~~Exercises~~ Habits to consider in the Treatment and Prevention of Emotional Disorders.

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Weber Human Services Medical Director

5/16/2024

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Why am I here?

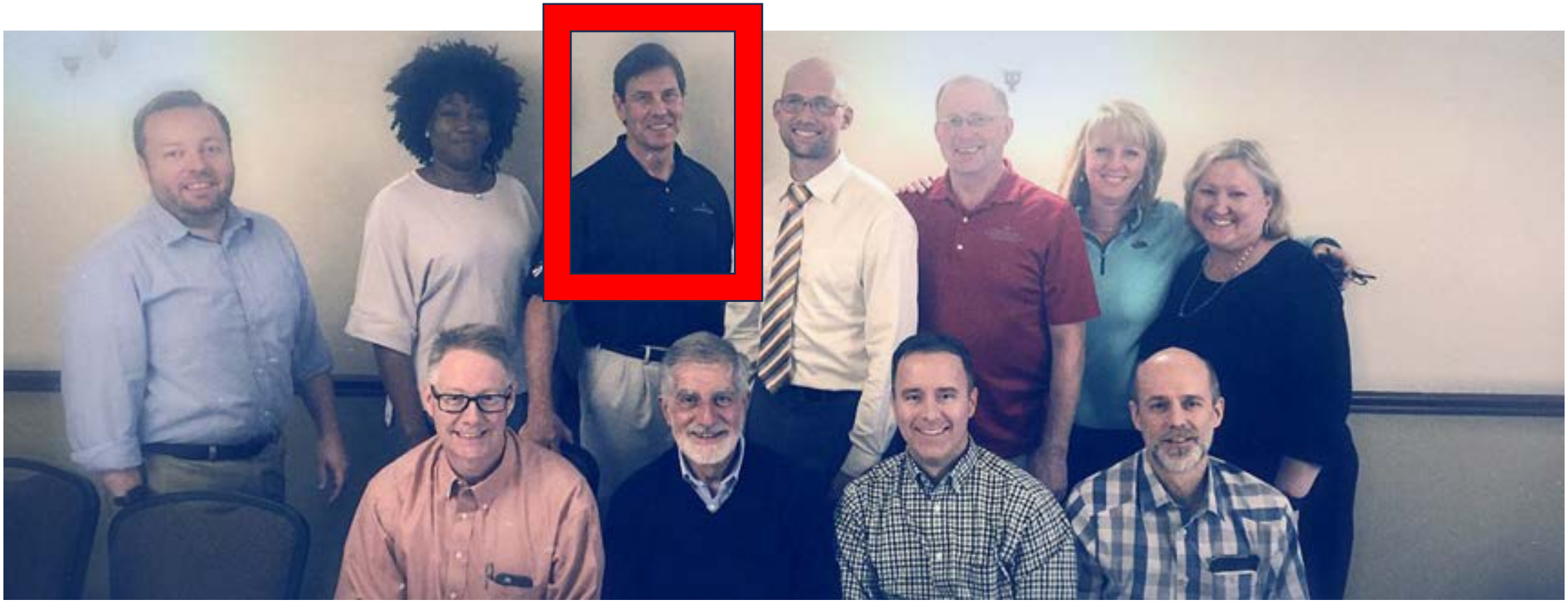
- Completed family medicine residency at McKay Dee Hospital in Ogden in 2016
- Not a psychiatrist
- Not a neurologist
- Not a neuroscientist
- Not a therapist

- I am the medical director of Weber Human Services (WHS)
  - Community behavioral health center that provides integrated care primarily for patients with mental health and substance use disorders
  - Services include primary care, psychiatry, psychotherapy, pharmacy, residential, case management, prevention, aging, etc
  - WHS focuses on providing evidence-based therapy such as the Unified Protocol for Transdiagnostic Treatment of Emotional Disorders (UP)

WEBER HUMAN SERVICES

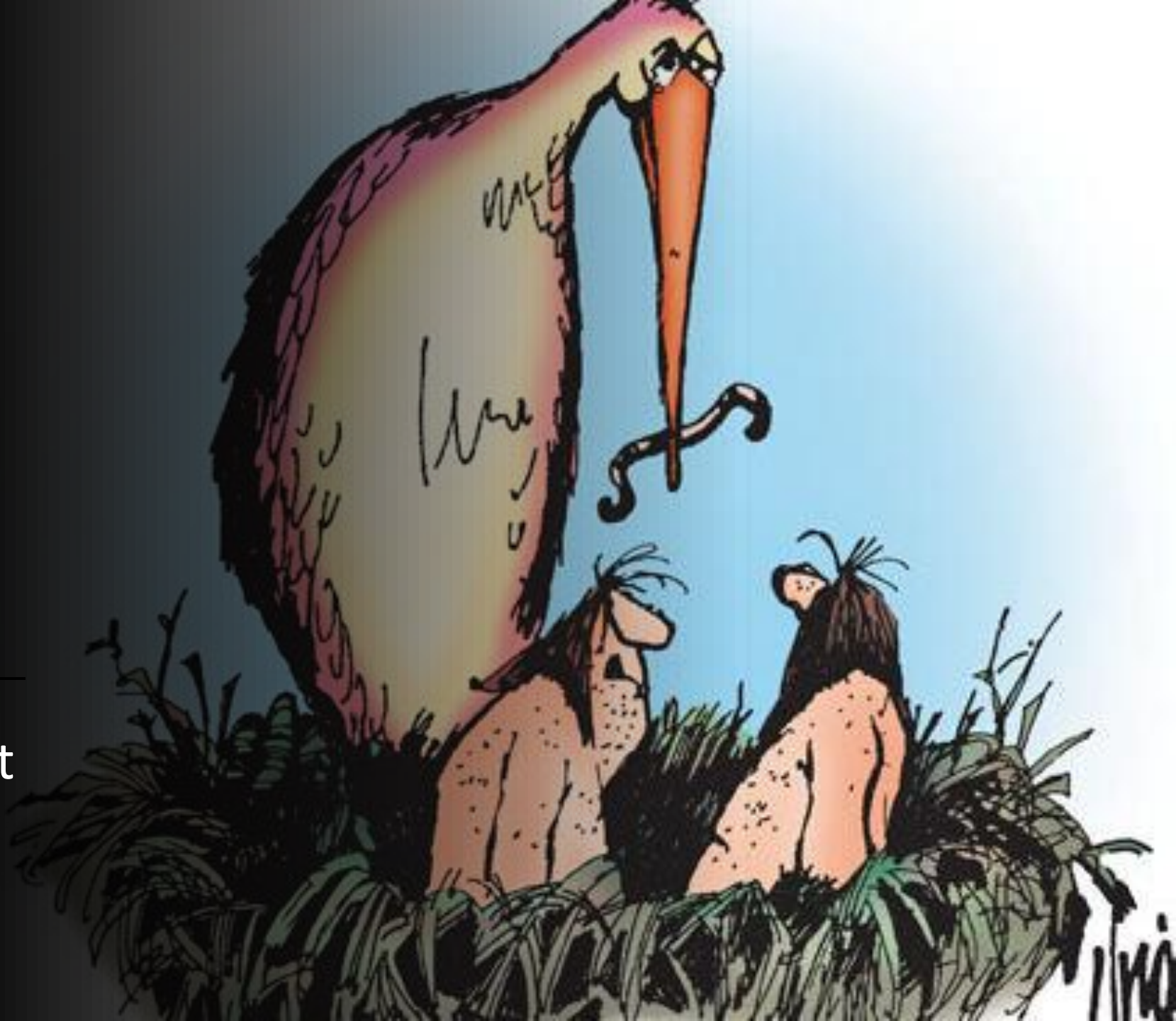
- In April 2023, I attended a Weber County Medical Society event at the School of Addiction Recovery
  - “SOAR is a Nonprofit Addiction Recovery Program and Recovery Gym located in Ogden, Utah that has been guiding people in recovery and teaching a healthy way of life since 2010.”[1]
  - During the event I made a comment suggesting a similarity in concepts used in barbell training and the Unified Protocol for Transdiagnostic Treatment of Emotional Disorders

One of my former attendings, Dr Steve Scharmann, is an OSMS officer and was in attendance at that meeting…



The moral of the story…

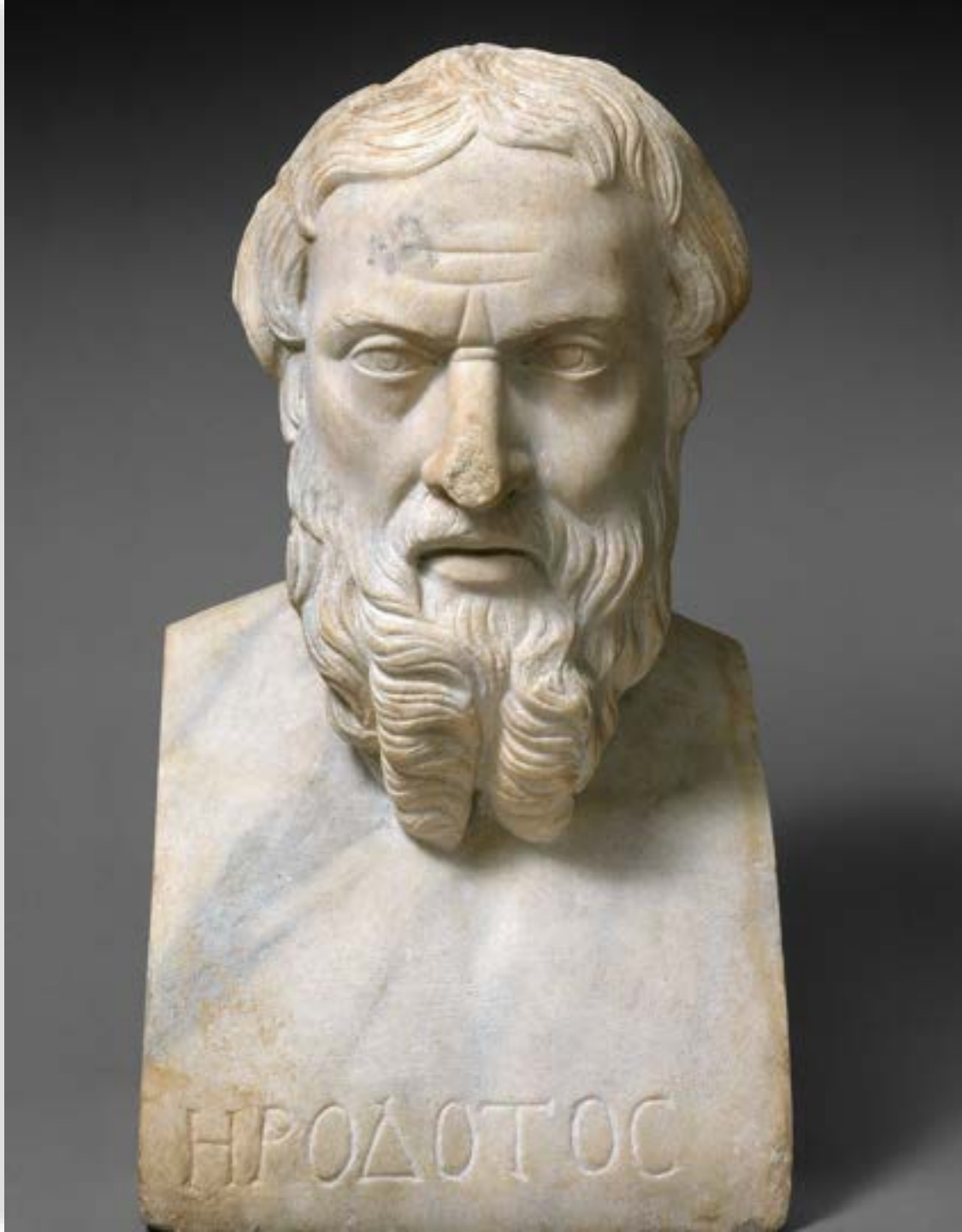
“Whatever you do, don’t open your mouth.”



- “I cannot but laugh when I see numbers of persons drawing maps of the world without having any reason to guide them; making, as they do, the ocean-stream to run all round the earth, and the earth itself to be an exact circle, as if described by a pair of compasses, with Europe and Asia just of the same size. The truth in this matter I will now proceed to explain in a very few words, making it clear what the real size of each region is, and what shape should be given them.”[2]

  -Herodotus, “The Father of History”, ~ 484 BC to 425 BC

- … Herodotus seems to have fallen victim to the same hubris that he is mocking.



- Theoretical physicist Michio Kaku said, “The human brain has 100 billion neurons, each neuron connected to 10,000 other neurons. Sitting on your shoulders is the most complicated object in the known universe.”[4]
- I realize that I am not qualified to give precise details regarding the “maps of the world” we will now discuss. But, I can say that I do spend a significant amount of time with individuals suffering from emotional disorders; and, am thereby able to observe trends, and patterns, that seem to help or hinder their success in recovery.
- I can say with confidence that the principlesa and ideas we will discuss are consistent with what I have observed in the lives of my patients, my family, my friends, and myself. I therefore hope they may also be of help to you.

66 = median number of days needed to cultivate a habit (subjective automaticity)

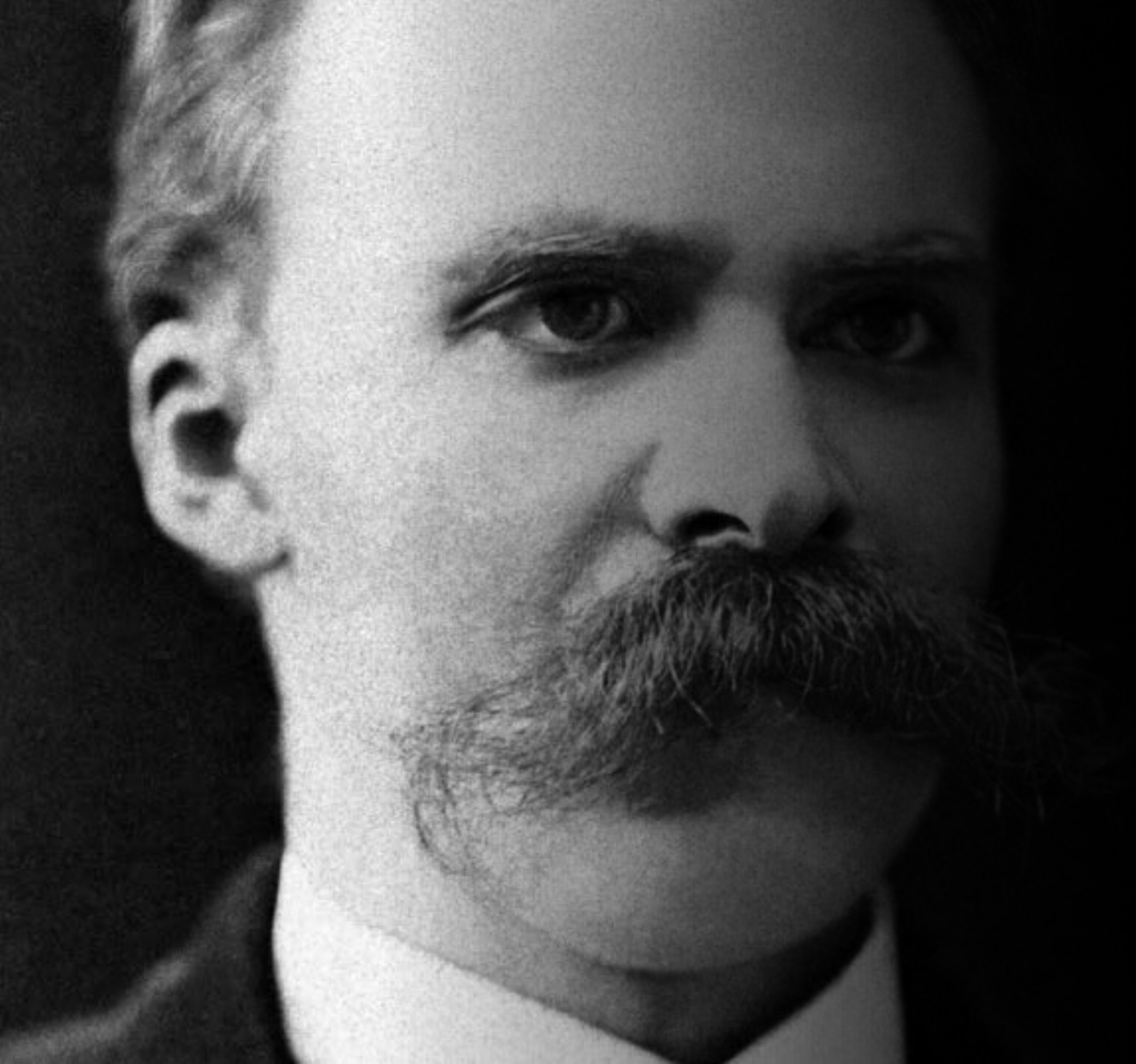
In other words: time and opportunity cost to implement and sustain habits is high.

