialdini's Psychology of Persuasion

American psychologist Robert Cialdini has identified **seven principles of influence** that make people more likely to say 'yes'

Authority

we tend to follow the lead of 'credible' experts

Consistency

we have a desire to commit to what we've already said or done

Social Proof

we tend to look to similar others to decide how to behave

Reciprocity

we feel obligated to return favors or give back

Liking

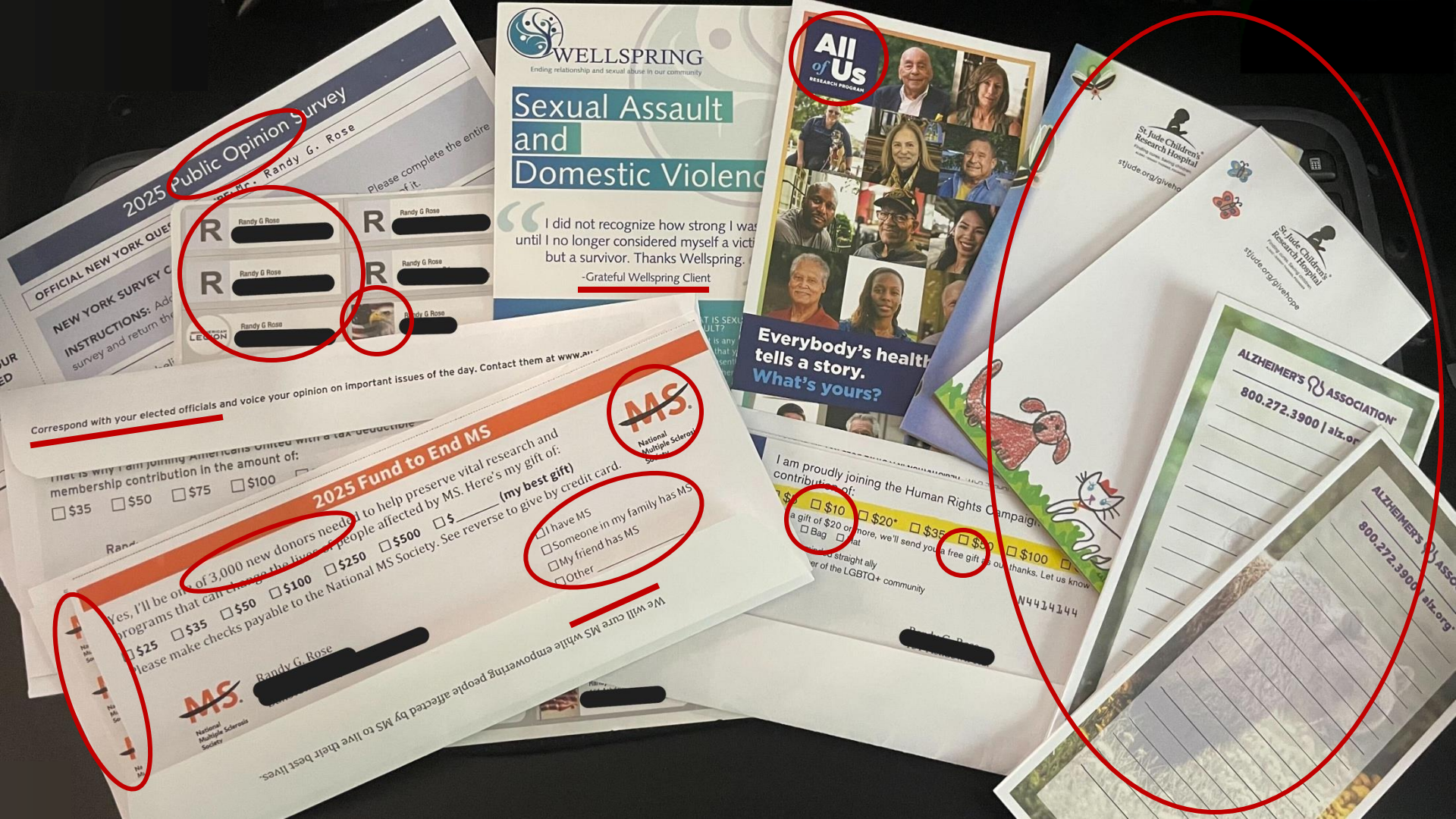
we tend to say yes to people we like, and we tend to like people who are like us

