RUSSELL FROHARDT, PH.D.

DEAN OF ACADEMIC SUCCESS, NORTHWEST VISTA COLLEGE

ALAMO WELL

ERS®

Behavioral Neuroscience of Adaptability: Changing Habits

Welcome to the webcast! We will be starting shortly. In the meantime, you can download handouts and ask questions.

Raise your hand

Ask a question

Download Handouts

Want answers?

Ask the staff a question

Exit

Send

Trivia Question

Framework

Your Adaptive Brain

4 Laws of Habit Formation

Using the Science to Your Advantage

Who is Dr. Russ?

Born in Denver, Colorado

Grew up in Aurora, Colorado

Academics

Undergraduate at University of Colorado, Boulder

Graduate at University of Vermont, Burlington

Postdoc at Dartmouth College, Hanover

13 Years as Professor at St. Edward's

6 Years as Dean at NVC

My Research

Undergraduate Honors Thesis:

Conditioned morphine tolerance and hyperalgesia in the rat.

Masters Thesis:

The effects of intrahippocampal infusion of the metabotropic glutamate receptor (mGluR) antagonist (R,S)-α-methyl-4-carboxyphenylglycine (MCPG) on **conditioned** fear.

My Research

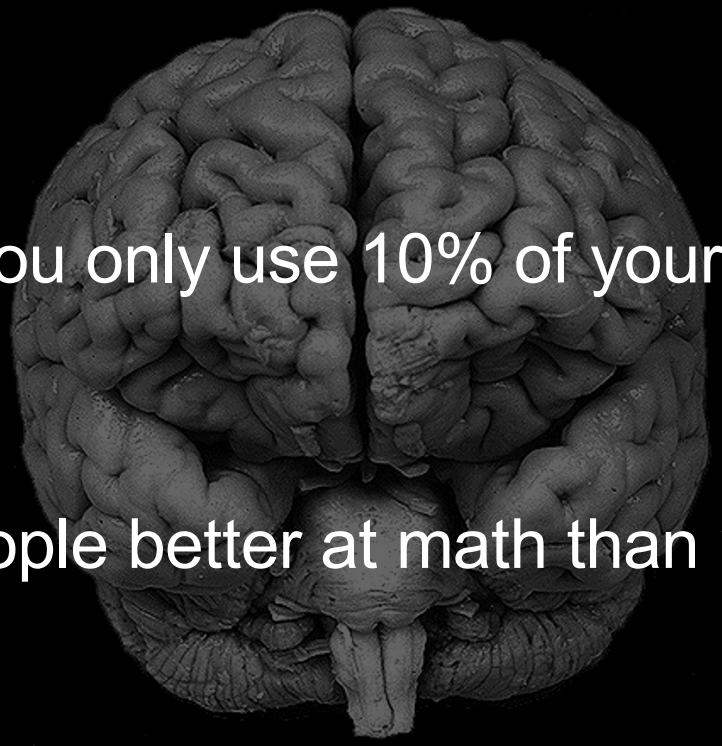
Dissertation Thesis:

Frohardt, R. (2009). Investigating the neural substrates of relapse behavior: The role of the hippocampus, bed nucleus of the stria terminalis, and nucleus accumbens in contextual fear **conditioning** and reinstatement. *Saarbrücken, Germany: VDM Verlag.*