Reference:

- Lally P, van Jaarsveld CHM, Potts HWW, Wardle J. How are habits formed: Modelling habit formation in the real world. _Eur J Soc Psychol_. 2010;40(6):998-1009. doi:10.1002/ejsp.674.

Nothing new here…

- **HABITS WORTH CULTIVATING:**
  - **Conscientiously selecting the media and experiences we expose our brain to**
  - **Practicing mindfulness**
  - **Choosing movement over and over and over again through exercise**



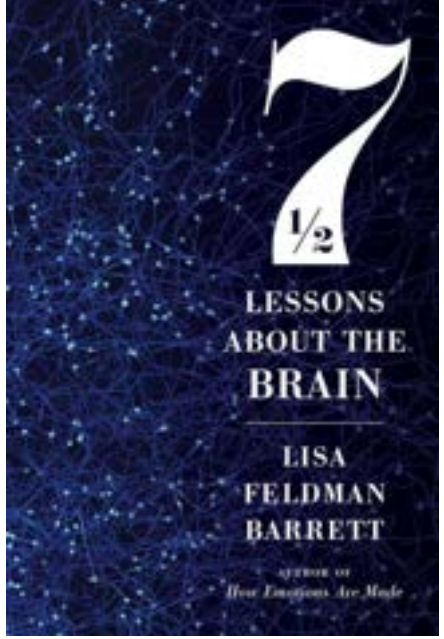
"He who has a why ….can bear almost any how.”

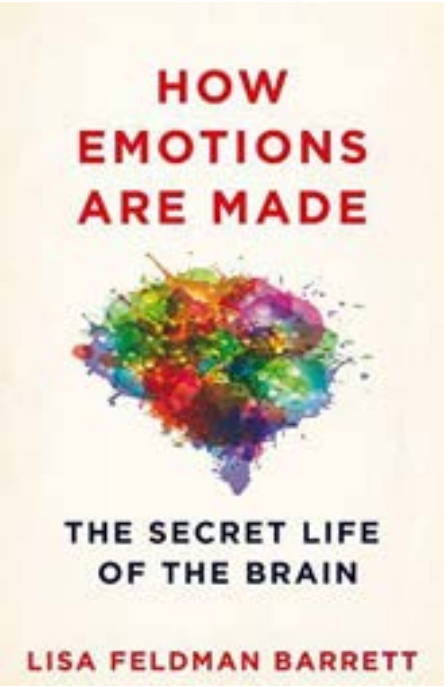
— Friedrich Nietzsche (as quoted by Viktor Frankl in Man’s Search for Meaning)

Objectives

- Explain how the brain functions as a "prediction machine" and how emotions are predictions constructed by the brain according to the Theory of Constructed Emotion (TCE)
- Explain how frequent intense negative emotions and their constituent thoughts, feelings, and behaviors can increase vulnerability to emotional disorders according to The Unified Protocol for the Transdiagnostic Treatment of Emotional Disorders (UP)
- Explain how media, mindfulness, and motion (exercise) can alter the intensity and frequency of negative emotions along with the thoughts, feelings, and behaviors associated with those emotions.

Theory of constructed emotion





Dr. Lisa Feldman Barrett, PhD

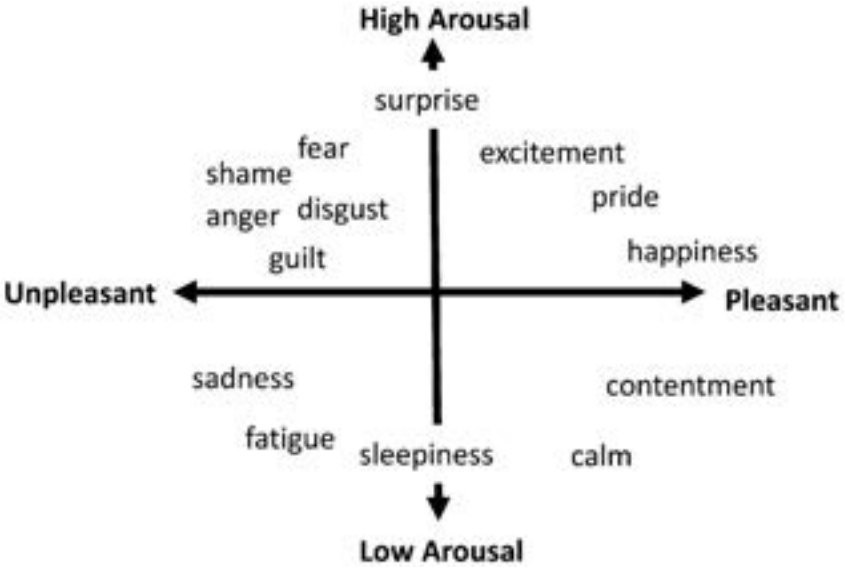
- Psychologist and Neuroscientist
- Among top 0.1% most cited scientists in the world
- University Distinguished Professor of Psychology at Northeastern University
- Holds appointments at Harvard Medical School and Massachusetts General Hospital as Chief Science Officer for the Center for Law, Brain & Behavior.
    - Barrett LF. About. Lisa Feldman Barrett. Available at: https://lisafeldmanbarrett.com/about/. Accessed May 6, 2024.

The brain is a prediction machine

- ~550 million years ago amphioxus = brainless wriggling stomach on a stick, like grass blade on ocean floor = human cousins
- Hunting develops ~Cambrian period = predators = need to know: "Can I eat that?" or "Will that eat me?"
- Increased movement and sense = Increased survival
- Energy efficiency crucial for survival: "What should I do and how much will it cost (water, salt, glucose, etc)?" = Allostasis = "body budget" = predicting and preparing to meet body's future needs based on past experiences
- Prediction is better than reaction
- The brain exists for allostasis; it exists to predict the needs and coordinate management of >600 muscles, dozens of hormones, pump 2000 gallons of blood per day, feed 128 billion neurons, digest food, excrete waste, etc. for >70 years

Affect ≠ Emotion

- One's basic sense of feeling, ranging from unpleasant to pleasant (called *valence*), and from idle to activated (called *arousal*).
  - Emotion is a much more complex mental construction.
- Not specific to emotion; it is a feature of consciousness.
- Occurs in every moment (whether you're aware of it or not) because interoception occurs in every moment.
  - Interoception: representations of sensory input that signal the condition of the entire body
- Like an allostasis status report of how things are and how they are anticipated to be



What are emotions? Why and how does our brain use them?

Theory of constructed emotion

"Emotions are your brain's best **guesses** [aka predictions] of what your bodily sensations mean, guided by your past experience."

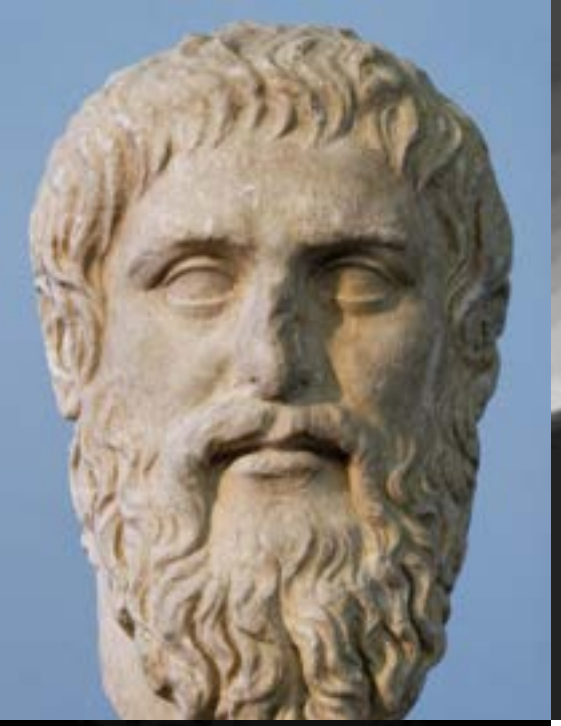
"Your brain constructs these guesses (emotions) in the blink of an eye – so rapidly, in fact, that emotions feel like uncontrollable reactions that happen to you, when emotions are actually made by you. [5]

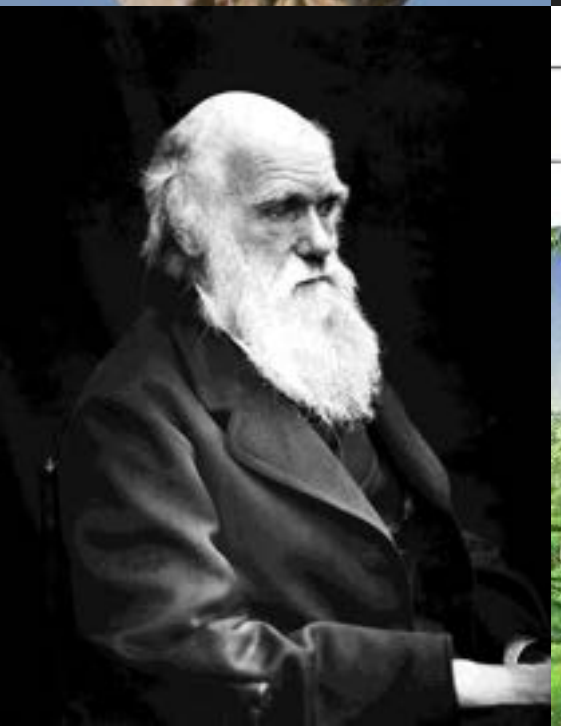
- Dr. Lisa Feldman Barrett, PhD

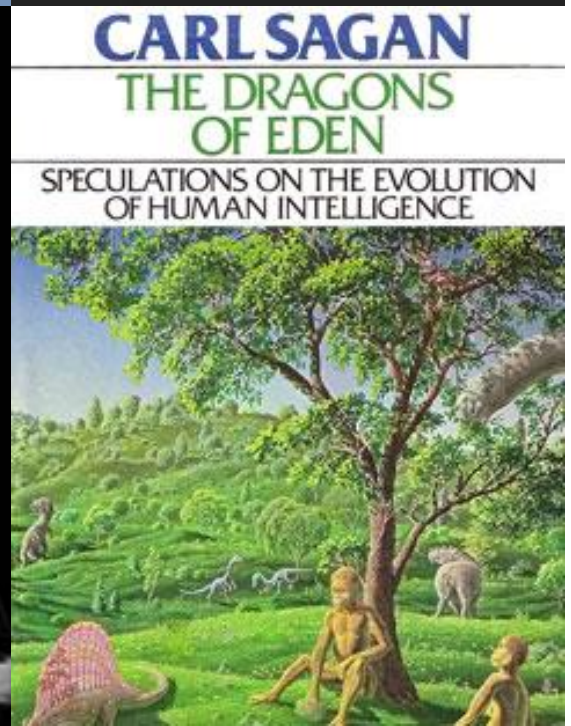
"For a long time, scientists were sure that emotions were caused by **dedicated brain circuits** – a circuit for happiness, one for fear, another for anger and so on – that automatically triggered a specific pattern of facial expression, bodily state and physical action.