Scarcity

we tend to see things/opportunities as more valuable when they are limited

Unity

we are more easily influenced by those with whom we share an identity


2025 Public Opinion Survey
OFFICIAL NEW YORK
NEW YORK SURVEY
INSTRUCTIONS:
Randy G. Rose
Please complete the entire
survey and return
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WELLSPRING
Ending relationship and sexual abuse in our community
Sexual Assault
and
Domestic Violenc
I did not recognize how strong I was
until I no longer considered myself a victi
but a survivor. Thanks Wellspring.
-Grateful Wellspring Client
All of Us
RESEARCH PROGRAM
Everybody's health
tells a story.
What's yours?
St. Jude Children's Research Hospital
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2025 Fund to End MS
of 3,000 new donors needed to help preserve vital research and
programs that can change the lives of people affected by MS. Here's my gift of:
Yes, I'll be on
$25 $35 $50 $100 $250 $500 $ _____ (my best gift)
Please make checks payable to the National MS Society. See reverse to give by credit card.
I have MS
Someone in my family has MS
My friend has MS
Other
MS
National Multiple Sclerosis Society
Randy G. Rose
We will cure MS while empowering people affected by MS to live their best lives.
I am proudly joining the Human Rights Campaign
$10 $20* $35 $50 $100
a gift of $20 or more, we'll send you a free gift
Bag
straight ally
of the LGBTQ+ community
thanks. Let us know
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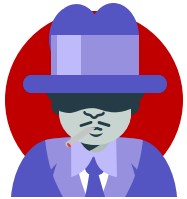
Thinking Fast and Slow

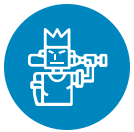
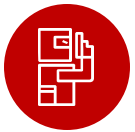


Daniel Kahneman simplified our brain's processing into 2 'systems'
- System 1: fast, automatic, emotional, and intuitive
- System 2: slow, effortful, logical, and deliberate

We heavily rely on System 1 to **save time and**, more importantly, **energy**
- Think of System 1 as your autopilot – recognizes faces, reacts to threats, finishes common phrases
  - Allows you to drive home while distracted on that work call

System 2 is lazy – it doesn't want to work if it doesn't have to
- "What you see is all there is"
- Rare for System 2 to ask "what's missing" leading to poor judgments under uncertainty



‘Let’s Play a Game’

5 Words, 3 Seconds

You will see 5 words on the screen for 3 seconds

Call out what they have in common

Pizza

Cheeseburger

Burrito

French Fries

Hot Dog

Hippo

Cheetah

Giraffe

Rhinoceros

Wildebeest

Bell

Red

Green

Sweet

Ghost

Eggplant

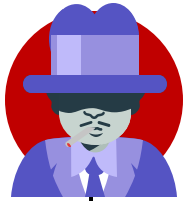
Umbrella

Oyster

Acetylene

Icicle

System 1's Intuition Leads to Errors



1		2
	‘Intuitive thinking’	‘Analytic thinking’
	Fast, impulsive, gut reaction	Slow, methodical, and conscious
	The friend who *keeps it real*	The friend who is *calm, cool, & collected*
	Often correct, effective, & results in ‘Aha!’	By the book, deliberate, reasonable
	Draws on available knowledge, experience, preconceptions, & existing mental models	Follows analytical processes like the scientific method & structured analysis

Key Insights

Milgrim

We tend to obey authority figures even when it conflicts with our morals, especially in structured environments

Cialdini

We don’t make decisions based solely on logic—we rely on mental shortcuts that are easily influenced by context, emotion, and more

Kahneman

Our thinking is dominated by fast, automatic processes that are prone to error—even when we know better, we often make mistakes!

Priming

The psychological phenomenon where exposure to one stimulus influences a response to a later stimulus and it happens in unconsciously

A form of implicit memory – past experiences shape perceptions, thoughts, and actions without your awareness

Can be semantic (verbal), perceptual (sensory), or conceptual (ideas)

- Study participants walked slower when primed with words related to old age
- Faint smells of citrus cleaning agents primed study participants to wash their hands or clean up
- Marketers use priming all the time – luxury yachts, fresh veggies, vibrant colors

You're blissfully unaware of just how unaware you are

Priming

Priming has big implications for cybersecurity education, awareness, leadership, and design where **subtle cues can tilt behavior**

Why Are We So Easily Duped?