Reinstatement = Model of Relapse Behavior

Examples: Drug Relapse, Phobias, Anxiety, Panic

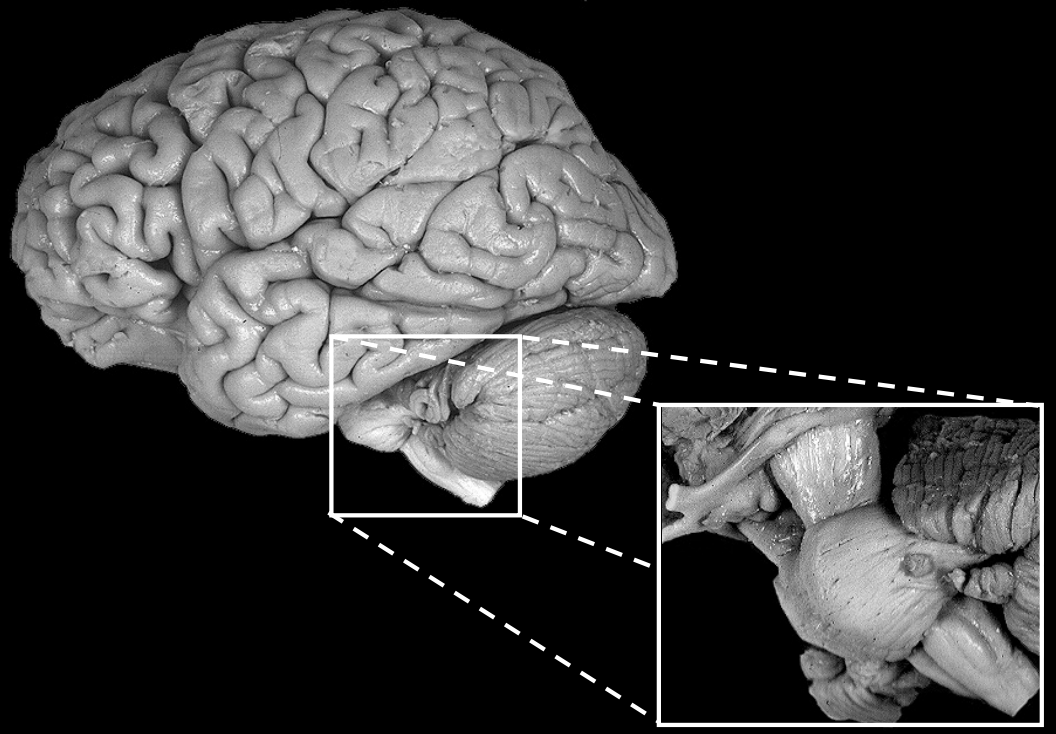
Neuroscience Myth-Busting



Do you only use 10% of your brain?

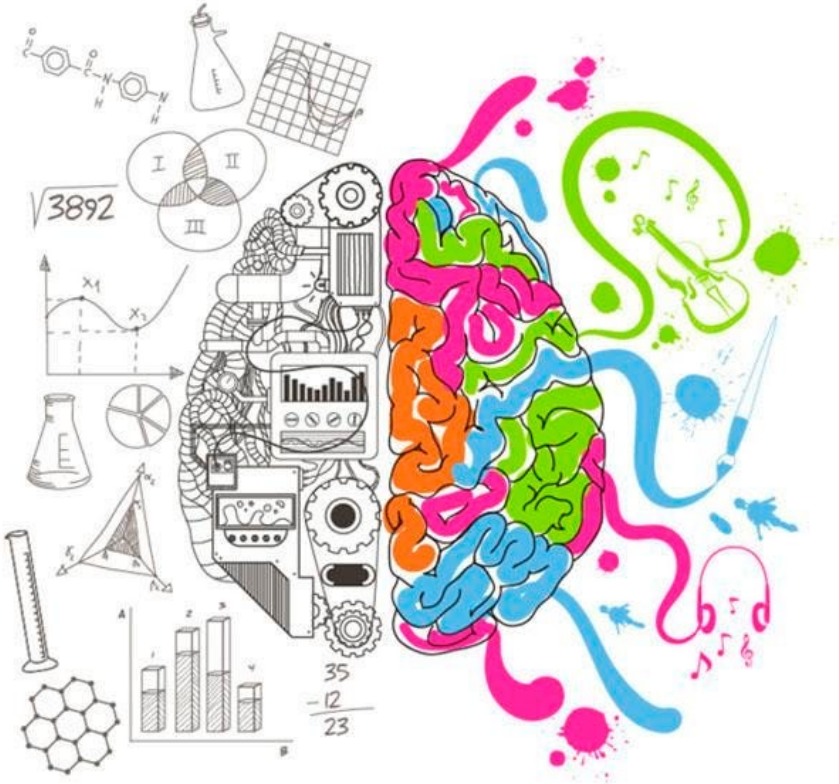
Are ‘left-brain’ people better at math than ’right-brain’ people?