For example, if you saw a snake, a supposed 'fear circuit' would activate, causing your eyes to widen, your heart to race and your body to prepare to flee. **A given emotion was thought to be a chain reaction of coordinated events and it occurred reliably enough to indicate when a person was experiencing it**." [5]

- Dr. Lisa Feldman Barrett, PhD







The “Triune Brain” Myth

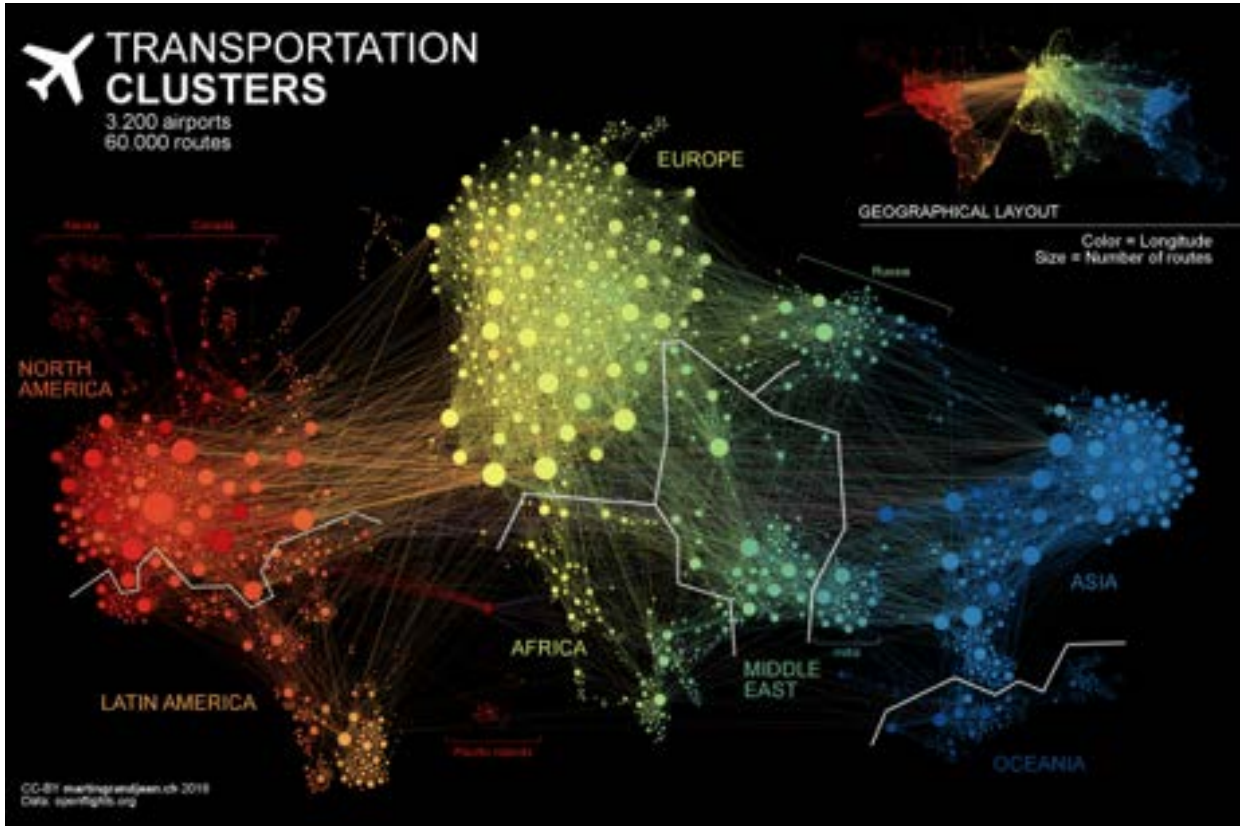
- Plato -> Paul MacLean in 1960s (seemed consistent w/ Darwinian evolution)-> Dragons of Eden in 1977 -> popularization of “Triune Brain” and made humans “best species” (capable of rationally controlling inner beast)
- Due to triune brain theory and Plato; Western Culture's best behavior and rationality explanations are:
  - Thinking brain (neocortex) must dominate the feeling brain (limbic system) & surviving brain (brainstem/basal ganglia).
    - CHOOSING not to act "rationally" = immorality
    - INABILITY to act "rationally" = mental illness

We Have One Brain, Not Three

- Problem: genes for all 3 areas are shared by all vertebrates
- Brain size/ shape dependent on allotted embryologic time and anatomical space to develop
- No such thing as an evolutionary more primitive “limbic system” or “lizard brain” producing emotions that are universal to mankind and that must be held in check by an evolutinonarily newer “Neocortex”
- **What if problems with rationality (and mental illness) were really problems with allostasis.; problems with the brain’s ability to effectively predict and meet future needs**?
    - Mental illness may be body-budgeting (allostasis) for the short term that's out of sync with the immediate environment, the needs of other people, or one's own long term interests.

Our brain is a network capable of innumerable memories, predictions, and actions

- Brain = network = collection of parts connected to function as a single unit.
- This is not a metaphor.
- ~128 billion neurons, each connected to a few thousand other neurons, = >500 trillion neuron-to-neuron connections
- Brain works like global air-travel system (thousands of airports). Some airports act as hubs and are able to take burdens off others. This system is more efficient with resources and is flexible/ scalable.
- Clusters of neurons like airports serve mostly local traffic; but, some densely connected clusters serve as far reaching hubs allowing most neurons to participate globally even while focusing locally.



NOT A STATIC SYSTEM

- Chemical neurotransmitters (fast)
  - Eg glutamate, serotonin, and dopamine make it easier or harder for signals to cross synapses between neurons (like airport staff who don't alter airport structure). This enables INNUMERABLE PATTERNS OF ACTIVITY
- Plasticity (slow)
  - Facts, friends' names, etc. become encoded in "wiring" via "tuning" (myelination, synaptogenesis, and neurogenesis), and "pruning" (opposite effects of tuning)
- Degeneracy (flexible)
  - Neurons can serve different roles depending on "who their conversation partner" is. E.g. neurons in the occipital ("visual") cortex become more devoted to sense of touch in blindfolded individuals taught braille after a few days. In permanent blindness the visual cortex neurons can be repurposed altogether.
  - Neurons can have more than one function
  - Different groups of neurons can produce same result (eg lift your right hand... do it again.... that likely didn't happen via the exact same set of neurons)
  - "Degeneracy in the brain means that your actions and experiences can be created in multiple ways. Each time you feel afraid, for example, your brain may construct that feeling with various sets of neurons"
  - Like the airlines, this allows ongoing system function even if some airports are damaged or changed

PREDICTION AND MEMORY

- “A brain doesn’t store memories like files in a computer—it reconstructs them on demand with electricity and swirling chemicals. We call this process remembering but it’s really assembling.” (and can be take place with different collection of neurons - degeneracy)
- A high complexity brain can combine past experiences in new ways to deal with things it has never encountered before... in a way... it can predict the future. It can adapt to changing environments.

COMPLEXITY

- Pocketknife w/ 14 tools that can be in opened or closed state = 2^{14} (16,384) possible patterns
- Pocketknife w/ 15 tools = 2^{15} (32,768) possible patterns
- Pocketknife w/ 14 tools that can be in opened, closed, or partial state = 3^{14} (4,782,969) possible patterns
- Observable universe = ~93 billion light years; w/ low density ~1 hydrogen atom/4 M^3 = ~10^{80} = ~2^{266} = ~ 1000 quadrillion vigintillion atoms
- 128 billion neurons, even if only considered as “firing or not firing” = $2^{128,000,000,000}$ possible patterns… If each pattern of activity represented a thought, a memory, an action, etc…. What could that mean??? What if we consider graded action potentials??? Could our brain create vastly more patterns than there are atoms in the universe?

Little Brains Wire Themselves to Their World

- **Human brains are born under construction. They don't take on their full adult structure and function until they finish their principal wiring, a process that takes about twenty-five years.**
- **Vision brain areas only develop normally after birth if baby's retinas are regularly exposed to light**
- **Shape of ears and their ability to focus sound into the ear changes brain development, so does bacterial exposure, exposure to faces, colors, shapes, words, etc**
- **Sensory integration occurs when brain begins to associate what combinations of senses mean (eg this combination of sounds, smells, touches, and sights is my mother)**

More “Tuning and Pruning”

- Tuning: strengthening neurons and their connections (bushy dendrites, myelinated axons). WELL-TUNED CONNECTIONS = INCREASED EFFICIENCY = MORE LIKELY TO BE REUSED IN FUTURE AND THEREFORE CERTAIN NEURAL PATTERNS ARE MORE LIKELY "I.E. NEURONS THAT FIRE TOGETHER WIRE TOGETHER"
- Pruning: less used connections weaken and die off: "if you don't use it you lose it”

Examples of Tuning and Pruning

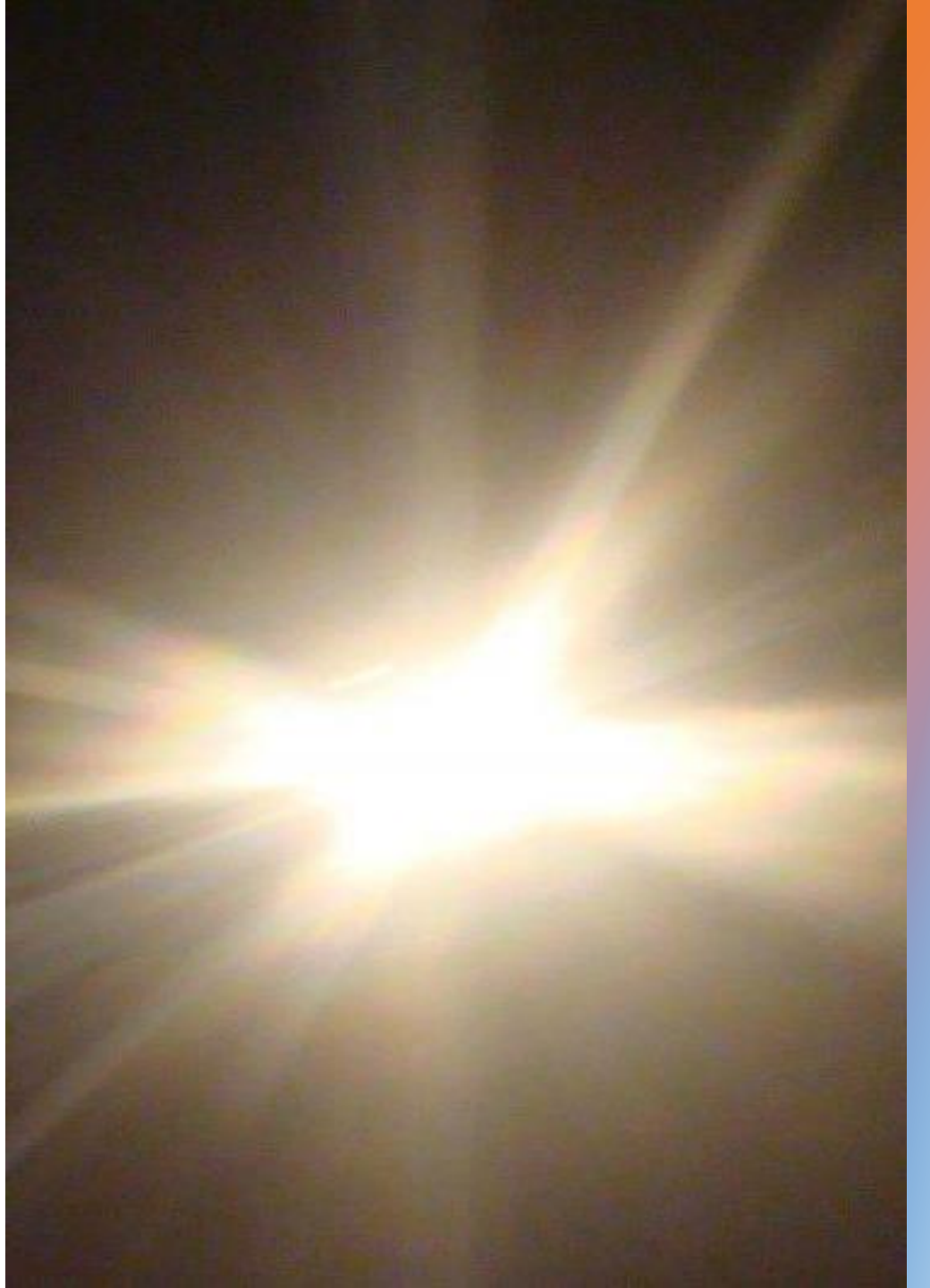
- Allostasis:
  - Caregivers regulate baby's physical environment, body budget, and brain development as it tunes and prunes by what the care givers do and do not do (eg feed baby, let baby fall asleep independently, etc) and baby brain eventually learns allostasis
- Attention:
  - Babies are born with twice as many neuron-to-neuron connections as needed by adult brain with bushier neurons. Through tuning and pruning "lamp" of attention becomes a "spotlight" as baby learns to identify most important stimuli and actions.
  - Caregivers direct attention via "baby talk", routines, toys, etc
  - Baby learns what is relevant in its environment to its body budget and what to ignore... it learns its NICHE
- Senses
  - Over time via tuning and pruning, frequently heard sounds are given more attention, others are ignored and the neuronal connections that carry that information fall into disuse
  - We also learn to pay more attention to those around us (who are often of the same ethnicity which can affect the way baby "sees" and pays attention to "others")

”How we treat each other really matters!”
– R.M.N.

- An advantage of cultural inheritance could be that it is flexible, efficient, and frugal because we don't have to encode everything we need to know (all of our wiring instructions) into our genes.
- RISK: SOCIAL WORLD IS REQUIRED FOR DEVELOPMENT as seen by absence thereof that sadly happened under communist outlaw of birth control in Romania in 1960’s. Thousands of neglected and sometimes warehoused infant orphans became abnormally developed adults (intellectual, attentional, self-control and other impairments). Neglect and poverty are dangerous to developing brains.
- Its not nature vs nurture. OUR NATURE REQUIRES NURTURE.

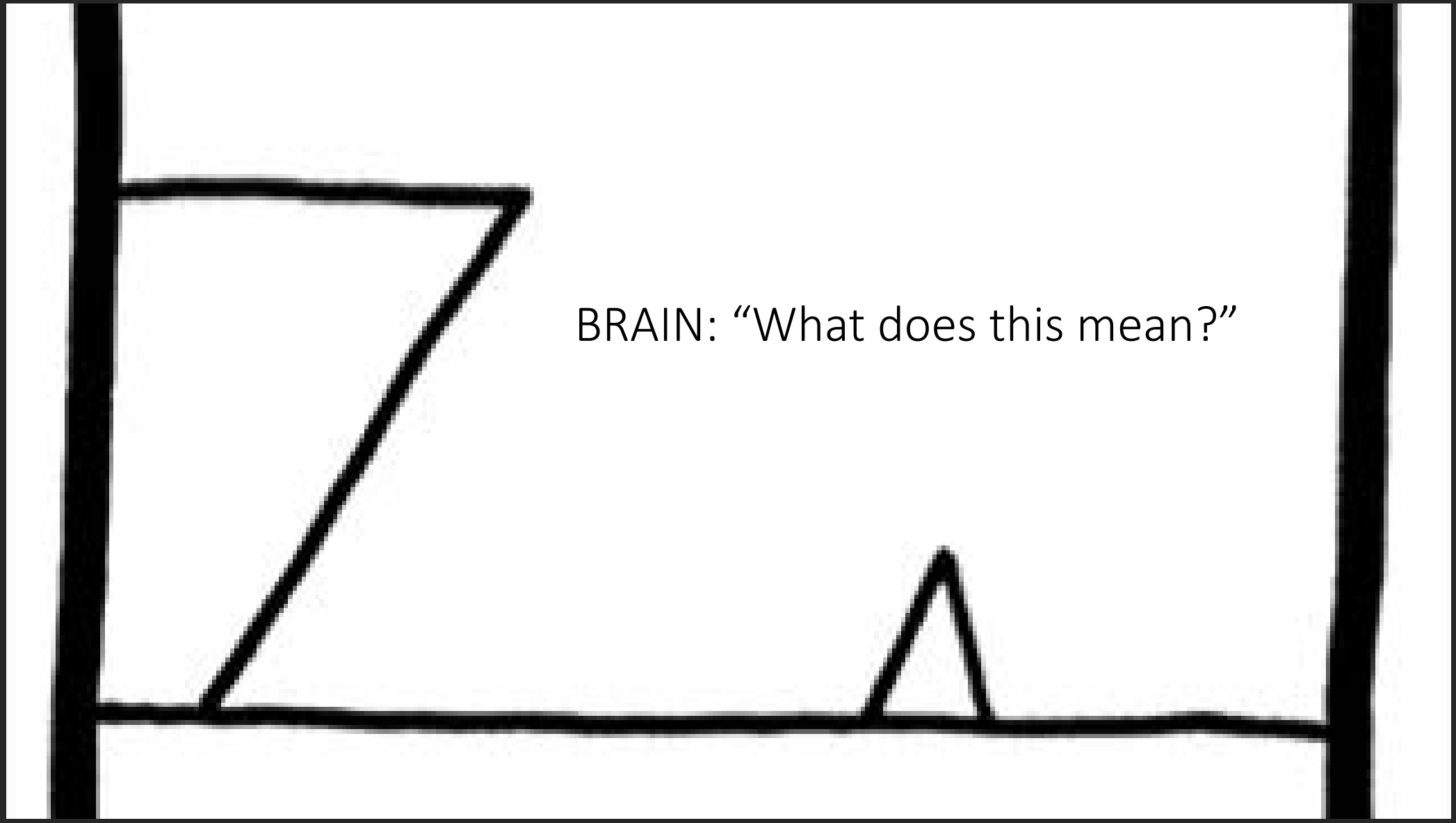
Simulation

- Brain lives in dark silent box asking "what does this mean" as it receives interoceptive and exteroceptive data regarding changes in chemicals, light waves, air pressure, etc. Brain's job is allostasis; so it must make meaning and predictions from all this ambiguous data.
- **Fortunately (and unfortunately), the brain draws on past experiences** (internal and external, personal, cultural) and almost instantaneously reconstruct bits and pieces of past experiences as neurons pass information back and forth assembling memories to infer meaning of current sensory data and determine what to do. This is called SIMULATION.
- I.e. "the last time I encountered something like this (internally and externally) what was happening?
- But wait… the brain also asks: “what SHOULD I see, hear, smell, taste, feel… and do… NEXT?