Milgrim

Obedience can override morality

Cialdini

Persuasion works on us even when we feel in control

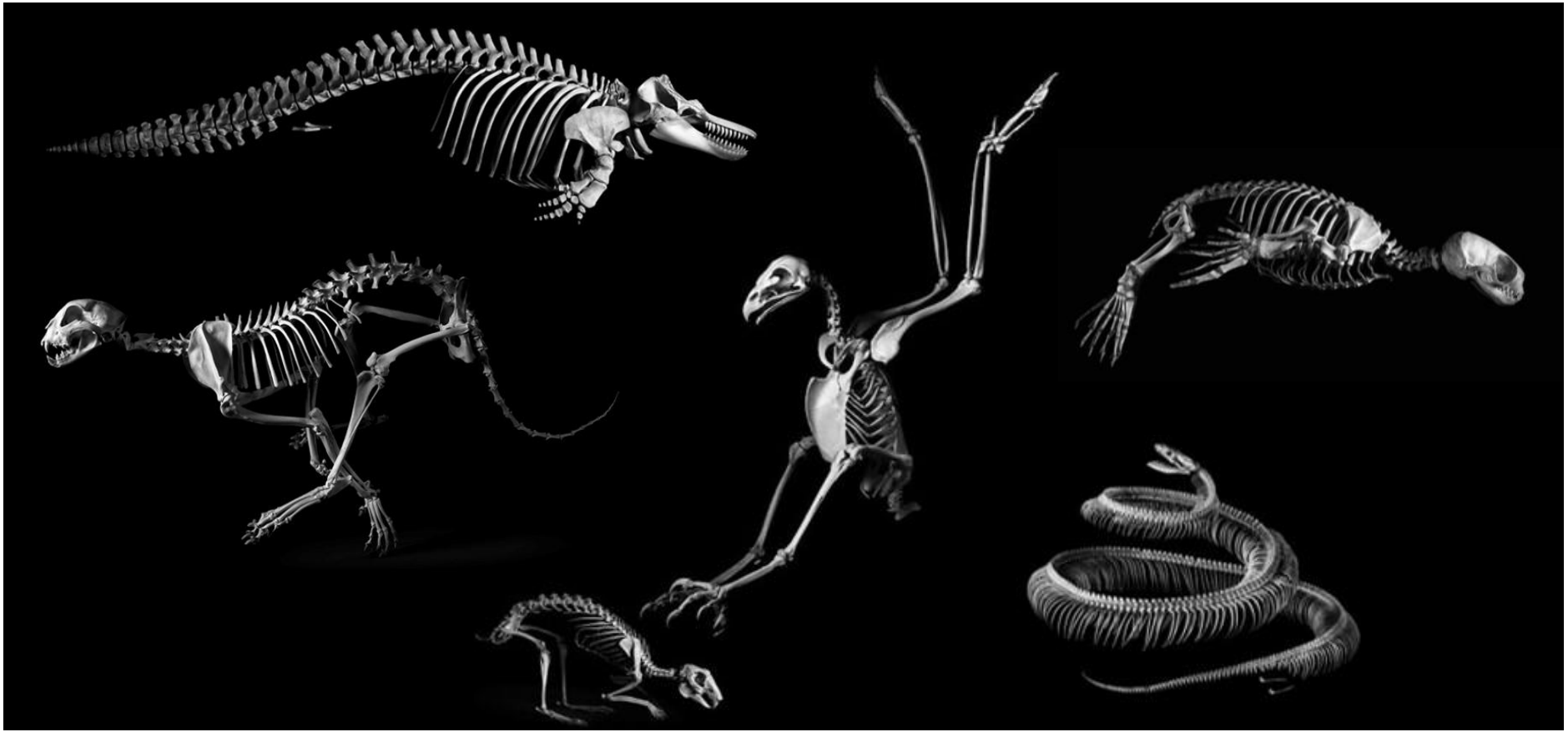
Kahneman

Our brains are lazy and want to make fast, biased decisions

Priming

What we see, hear, & even smell can shape our behavior without us knowing

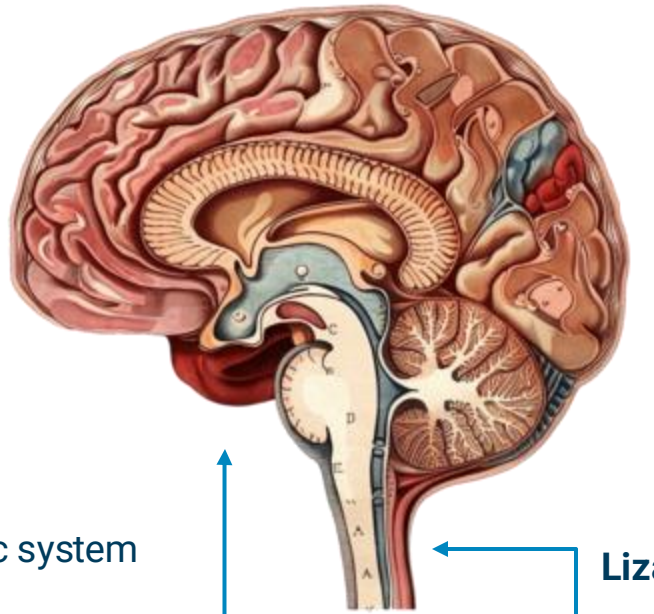
Why Are We So Easily Duped?



Why Are We So Easily Duped?

The human brain has evolved very little in 10k years

Humans have '3 brains in 1'



Human Brain: neocortex

- *High-level (3rd brain)*
- *Language, abstract thought, imagination, consciousness*
- *Foresight*

Mammal Brain: limbic system

- *Mid-level (2nd brain)*
- *Emotions, memories, habits*
- *Hindsight*

Lizard Brain: brain stem & cerebellum

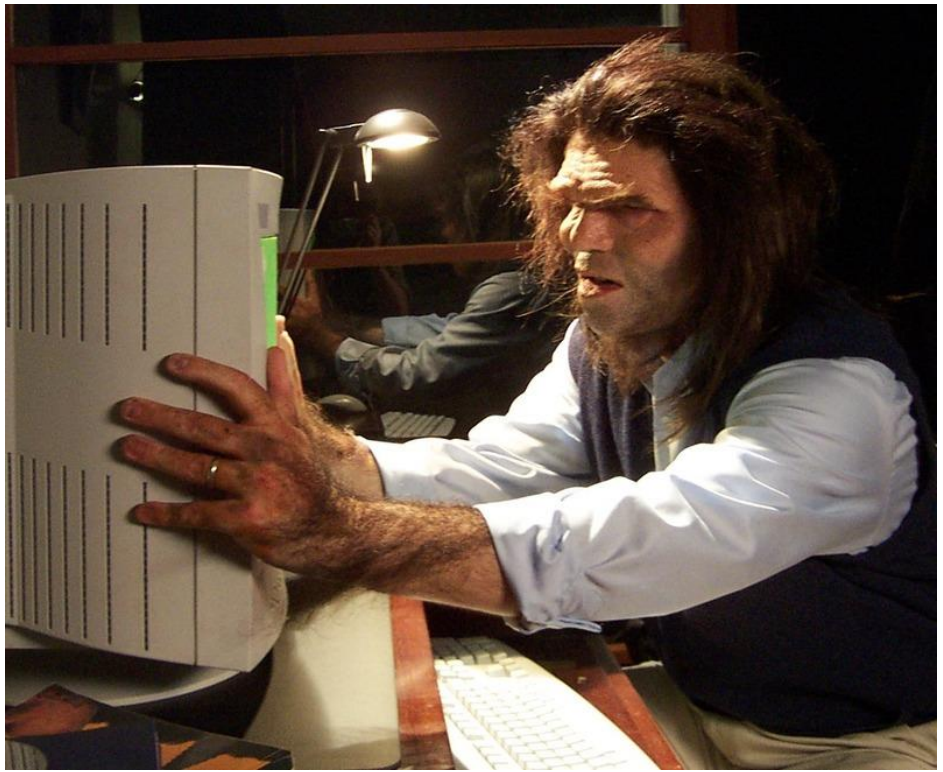
- *Low-level (1st brain)*
- *Fight or flight*
- *Reflexes, instincts, basic needs*

Complex & self-aware

Provides logic & reasoning to largely illogical, unreasonable beings

About 2% of your overall body mass yet uses more than 20% of the energy you consume!

Why Are We So Easily Duped?



Cognitive Biases & Logical Fallacies

Cognitive biases are the result of the brains wiring and help us maintain confidence in our choices & actions

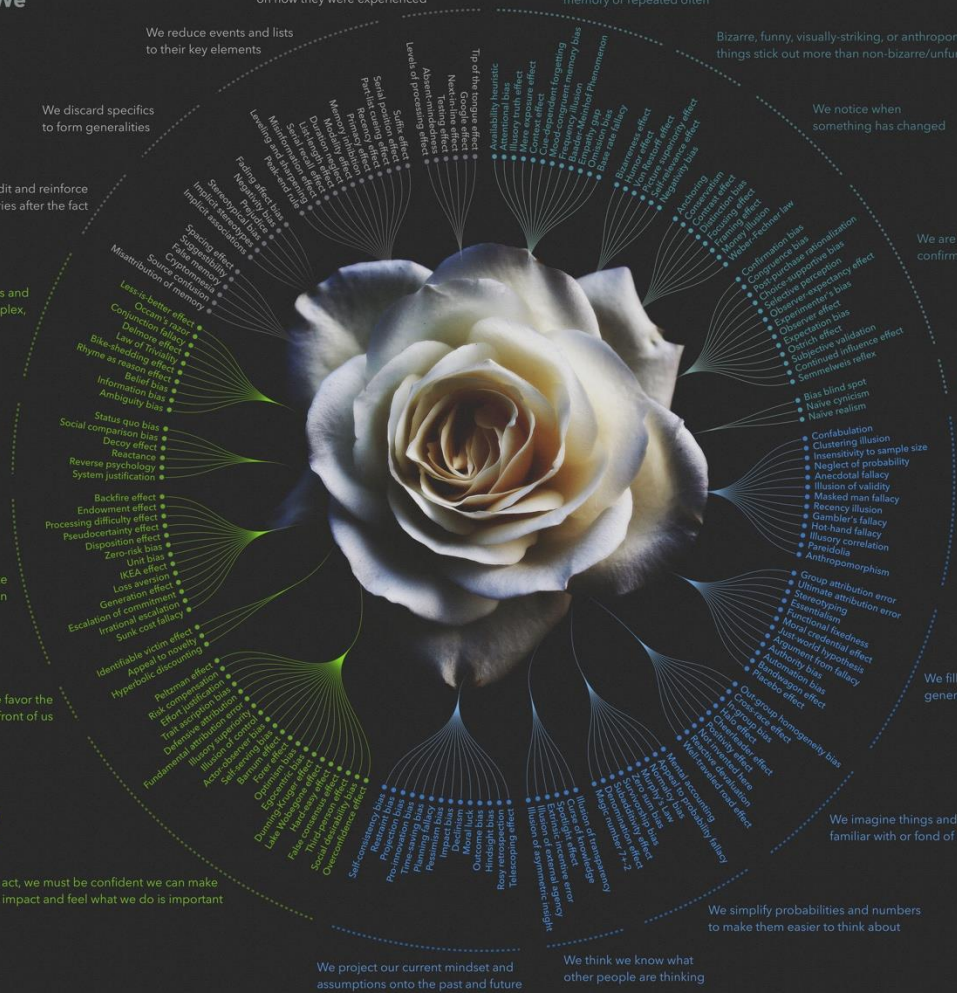
Cognitive biases slant our thinking toward certain outcomes