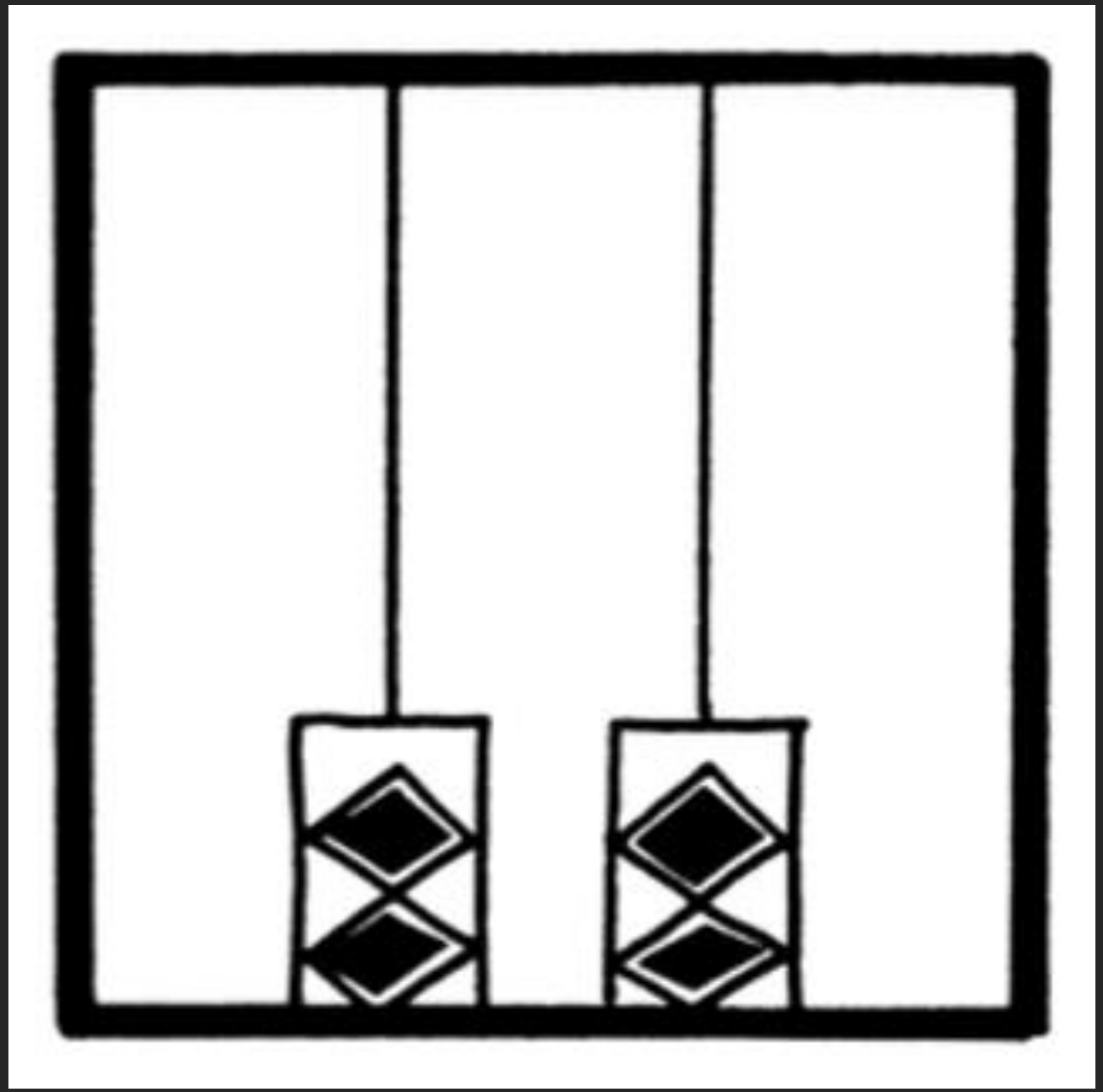


Prediction alters sensory input and creates our reality

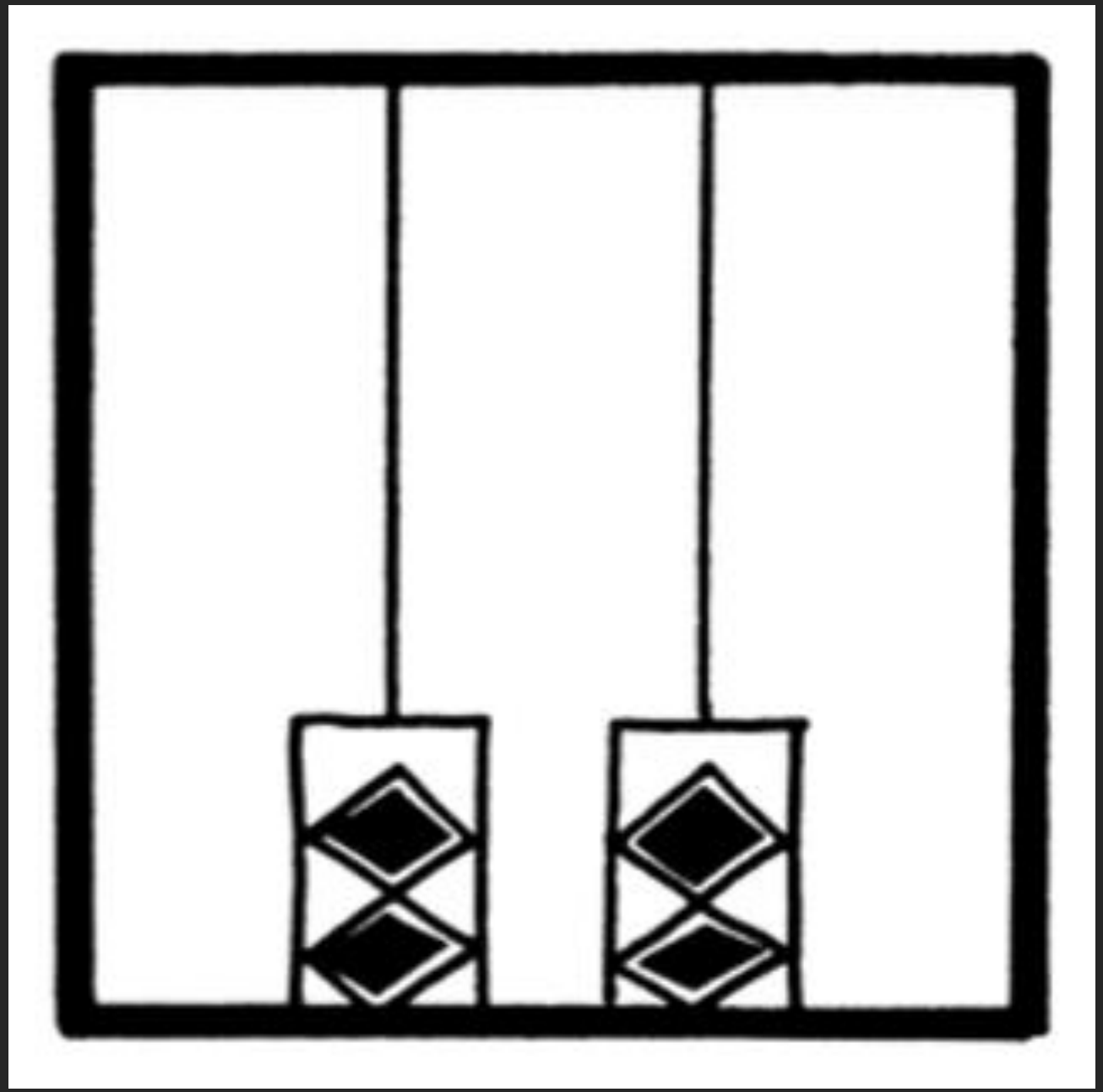
… even if its wrong


BRAIN: “What does this mean?”

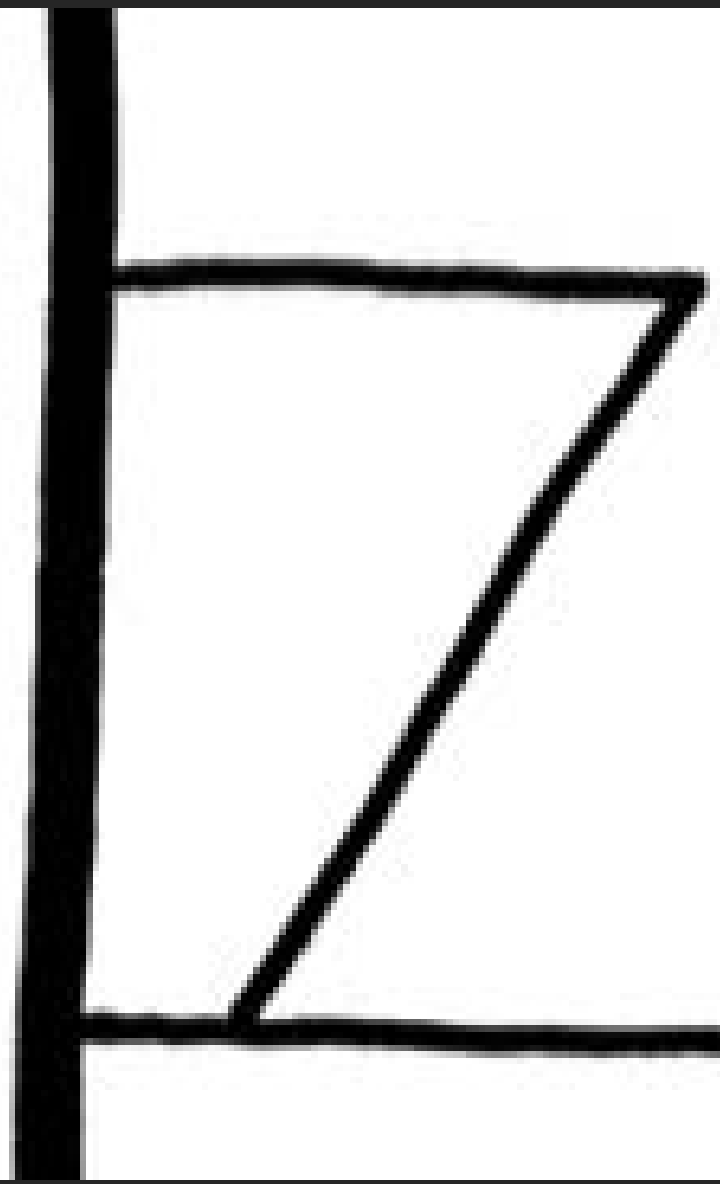

SHIP ARRIVING TOO LATE
TO SAVE A DROWNING WITCH



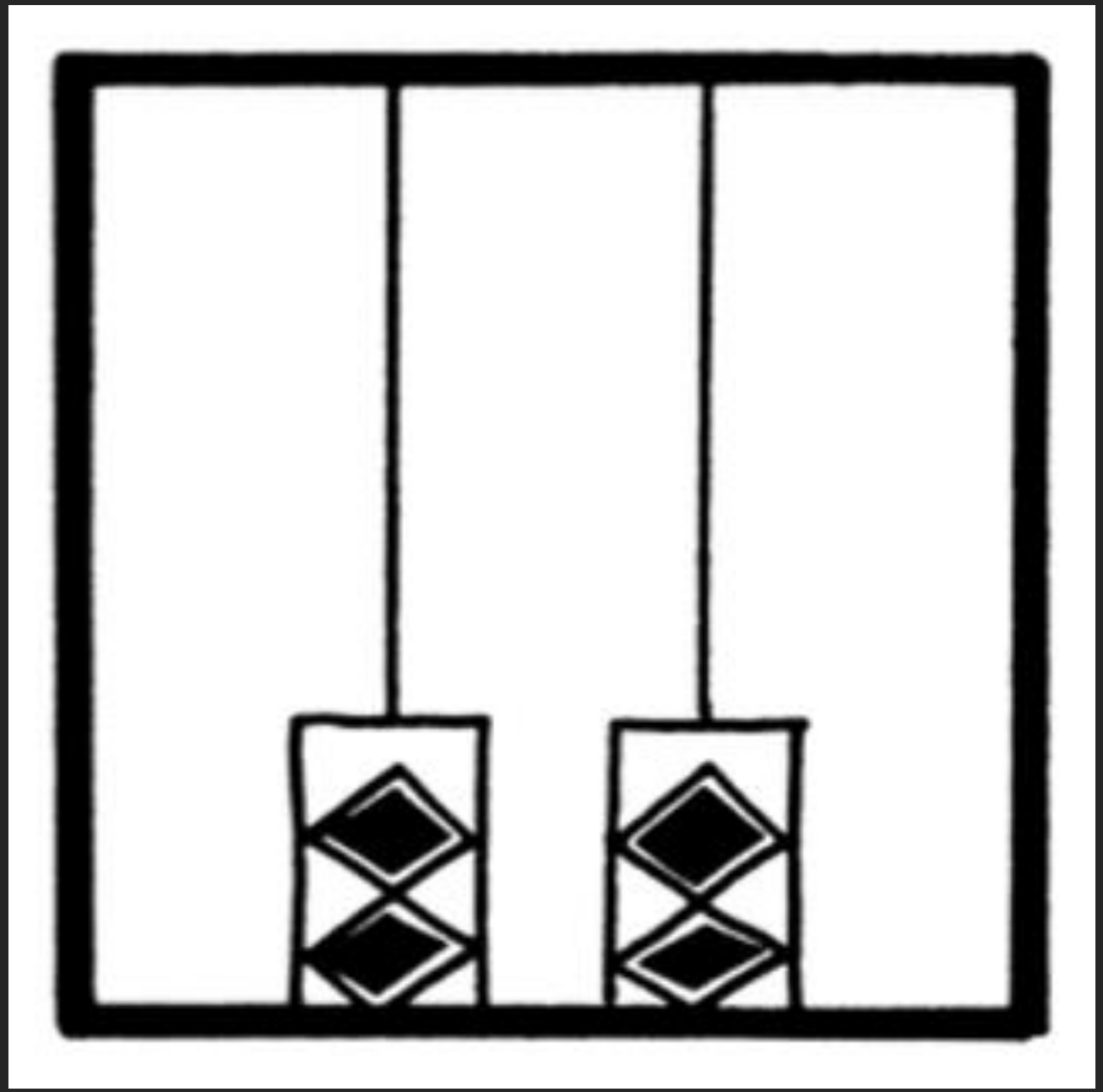
Brain: “What does this mean?”



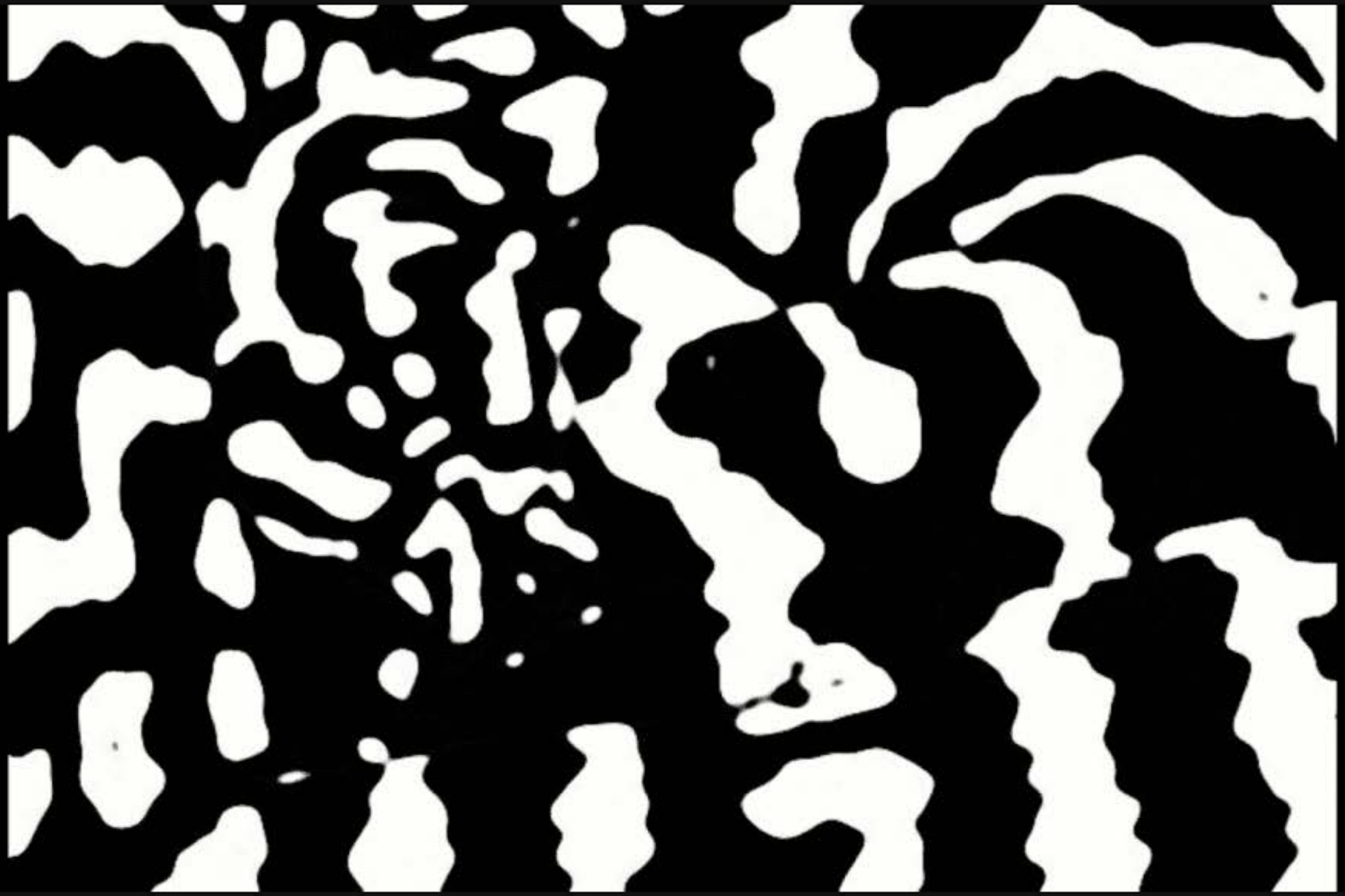
STORK WEARING ARGYLE SOCKS

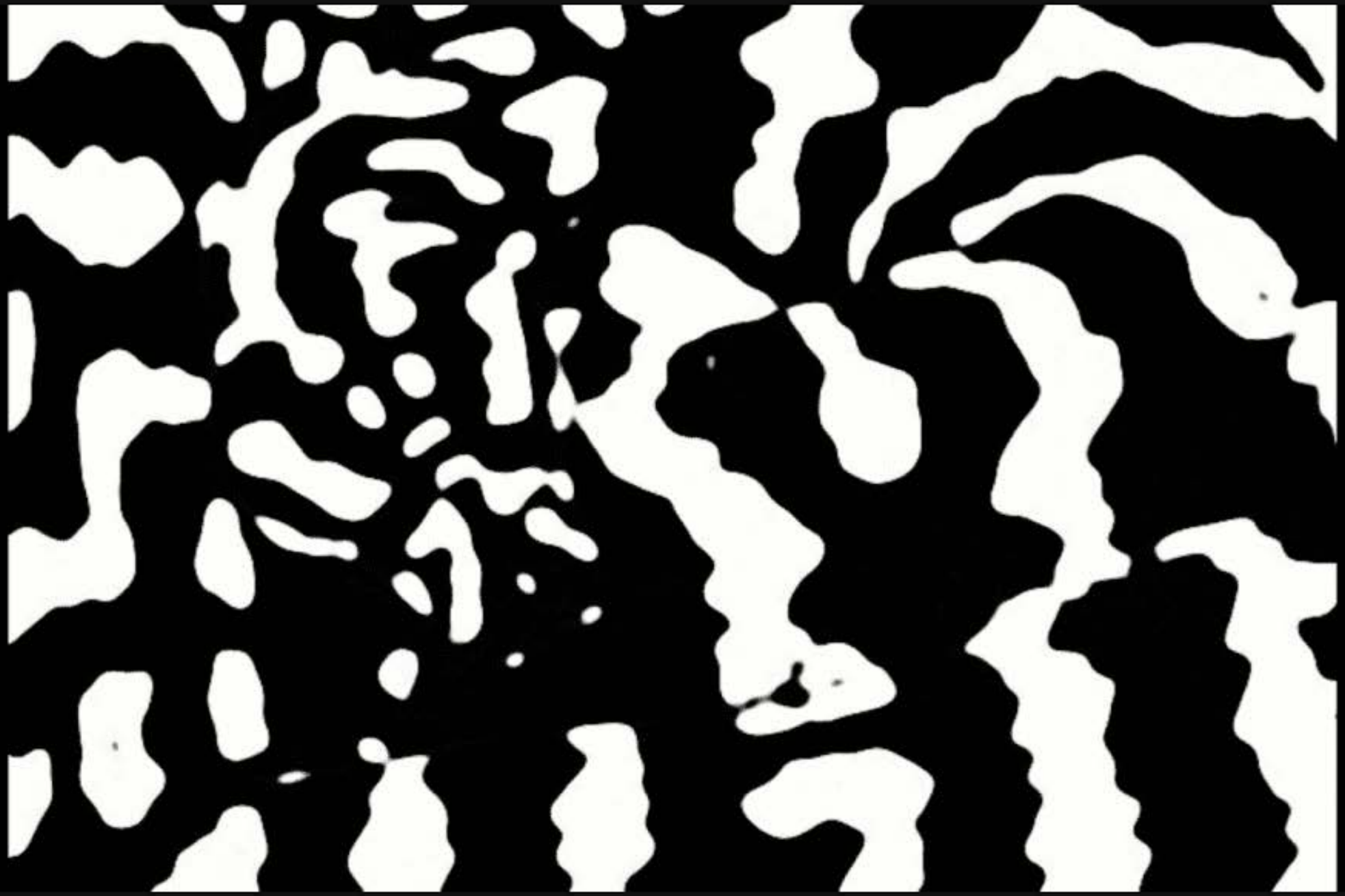


You can now see familiar objects instead of random lines and shapes. Your brain is assembling memories from bits and pieces of past experiences to go beyond the visual data in front of you and make meaning (simulation). In the process, **your brain is literally changing the firing of its own neurons**.



- Objects that you have never seen before now leap from the screen. The lines and shapes haven't changed—you have.
- Artwork, particularly abstract art, is made possible because the human brain constructs what it experiences.
- What we see/hear/smell/feel etc = combination of what's happening in the world, in our body and what's in our brain in the form of past experiences as the brain guesses what interoceptive and exteroceptive stimuli mean and constructs predictions.





Constructive process happens predictively.

- Brain actually begins to sense (predict) the moment-to-moment changes in the world around us before those light waves, chemicals, and other sense data hit our brain.
- The same is true for moment-to-moment changes in our body—our brain begins to sense them before the relevant data arrives from our organs, hormones, and various bodily systems.
- We don’t experience our senses this way, but it’s how our brains navigate the world and control our bodies.

Think about a time you were very thirsty… How long after drinking water was your thirst alleviated?

- “Ingested water appeared in plasma and blood cells within 5 min and the half-life of absorption (~11–13 min) indicates a complete absorption within ~75–120 min.”
  - Péronnet F, Mignault D, du Souich P, et al. Pharmacokinetic analysis of absorption, distribution and disappearance of ingested water labeled with D2O in humans. Eur J Appl Physiol. 2012;112(9):2213-2222. doi:10.1007/s00421-011-2194-7.
- Water can’t possibly reach bloodstream in a few seconds. So what relieved your thirst? Prediction. As your brain plans and executes the actions that allow you to drink and swallow, it simultaneously anticipates the sensory consequences of gulping water, causing you to feel less thirsty long before the water has any direct effect on your blood.

Boom...

Boom...

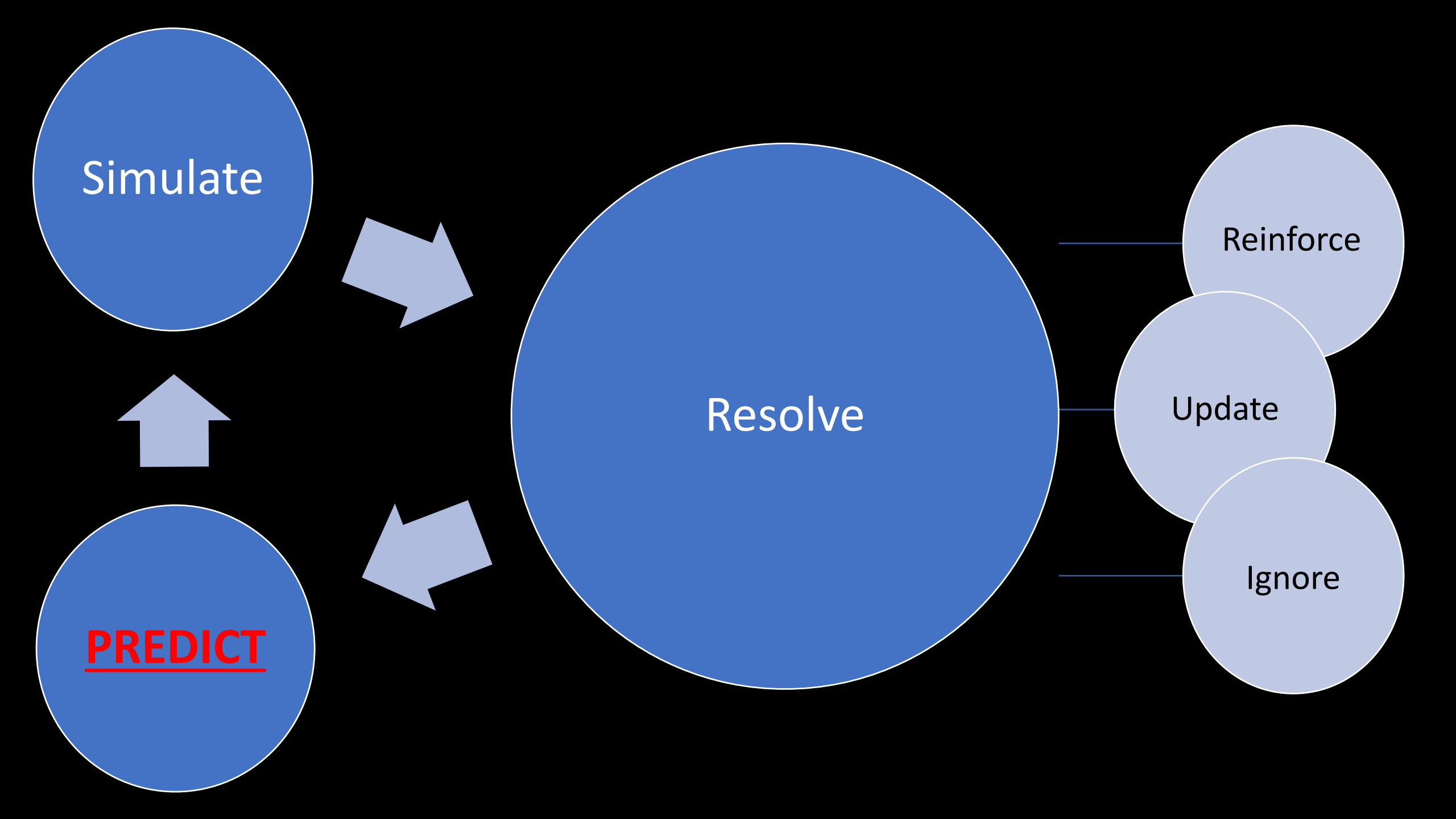
Boom…

- 19th century physiologist Ivan Pavlov won Nobel Prize for his work on classical conditioning when laboratory dogs were conditioned to salivate in the absence of food with only the sound of a metronome as a stimulus.
- What wasn't realized was that the dogs weren't just "reacting" to the sound by drooling, their brains were predicting food and preparing their bodies for it.

Brain:

"Based on what I know about this war, and given that I am deep in the woods with my comrades, gripping a rifle, heart pounding, and there are moving figures ahead, and maybe something pointy, what am I likely to see next?"

- In this situation, the stuff inside and outside the soldier's head didn't match, and the inside stuff prevailed.


Simulate
Resolve
Reinforce
Update
Ignore
PREDICT

- Our brains constantly predict and compare these predictions with incoming sensory data. When predictions align, our brains efficiently prepare us to act, constructing our reality in the process. However, when predictions are wrong, our brains still construct reality, altering or ignoring sensory data; and leading to errors. Despite conflicting data, our brains may not update their predictions, especially in life-threatening situations.

- What if our brain's ability to interpret situations and predict appropriate emotional responses was impaired? An organ unable to appropriately perform its function is considered to have a "disorder".