Logical fallacies are flaws in the application of reasoning—or the right reasoning—in a given scenario

Recognizing both and deploying mitigating tactics are key to defending against social engineering & other persuasion attempts.

“Men are not to be reasoned out of an opinion that they have not reasoned themselves into.” – **Fisher Ames**

COGNITIVE BIAS CODEX



strawman

Misrepresenting someone's argument to make it easier to attack.

By exaggerating, misrepresenting, or just completely fabricating someone's argument, it's much easier to present your own position as being reasonable, but this kind of dishonesty serves to undermine rational debate.

After Will said that we should put more money into health and education, Warren responded by saying that he was surprised that Will hates our country so much that he wants to leave it defenceless by cutting military spending.

false cause

Presuming that a real or perceived relationship between things means that one is the cause of the other.

Many people confuse correlation (things happening together or in sequence) for causation (that one thing actually causes the other to happen). Sometimes correlation is coincidental, or it may be attributable to a common cause.

Pointing to a fancy chart, Roger shows how temperatures have been rising over the past few centuries, whilst at the same time the numbers of pirates have been decreasing, thus pirates cool the world and global warming is a hoax.

appeal to emotion

Manipulating an emotional response in place of a valid or compelling argument.

Appeals to emotion include appeals to fear, envy, hatred, pity, guilt, and more. Though a valid, and reasoned, argument may sometimes have an emotional aspect, one must be careful that emotion doesn't obscure or replace reason.

Luke didn't want to eat his sheep's brains with chopped liver and brussels sprouts, but his father told him to think about the poor, starving children in a third world country who weren't fortunate enough to have any food at all.

the fallacy fallacy

Presuming a claim to be necessarily wrong because a fallacy has been committed.

It is entirely possible to make a claim that is false yet argue with logical coherency for that claim, just as it is possible to make a claim that is true and justify it with various fallacies and poor arguments.

Recognising that Amanda had committed a fallacy in arguing that we should eat healthy food because a nutritionist said it was popular, Alyse said we should therefore eat bacon double cheeseburgers every day.

slippery slope

Asserting that if we allow A to happen, then Z will consequently happen too, therefore A should not happen.

The problem with this reasoning is that it avoids engaging with the issue at hand, and instead shifts attention to baseless extreme hypotheticals. The merits of the original argument are then tainted by unsubstantiated conjecture.

Colin Closet asserts that if we allow same-sex couples to marry, then the next thing we know we'll be allowing people to marry their parents, their cars and even monkeys.

ad hominem

Attacking your opponent's character or personal traits in an attempt to undermine their argument.

Ad hominem attacks can take the form of overtly attacking somebody, or casting doubt on their character. The result of an ad hom attack can be to undermine someone without actually engaging with the substance of their argument.

After Sally presents an eloquent and compelling case for a more equitable taxation system, Sam asks the audience whether we should believe anything from a woman who isn't married, was once arrested, and smells a bit weird.

tu quoque

Avoiding having to engage with criticism by turning it back on the accuser - answering criticism with criticism.

Literally translating as 'you too' this fallacy is commonly employed as an effective red herring because it takes the heat off the accused having to defend themselves and shifts the focus back onto the accuser themselves.

Nicole identified that Hannah had committed a logical fallacy, but instead of addressing the substance of her claim, Hannah accused Nicole of committing a fallacy earlier on in the conversation.

personal incredulity

Saying that because one finds something difficult to understand, it's therefore not true.

Subjects such as biological evolution via the process of natural selection require a good amount of understanding before one is able to properly grasp them; this fallacy is usually used in place of that understanding.