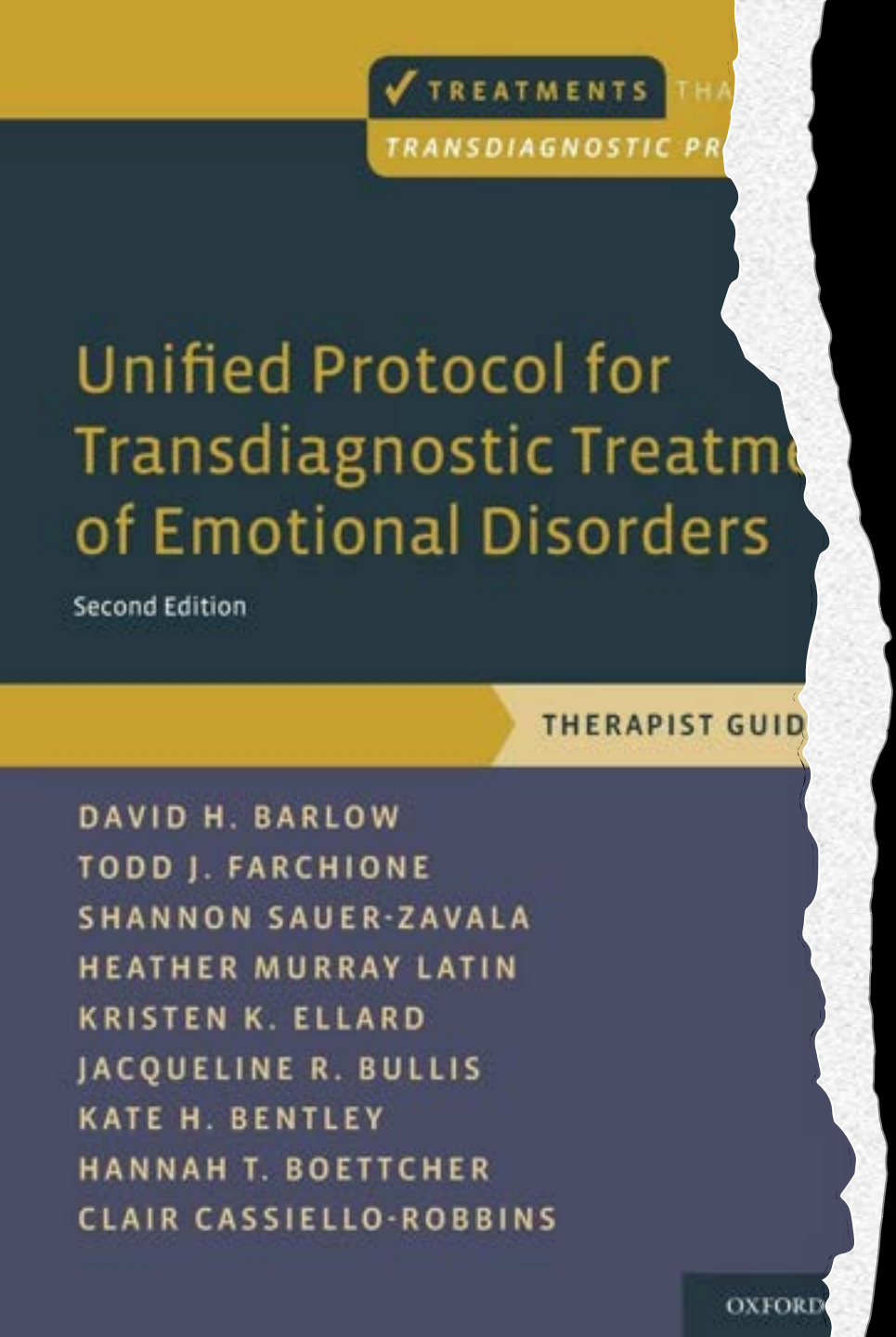
- An emotional disorder could be considered an inability of the brain to effectively execute its' primary function of interpreting current sensations and predicting future needs, stimuli and best actions (i.e. allostasis).

The Unified Protocol for Transdiagnostic Treatment of Emotional Disorders (UP)

WEBER HUMAN SERVICES

MISSION
Weber Human Services creates hope and opportunities that enable all clients and staff to:
do the work necessary
to become their best self
and find joy through people, place, and purpose.

MOTTO	METHODS
Work	Engagement
Become	Intervention
Serve	Recovery



- A form of psychotherapy designed to help those with anxiety, depression, and other disorders with strong emotional components
- 8 modules administered over 12-16 weekly sessions that last 50-60 minutes

UP is evidence based

- Based on extensively validated therapies: MI, ACT, and CBT
- Significantly reduced symptoms in multiple anxiety disorders w/ continued improvement 18 mo later
- UP vs Single Disorder Protocols (SDPs) for GAD, Social anxiety disorder, OCD, and panic disorder = similar significant severity reduction; but, also significantly less attrition than SDP's and 62% of UP patients no longer met diagnostic criteria for any emotional disorder and improvements were largely maintained 1 yr later
- Can be successfully applied to numerous diagnoses that are characterized by the emotional disorder vulnerabilities including substance use disorder, unipolar and bipolar depression, borderline personality, disorder, and PTSD
- Shown to change temperament with small to moderate changes in neuroticism from pre to post treatment

“Transdiagnostic”

- “research suggests … considerable overlap in symptoms across disorders”
- “there appears to be a broad treatment response when targeting one disorder that often generalizes across other disorders”
- “there are extremely high rates of comorbidity for the range of anxiety and depressive disorders (estimates as high as 75%)…, suggesting that patients do not fit neatly into the diagnostic boxes the field has created for them”
- This evidence suggests that there may be a common set of vulnerabilities contributing to the development of anxiety, depressive, and related disorders that can become a more efficient focus of treatment than the diverse symptoms themselves.”

Principles

- "Emotional Disorders" involve frequent intense negative emotions and those emotions have 3 parts:
  - Cognitions (Thoughts)
  - Sensations (Physical Feelings)
  - Behaviors
- Attempts to avoid or dampen the intensity of uncomfortable emotions (thoughts, feelings, behaviors) —ultimately backfire and contribute to their perpetuation
- The UP helps patients learn to confront, experience, and respond to uncomfortable emotions in more adaptive way
  - Leading to new learning and memories
  - Leading to changes in brain function
  - This can reduce intensity/frequency of negative emotions in the future
- However, the UP does not attempt to directly diminish uncomfortable symptoms but rather to expose patients to them.

Core skills taught in the UP include:

- Thoughts
  - Nonjudgmental and present-focused awareness of thoughts and sensations and the avoidance and reappraisal of "overestimating" and "catastrophizing" the assumed implications of those thought and sensations
- Feelings:
  - Facing physical sensations
- Behaviors
  - Countering emotional behaviors with alternative actions

How might media, mindfulness, and motion alter the intensity and frequency of negative emotions along with the thoughts, feelings, and behaviors associated with those emotions.

Habit #1: Media

Predictions precede sensory experiences, with the brain initiating actions before conscious awareness. This predictive nature of our brains depends on our memory and environment.

Although we cannot change our past experiences or our genes; we can influence future predictions through learning, experiences, and deliberate efforts, altering our brain's wiring and shaping our reality.

We often speak of the potential negative influence of media on children:

Children ≥8 years and adolescents in the United States spend an average of six hours per day watching television, playing video games, or using computers.

Adverse effects of exposure to media violence may include:

- Increased tendency to behave violently toward others (aggressor effect)
- Increased fearfulness of becoming a victim, with a resultant increase in self-protective behavior
- Increased callousness and desensitization toward actual violence (bystander effect)
- A cycle in which aggressive children who watch television violence identify with violent characters, act like those characters, and seek out more and more violent programming

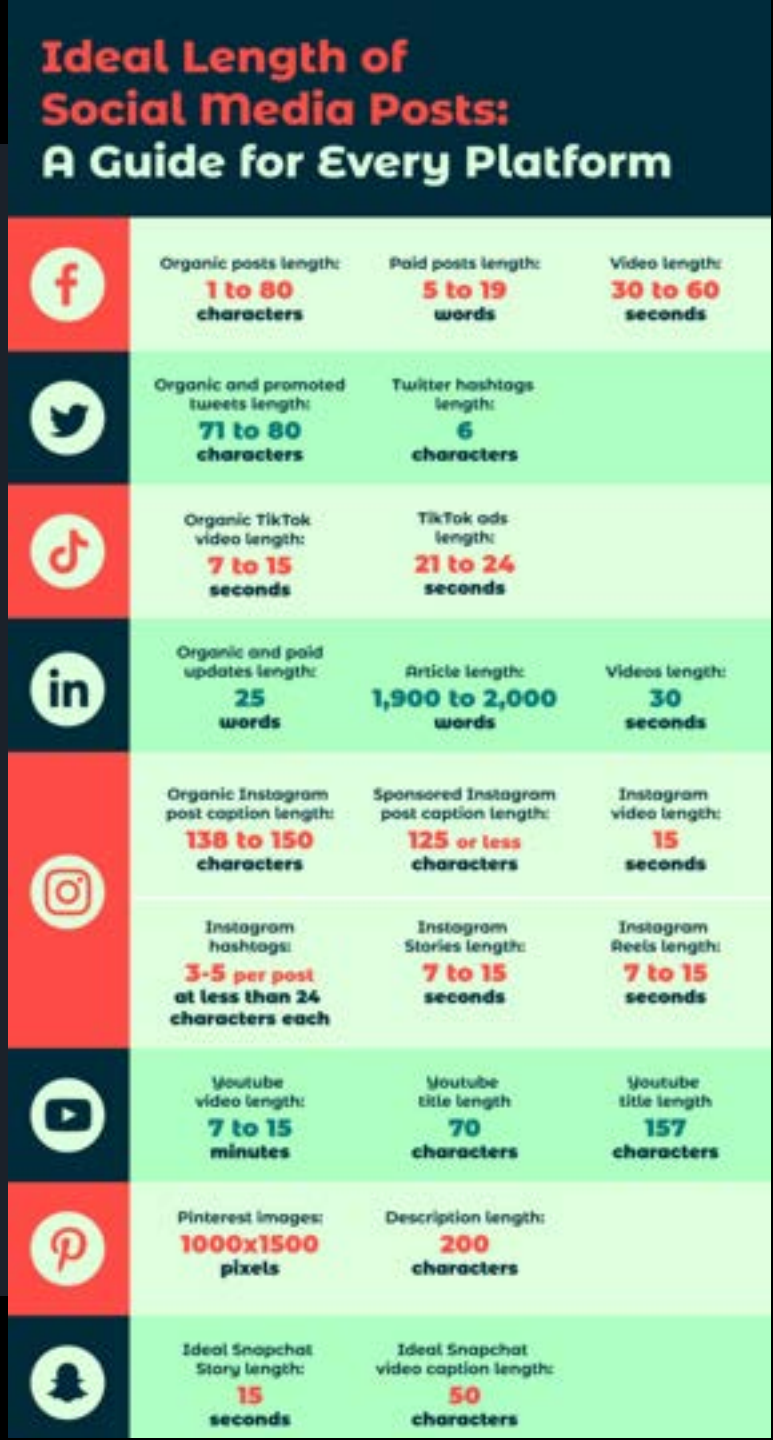
Strasburger VC. Television and Media Violence. In: **UpToDate**. [Internet]. [cited 2024 May 3]. Available from: https://www.uptodate.com/contents/television-and-media-violence.

- “The most common question parents ask me is, 'is social media safe for my kids'. The answer is that we don't have enough evidence to say it's safe, and in fact, there is growing evidence that social media use is associated with harm to young people's mental health,” said U.S. Surgeon General Dr. Vivek Murthy, May 23, 2023

How might media affect our patients' predictions (or our own)?

- E.g.
  - Pornography
  - Angry, mocking, accusatory political commentary
  - Sensational news
  - Music lyrics
  - Violent video games or movies
- What would brains exposed to these types of media "expect" to see in their world and therefore; what would they predict?
- What type of sensory information would these brains prioritize or create?

How does our media use affect our capacity for attention?



- Newberry C. The Ideal Length of Everything Online, Backed by Research [Internet]. Hootsuite. 2023 [cited 2024 May 4]. Available from: https://blog.hootsuite.com/ideal-social-media-post-length/

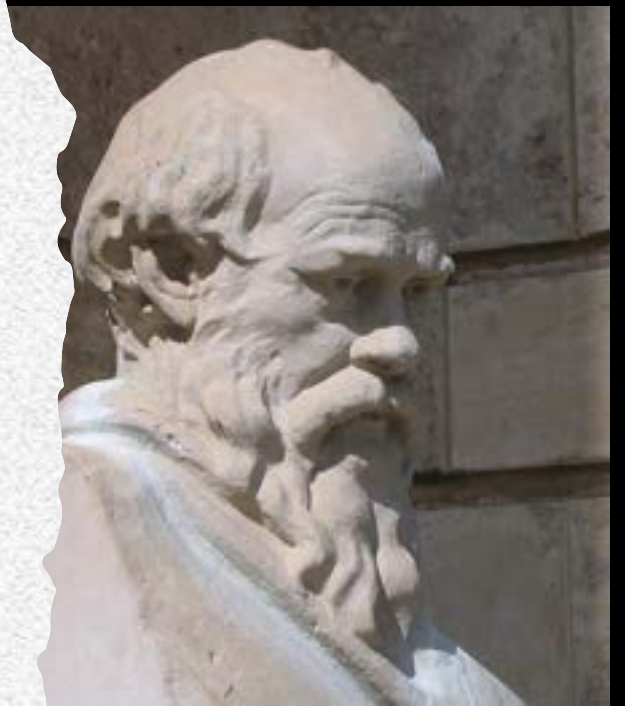
What media do we use or suggest to our patients when seeking wisdom, experience, and perspective?

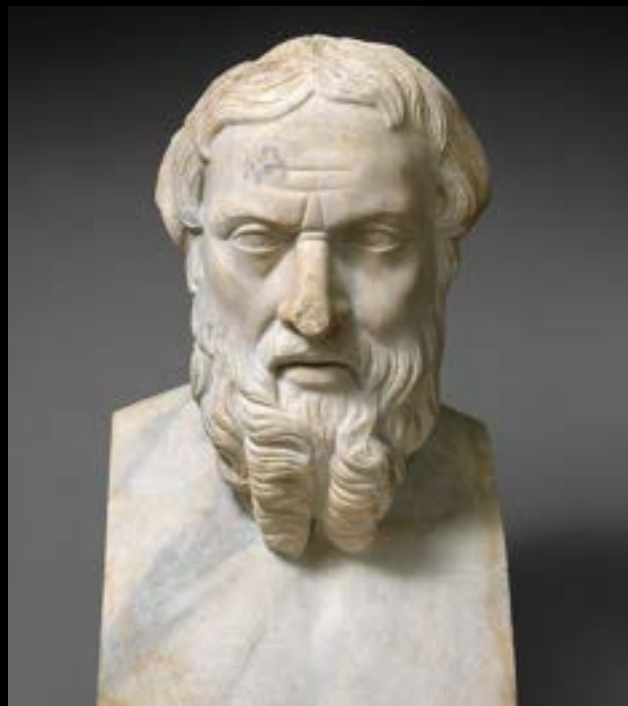
- Every age and every person suffers from their own blindness, “the only palliative is to keep the clean breeze of the centuries blowing through our minds, and this can be done only by reading old books.”
  - C.S. Lewis

- "I neither know nor think I know"
  - Socrates (Plato, *Apology*)

- The universe is change; our life is what our thoughts make it.
  - Marcus Aurelius' (Meditations)

- "Soft countries [give] birth to soft men“
  - Cyrus the Great (The History of Herodotus)





- Everyone who's ever learned a skill, whether it's driving a car or tying a shoe, knows that things that require effort today become automatic tomorrow with enough practice.
- They're automatic because the brain has tuned and pruned itself to make different predictions that launch different actions. As a consequence, we experience ourselves and the world around us differently. We can choose what we expose ourselves to.