Kirk drew a picture of a fish and a human and with offensive disdain asked Richard if he really thought we were stupid enough to believe that a fish somehow turned into a human through just, like, random things happening over time.

special pleading

Moving the goalposts or making up exceptions when a claim is shown to be false.

Humans are funny creatures and have a foolish aversion to being wrong. Rather than appreciate the benefits of being able to change ones mind through better understanding, many will invent ways to cling to old beliefs.

Edward Johns claimed to be psychic, but when his abilities' were tested under proper scientific conditions, they magically disappeared. Edward explained this saying that one had to have faith in his abilities for them to work.

loaded question

Asking a question that has an assumption built into it so that it can't be answered without appearing guilty.

Loaded question fallacies are particularly effective at derailing rational debates because of their inflammatory nature - recipients of a loaded question are compelled to defend themselves and may appear flustered or on the back foot.

Grace and Helen were both romantically interested in Brad. One day, with Brad sitting within earshot, Grace asked in an inquisitive tone whether Helen was having any problems with a fungal infection.

burden of proof

Saying that the burden of proof lies not with the person making the claim, but with someone else to disprove.

The burden of proof lies with someone who is making a claim, and is not upon anyone else to disprove. The inability, or disinclination, to disprove a claim does not make it valid (however we must always go by the best available evidence).

Bertrand declares that a teapot is, at this very moment, in orbit around the Sun between the Earth and Mars, and that because no one can prove him wrong his claim is therefore a valid one.

ambiguity

Using double meanings or ambiguities of language to mislead or misrepresent the truth.

Politicians are often guilty of using ambiguity to mislead and will later point to how they were technically not outright lying if they come under scrutiny. It's a particularly tricky and premeditated fallacy to commit.

When the judge asked the defendant why he hadn't paid his parking fines, he said that he shouldn't have to pay them because the sign said 'Fine for parking here' and so he naturally presumed that it would be fine to park there.

the gambler's fallacy

Believing that 'runs' occur to statistically independent phenomena such as roulette wheel spins.

This commonly believed fallacy can be said to have helped create a city in the desert of Nevada USA. Though the overall odds of a 'big run' happening may be low, each spin of the wheel is itself entirely independent from the last.

Red had come up six times in a row on the roulette wheel, so Greg knew that it was close to certain that black would be next up. Suffering an economic form of natural selection with this thinking, he soon lost all of his savings.

bandwagon

Appealing to popularity or the fact that many people do something as an attempted form of validation.

The flaw in this argument is that the popularity of an idea has absolutely no bearing on its validity. If it did, then the Earth would have made itself flat for most of history to accommodate this popular belief.

Shamus pointed a drunken finger at Sean and asked him to explain how so many people could believe in leprechauns if they're only a silly old superstition. Sean, however, had had a few too many Guinness himself and fell off his chair.

appeal to authority

Saying that because an authority thinks something, it must therefore be true.

It's important to note that this fallacy should not be used to dismiss the claims of experts, or scientific consensus. Appeals to authority are not valid arguments, but nor is it reasonable to disregard the claims of experts who have a demonstrated depth of knowledge (unless one has a similar level of understanding).

Not able to defend his position that evolution isn't true, Bob says that he knows a scientist who also questions evolution (and presumably isn't himself a primate).

composition /division

Assuming that what's true about one part of something has to be applied to all, or other, parts of it.

Often when something is true for the part it does also apply to the whole, but because this isn't always the case it can't be presumed to be true. We must show evidence for why a consistency will exist.

Daniel was a precocious child and had a liking for logic. He reasoned that atoms are invisible, and that he was made of atoms and therefore invisible too. Unfortunately, despite his thinky skills, he lost the game of hide and go seek.

no true scotsman

Making what could be called an appeal to purity as a way to dismiss relevant criticisms or flaws of an argument.

This fallacy is often employed as a measure of last resort when a point has been lost. Seeing that a criticism is valid, yet not wanting to admit it, new criteria are invoked to dissociate oneself or one's argument.

Angus declares that Scotsmen do not put sugar on their porridge, to which Lachlan points out that he is a Scotsman and puts sugar on his porridge. Furious, like a true Scot, Angus yells that no **true** Scotsman sugars his porridge.

genetic

Judging something good or bad on the basis of where it comes from, or from whom it comes.

To appeal to prejudices surrounding something's origin is another red herring fallacy. This fallacy has the same function as an ad hominem, but applies instead to perceptions surrounding something's source or context.

Accused on the 6 o'clock news of corruption and taking bribes, the senator said that we should all be very wary of the things we hear in the media, because we all know how very unreliable the media can be.

black-or-white

Where two alternative states are presented as the only possibilities, when in fact more possibilities exist.

Also known as the false dilemma, this insidious tactic has the appearance of forming a logical argument, but under closer scrutiny it becomes evident that there are more possibilities than the either/or choice that is presented.

Whilst rallying support for his plan to fundamentally undermine citizens' rights, the Supreme Leader told the people they were either on his side, or on the side of the enemy.

begging the question

A circular argument in which the conclusion is included in the premise.

This logically incoherent argument often arises in situations where people have an assumption that is very ingrained, and therefore taken in their minds as a given. Circular reasoning is bad mostly because it's not very good.

The word of Zorbo the Great is flawless and perfect. We know this because it says so in The Great and Infallible Book of Zorbo's Best and Most Truest Things that are Definitely True and Should Not Ever Be Questioned.

appeal to nature

Making the argument that because something is 'natural' it is therefore valid, justified, inevitable, good, or ideal.

Many 'natural' things are also considered 'good,' and this can bias our thinking, but naturalness itself doesn't make something good or bad. For instance, murder could be seen as very natural, but that doesn't mean it's justifiable.

The medicine man rolled into town on his bandwagon offering various natural remedies, such as very special plain water. He said that it was only natural that people should be wary of 'artificial' medicines like antibiotics.

anecdotal

Using personal experience or an isolated example instead of a valid argument, especially to dismiss statistics.

It's often much easier for people to believe someone's testimony as opposed to understanding variation across a continuum. Scientific and statistical measures are almost always more accurate than individual perceptions and experiences.

Jason said that that was all cool and everything, but his grandfather smoked, like, 30 cigarettes a day and lived until 97 - so don't believe everything you read about meta analyses of sound studies showing proven causal relationships.

the texas sharpshooter

Cherry-picking data clusters to suit an argument, or finding a pattern to fit a presumption.

This false causes' fallacy is coined after a marksman shooting at barns and then painting a bullseye target around the spot where the most bullet holes appear. Clusters naturally appear by chance, and don't necessarily indicate causation.

The makers of Sugarette Candy Drinks point to research showing that of the five countries where Sugarette drinks sell the most units, three of them are in the top ten healthiest countries on Earth, therefore Sugarette drinks are healthy.

middle ground

Saying that a compromise, or middle point, between two extremes must be the truth.

Much of the time the truth does indeed lie between two extreme points, but this can bias our thinking; sometimes a thing is simply untrue and a compromise of it is also untrue. Half way between truth and a lie, is still a lie.

Holly said that vaccinations caused autism in children, but her scientifically well-read friend Caleb said that this claim had been debunked and proven false. Their friend Alice offered a compromise that vaccinations cause some autism.

Commonly Seen Biases in Cybersecurity

Anchoring — Over-emphasizing one piece of information

Perceived losses feel more painful than equivalent gains are pleasurable — **Loss Aversion**

Hindsight Bias — "I knew it all along"

Assuming 2 things are connected when they're not — **Illusory Correlation**

Base Rate Neglect — Ignoring the commonality (base rate) of an event

Tendency for low-ability people to overestimate their abilities & vice versa — **Dunning-Kruger Effect**

Heuristics

Mental shortcuts (‘rules of thumb’) that simplify decision-making

Useful for System 1 thinking, but prone to error

Stereotypes

We often judge something based on how much it aligns with a prconceived notion

Such as a quiet person being more likely to be a librarian than a salesperson

Informed by **emotional response** and **recognition**

How we feel about something or whether it is familiar can impact our ‘correctness’

Usefulness

Useful in day-to-day life but can lead to dangerously flawed conclusions when the stakes are high!

Heuristics Quiz

A grill and tongs cost $110 in total.
The grill costs $100 more than the tongs.
How much do the tongs cost?

$5

An evil genius made 8 machines that take 8 minutes to make 8 traps.
How long would it take 64 of the same machines to make 64 traps?

8 minutes

The number of scary clowns in a magic clown car doubles every day.
If it takes 30 days to fill the car to clown capacity, how long would it take to fill the car halfway?

29 days

Heuristics Quiz

Which causes more deaths per year in the U.S.?

a. Medical errors

b. Car accidents

Medical errors are the 3rd leading cause of death in the U.S. with over 250k per year whereas car accidents cause only 40k per year

Adults are more likely to?

a. Sleep with a comfort object like a blankie or a stuffed animal

b. Wash their hands after using the bathroom

Surveys reveal 34% for comfort object and less than 20% for handwashing!