Habit #2: Mindfulness

My first introduction to mindfulness…

- “You want me to just sit here and pay attention to my breathing?... That’s it? That’s your plan!?”

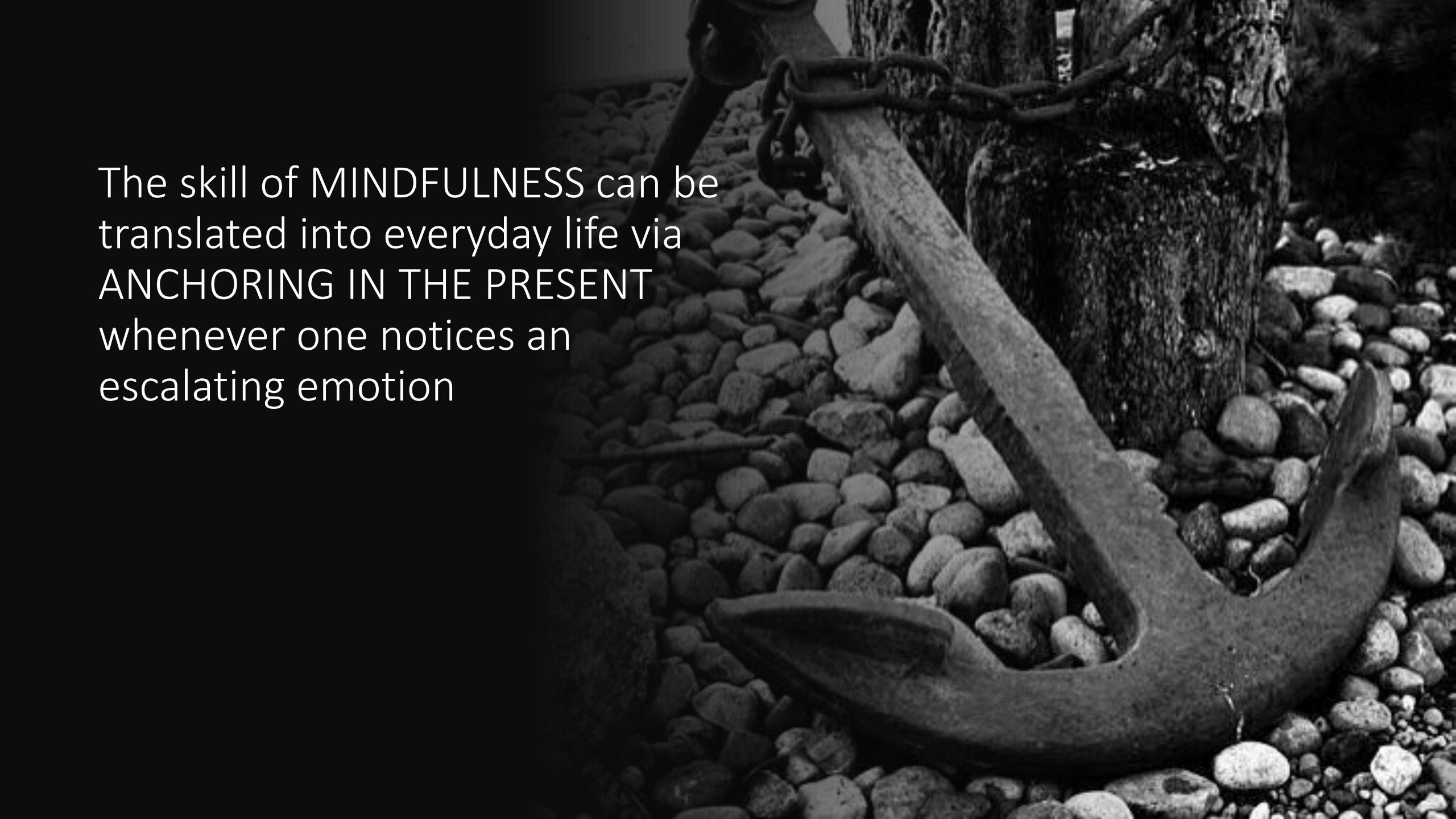
“If it changes anatomy… it must be doing something…”

- Regular practice of mindful meditation has been associated with a range of anatomical changes in the brain. These include larger gray matter volumes in the right orbito-frontal cortex, thalamus, and left inferior temporal gyrus, as well as the right hippocampus (Luders 2009). Other studies have found increased gray matter density in the brain stem (Vestergaard-Poulsen 2009), and changes in the topological and spatial properties of brain functional networks (Jao 2016). These changes are thought to be related to improvements in psychological and physiological well-being, and may have potential implications for the treatment of various conditions.

MINDFULNESS as taught in the U.P.

- Practice at least 5 minutes per day for a week seated on a chair with hands on lap
- Ground in the here and now by closing eyes, picturing self in room, and feeling contact with floor, chair, etc
- Focus on breath to bring attention to the present moment
  - Describe SENSATIONS matter-of-factly without judgement
  - Observe THOUGHTS without reacting to them as if they are true. (thoughts ≠ facts)
  - Notice natural ebb and flow in intensity of entire emotional experience (sensations, thoughts, and behavioral urges)
  - Use breath to return to nonjudgemental present-focused awareness if caught up in judging, future, overestimating or catastrophizing
- When ready bring self back to the room, picturing it, feeling contact with floor, chair, etc, then open eyes

The skill of MINDFULNESS can be translated into everyday life via ANCHORING IN THE PRESENT whenever one notices an escalating emotion



ANCHORING IN THE PRESENT

- Use your breath and the feeling of the floor beneath your feet to ground yourself where you are and in the present moment.
- Do a three-point check:
  - What are you thinking right now?
  - What are you feeling in your body right now?
  - What are you doing or feeling like doing right now?
- Ask yourself:
  - Is my response (thoughts, physical feelings, behaviors) consistent with what is going on here and now; or am I reacting to the past or predictions of the future?
  - Am I interpreting or judging automatic and overestimated or catastrophized thoughts as "truths" instead of mere possibilities
- Bring your response in line with the demands of the present moment by selecting an alternative action.

How does Mindfulness affect our capacity for attention?

- Newberry C. The Ideal Length of Everything Online, Backed by Research [Internet]. Hootsuite. 2023 [cited 2024 May 4]. Available from: https://blog.hootsuite.com/ideal-social-media-post-length/

Research has shown that the practice of mindfulness can significantly impact the brain's attention and pain perception processes.

Studies have found that mindfulness can reduce pain unpleasantness and anticipatory anxiety by decreasing cognitive control and increasing sensory processing (Gard 2012). This is supported by the finding that mindfulness meditation training can reduce pain intensity and unpleasantness by altering the construction of the pain experience (Zeidan 2011). Furthermore, mindfulness training has been found to decrease the automatic orientation towards pain stimuli, indicating a reduced attention capture effect (Strofer 2012). These effects are associated with lower pain sensitivity and greater deactivation of brain regions involved in sensory, cognitive, and affective appraisals (Zeidan 2018). Overall, the practice of mindfulness appears to have a significant impact on the brain's attention and pain perception processes, leading to reduced pain sensitivity and altered pain experience.

- Research shows that students can learn to reappraise and experience their physical sensations not as anxiety but as energized determination, and when they do, they perform better on tests. That determination seeds their brains to predict differently in the future. If they practice this skill enough, they can pass a test, pass their courses, and graduate, hugely impacting future earning potential.
  - Lisa Feldman Barrett

Mindfulness can enable us to:

STOP THINK GO

STOP

How do you feel? Happy, scared, angry, sad? The way you feel will affect your decisions of what to do.

THINK

What are your options? There are many possibilities to choose from – both negative and positive. What are the positive and negative outcomes from the options?

GO

Now you've weighed up some of your options, the positive and the negative outcomes – which will you choose?

Habit #3: Movement

My comments at SOAR that got me into this:

- In therapy, only exercises of very limited intrinsic value can be employed to expose patients to opportunities to "face physical exertion" as directed by the UP
- Exercises with repeated sets such as HIIT and barbell training could provide safe, effective, titratable, and intrinsically valuable opportunities to develop core skills of the UP including:
  - Facing uncomfortable physical sensations
  - Countering emotional behaviors with alternative actions

SOAR
SCHOOL OF ADDICTION RECOVERY

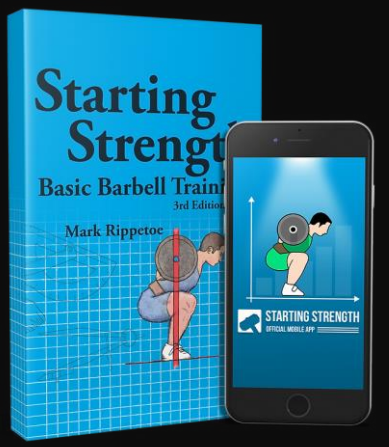
High Intensity Interval Training (HIIT)

- Cardiovascular exercise that involves alternating short bursts of intense activity for 30 seconds to multiple minutes with periods of less intense activity or complete rest.
- Pattern is repeated several times over a session that can often lasts ~ 20 minutes
- The intense phases push the body to work hard in a short burst, often close to maximum effort. The recovery phases help to partially lower the heart rate and prepare the body for the next round of high intensity.
- Efficient in burning calories and improving aerobic and anaerobic fitness, often in less time compared with more traditional steady-state workouts.
- Shown to increase metabolic rate for hours after exercise, improve insulin sensitivity, and potentially contribute to fat loss.

Advantages of Barbell Training

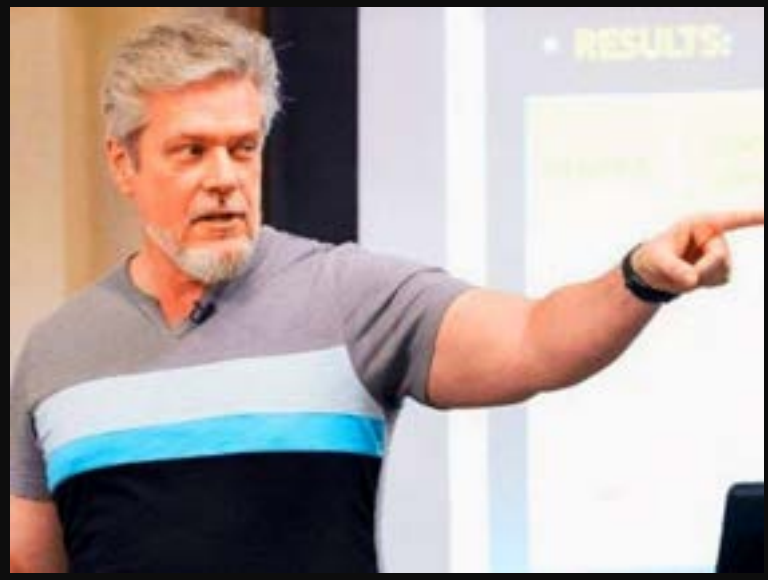
- Human body functions as a complete system and best responds to training as a complete system
- Properly performed, full-range-of-motion barbell exercises are essentially the functional expression of human skeletal and muscular anatomy under a load.
- Barbells allow weight to be moved in exactly the way the body is designed to move it, since every aspect of the movement is determined by the body. Machines, on the other hand, force the body to move the weight according to the design of the machine.

-Mark Ripptoe



“Practical Guidelines for Implementing a Strength Training Program for Adults” UpToDate 2024

- Strength training with barbells provides for the ergonomic loading of natural human movement patterns through a complete range of motion, allowing for the imposition of training stresses to a large volume of musculoskeletal tissue using just a few exercises.
- Whenever possible, the authors' preference is for training with barbells.
- Any individual who can ambulate independently and is medically safe to exercise may begin a strength training program using some form of free-weight-based exercise



Jonathon Sullivan, MD, PhD, FACEP, SSC

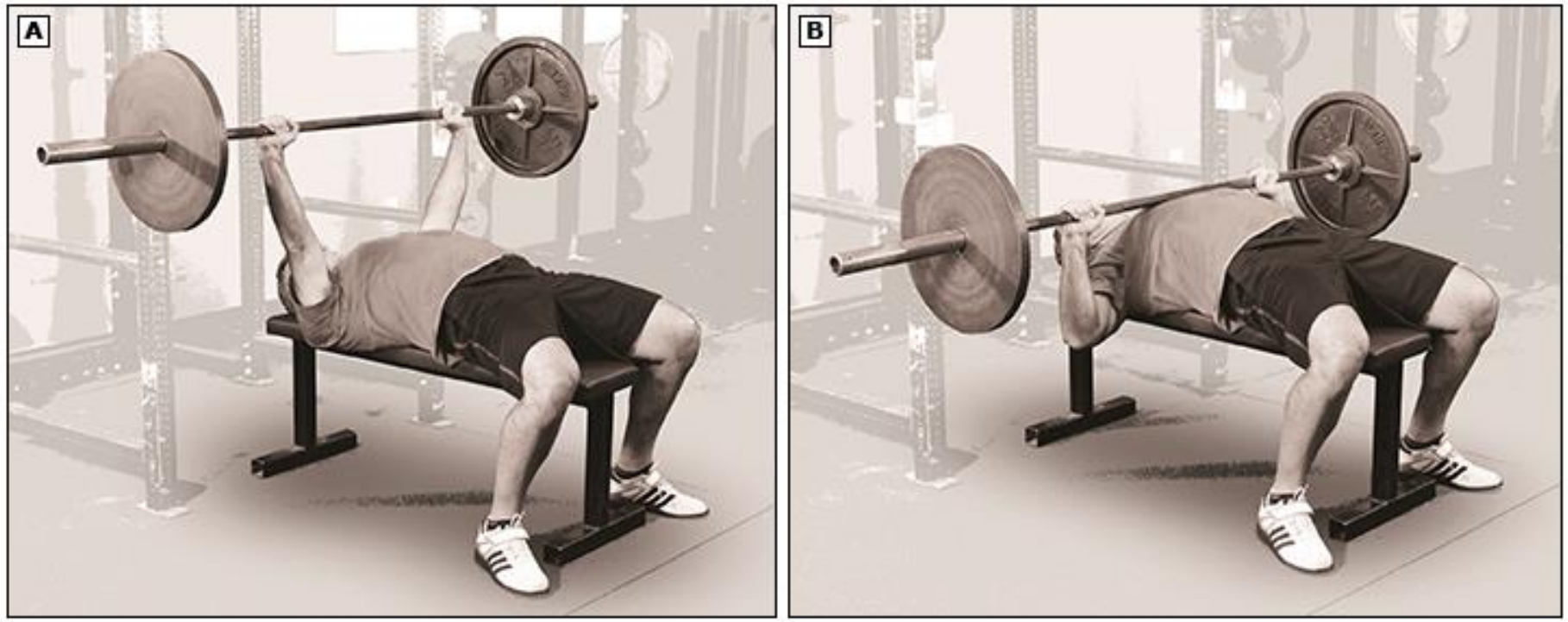
UpToDate®

What lifts to start with?

Learn the lifts that move the most muscle in the least amount of time:

- Bench Press
- Deadlift
- Squat
- Standing Press

Bench press



This exercise or one of its variants is accessible to most patients, even those with moderate to severe weakness and deconditioning. It produces massive improvements in upper-body strength and improves patient confidence and compliance with training.

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Barbell deadlift

In this exercise, a barbell or other weight is lifted straight from the floor to a standing position. Arm strength is not used to lift the bar, only to hold it; power comes from the hips and lower extremities, with concomitant training of the stabilizing musculature of the back and trunk.

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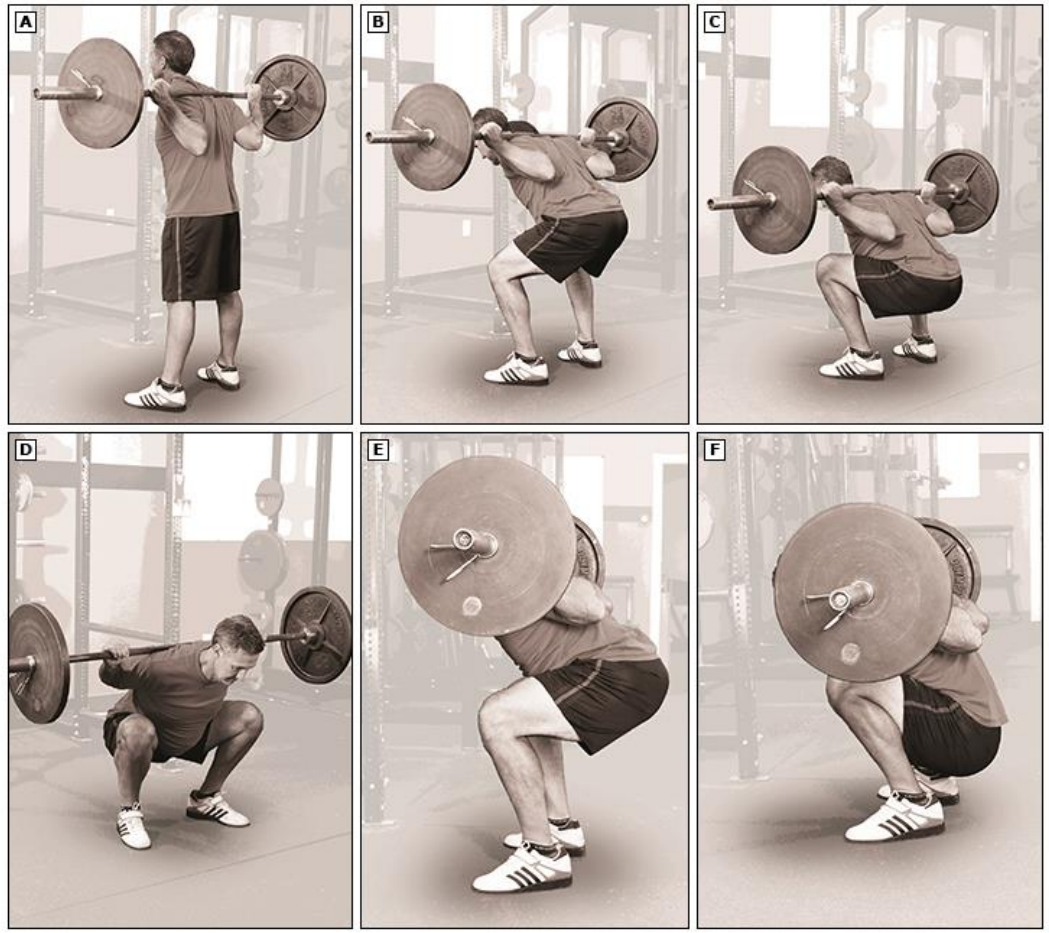
Low-bar back squat



In the barbell back squat (figures A-D), the bar is carried on the back and the hips are lowered and raised through a complete range of motion, with the hips descending just below the level of the knee joint at the bottom position (figures C and D). In figure E, the trainee has not achieved sufficient depth; in figure F, the trainee has descended too far. Note how throughout the exercise, the back is kept in a neutral position (without rounding or hyperextension) and the knees and feet are kept in the same sagittal plane.

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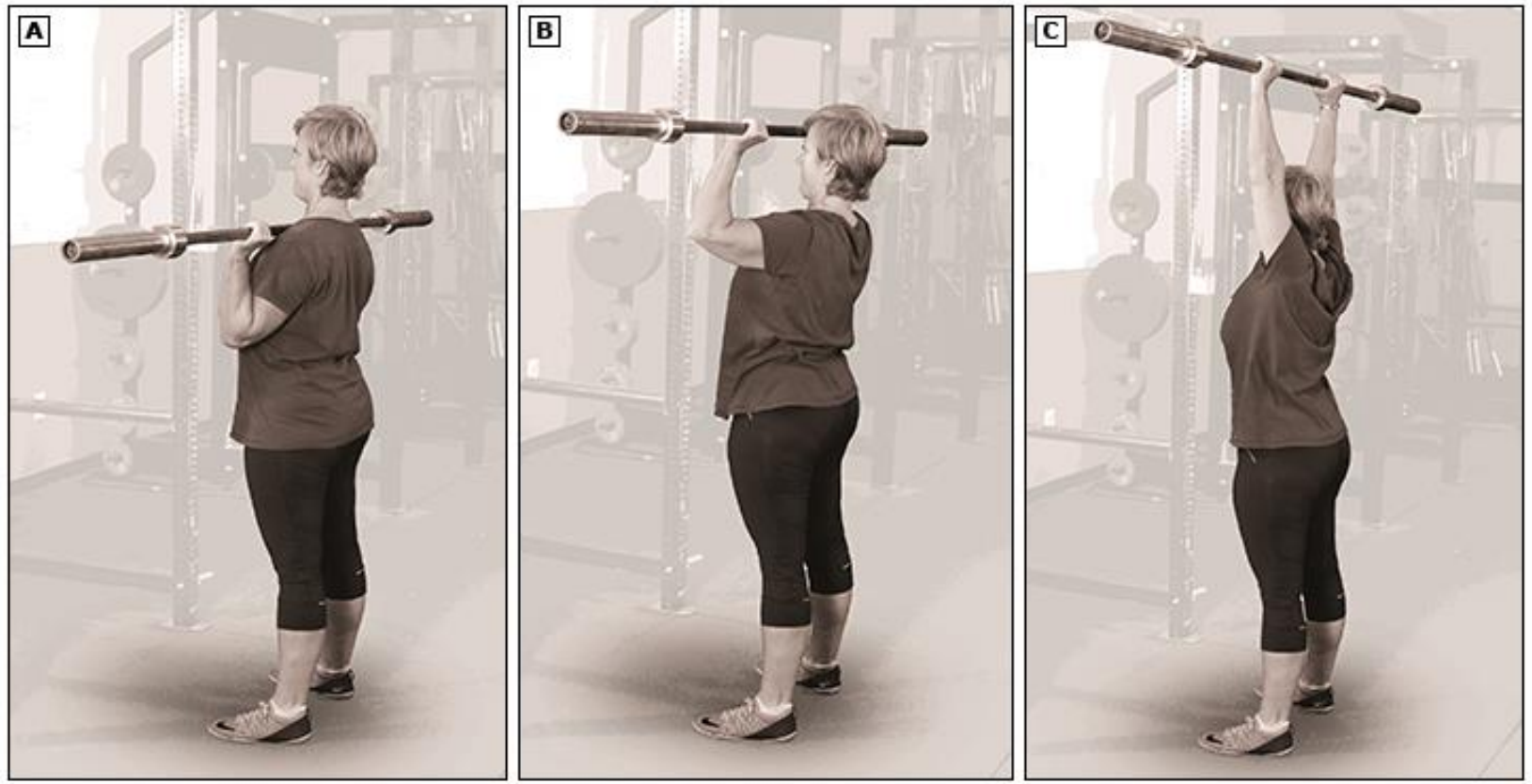
Overhead barbell press



In this exercise, the patient lifts the barbell straight up to a position directly over the shoulder joints. This exercise requires and therefore trains not only shoulder and upper extremity strength and mobility, but also balance, proprioception, and strength of the legs and trunk.

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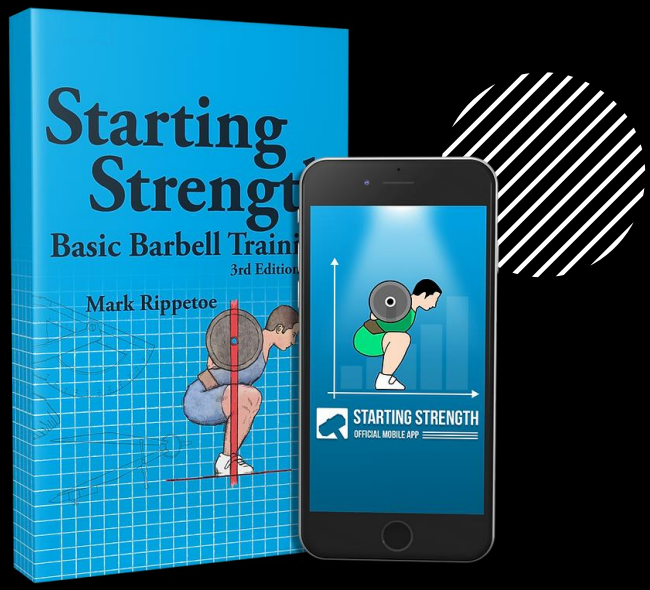
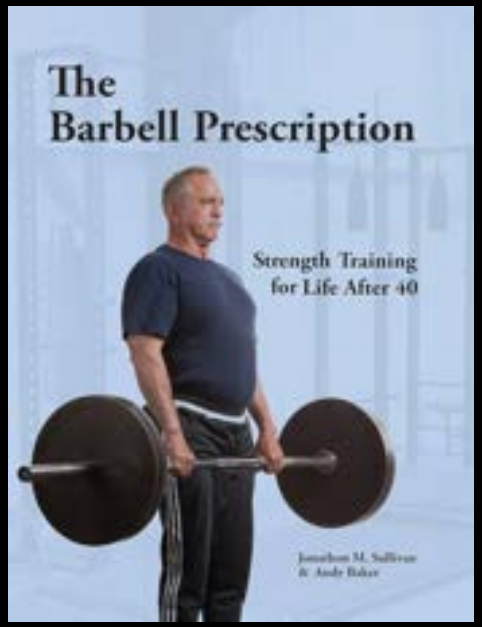
How to learn the lifts

- Starting Strength App and Book
- Barbell Prescription





What workout to start with?

Novice barbell strength training program

Workout A		
Exercise (preferred; most effective)	**Alternatives (based on resources and patient limitations)**	**Volume (repetitions [reps] × sets; frequency)***
Barbell back squat	Leg press, box squats (assisted or unassisted), goblet squats, front squats	5 reps × 3 sets; 2 to 3 sessions/week
Barbell bench press	Incline bench press, dumbbell bench press, narrow-grip bench press	5 reps × 3 sets; 1 to 2 sessions/week
Deadlift	Kettlebell deadlift, rack pulls	5 reps × 1 set; 2 to 3 sessions/week After 2 to 3 weeks, deadlift is gradually reduced to no more than once weekly
Workout B		
Exercise (preferred; most effective)	**Alternatives (based on resources and patient limitations)**	**Volume (reps × sets; frequency)**
Barbell back squat	Leg press, box squats (assisted or unassisted), goblet squats, front squats	5 reps × 3 sets; 2 to 3 sessions/week
Barbell overhead press	Seated dumbbell press, T-bar rows, standing barbell or dumbbell curls	5 reps × 3 sets; 2 to 3 sessions/week
Deadlift	Kettlebell deadlift, rack pulls	5 reps × 1 set; 2 to 3 sessions/week After 2 to 3 weeks, deadlift is gradually reduced to no more than once weekly

Please refer to UpToDate topics for additional details about exercises and programming for particular patient populations.

*Repetitions, sets, and volume apply to work sets only; warm-up sets are not included.

Courtesy of Jonathon Sullivan, MD.

UpToDate®

Common misconceptions about strength training

The following statements are true:

- Holding the breath (Valsalva maneuver) is a natural and unavoidable response to lifting a heavy load. It is safe in trainees without vascular abnormalities.
- Resistance training is not contraindicated by uncomplicated pregnancy.
- Properly prescribed and supervised strength training is beneficial and safe for children and adolescents, and it does not impair growth.
- Properly performed strength training is beneficial to patients with osteoarthritis (OA).
- Properly performed strength training improves hypertension
- Properly performed strength training improves mobility.
- Properly performed strength training (as opposed to bodybuilding) does not cause females to develop a bulky, excessively muscular appearance.

Riebe D, Franklin BA. Practical Guidelines for Implementing a Strength Training Program for Adults [Internet]. UpToDate; 2024 [cited 2024 May 4]. Available from: https://www.uptodate.com/contents/practical-guidelines-for-implementing-a-strength-training-program-for-adults

Sport or Activity Injuries per 100 participation hours

- Soccer 6.2
- Rugby 1.92
- Basketball 1.03
- U.S. Track-and-Field 0.57
- Cross-country 0.37
- U.K. Track-and-Field 0.26
- Physical Education 0.18
- Football 0.1 Squash 0.1
- Tennis 0.07
- Badminton 0.05
- Gymnastics 0.044
- Weight Training 0.0012
- Powerlifting (competitive) 0.0008
- Weightlifting (competitive) 0.0006

From Hamill, B. “Relative Safety of Weightlifting and Weight Training,” Journal of Strength and Conditioning Research 8(1):53-57, 1994. -Rippetoe, Mark. Starting Strength (pp. 655-656). The Aasgaard Company. Kindle Edition.

Most can safely participate…
UpToDate 2024

Conclusions

- Emotions are predictions constructed by the brain and are based on the voluntary and involuntary experiences it is subjected to. The brain's may or may not be accurate.
- The brain's future predictions (including emotions) can be influenced by the way we choose to interpret and engage with the thoughts, physical sensations, and behavioral urges that are associated with present emotions
- Consistent and conscientious effort to wisely utilize media, mindfulness, and movement can decrease our risk for emotional disorders.

We see what we seek.

We become what we do.

"Sometimes we’re responsible for things not because they’re our fault, but because we’re the only ones who can change them"

-Dr Lisa Feldman Barrett