Which supermarket option leads to more purchases?

a. A display with 24 flavors of jam

b. A display with 6 flavors of jam

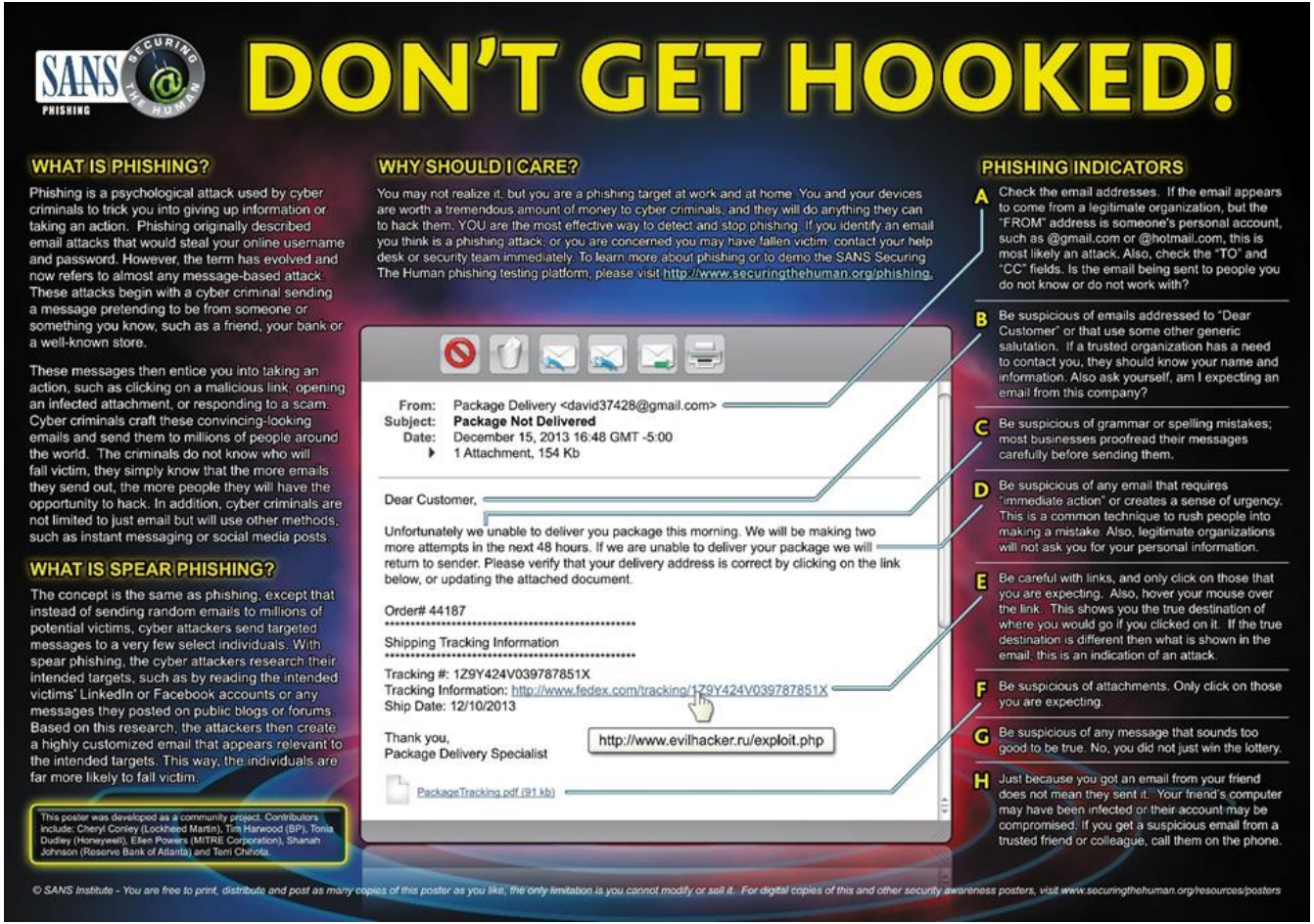
Fewer options led to 10x more purchases in a famous study!

What is wrong with this?

Noisy & wordy

Guidance focused on WHAT to look for but misses the opportunity to teach HOW to be more skeptical in general

If we don't initially suspect we're being dupe, the technical indicators won't help!



Bolster Your Defenses

Slow down!

Most mistakes come from trading off speed for diligence.

If you have time to do it twice, you have time to do it right.

Don't be afraid to talk it out with someone & welcome criticism of your thought processes

Metacognition

Spend time ***thinking*** about your own thinking

Be Self-Aware

Recognize when your brain is saving energy & when it's not (or when it shouldn't be!)

Commit to Thinking Critically

Be aware of your cognitive machinery & when in doubt, **frame the situation differently**





“For me, it is far better to grasp the Universe as it really is than to persist in delusion, however satisfying and reassuring.”
Carl Sagan





Memory Test

Sleep	Blanket	Night
Yawn	Tired	Snore
Nap	Dream	Peace
Slumber	Rest	Pillow

Memory Test

60 seconds to write down every word you remember

Memory Test

- How many got **Sleep**?
- How many got **Pillow**?
- How many got **Bed**?

Memory Test

Where is **Bed** in this list?

Sleep	Blanket	Night
Yawn	Tired	Snore
Nap	Dream	Peace
Slumber	Rest	Pillow

Reconstructive Reference:

Your brain implanted a memory by
filling in missing information based on context