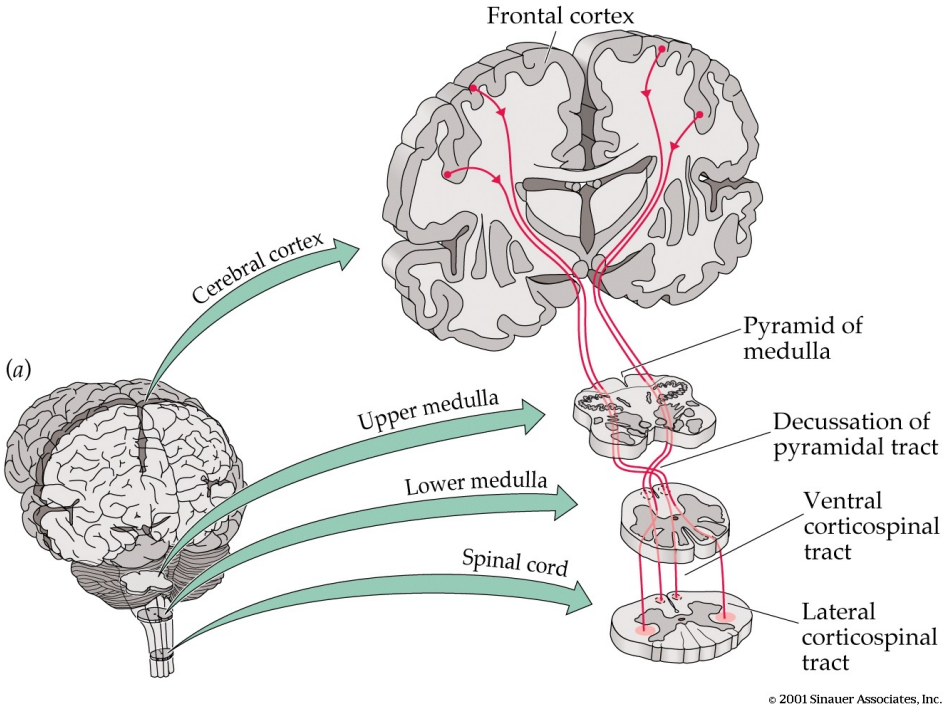
You only use about 10% of your brain?



You need this much
(> 10%) to stay alive!

There is little evidence for hemispheric dominance, although it is popularized in media.





Framework

Your Adaptive Brain

Sensation & Perception, Learning & Memory, Cognition, Emotion & Arousal, Executive Function

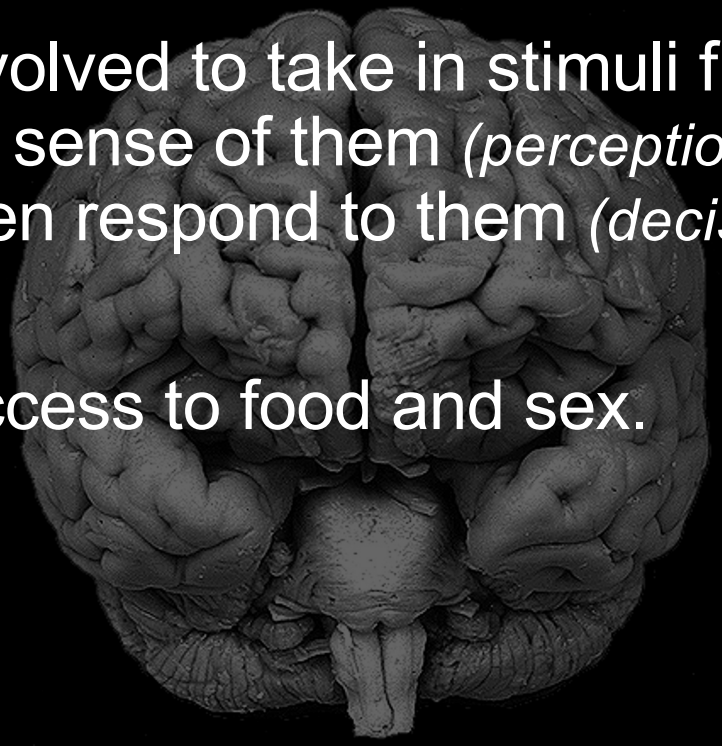
4 Laws of Habit Formation

Using the Science to Your Advantage

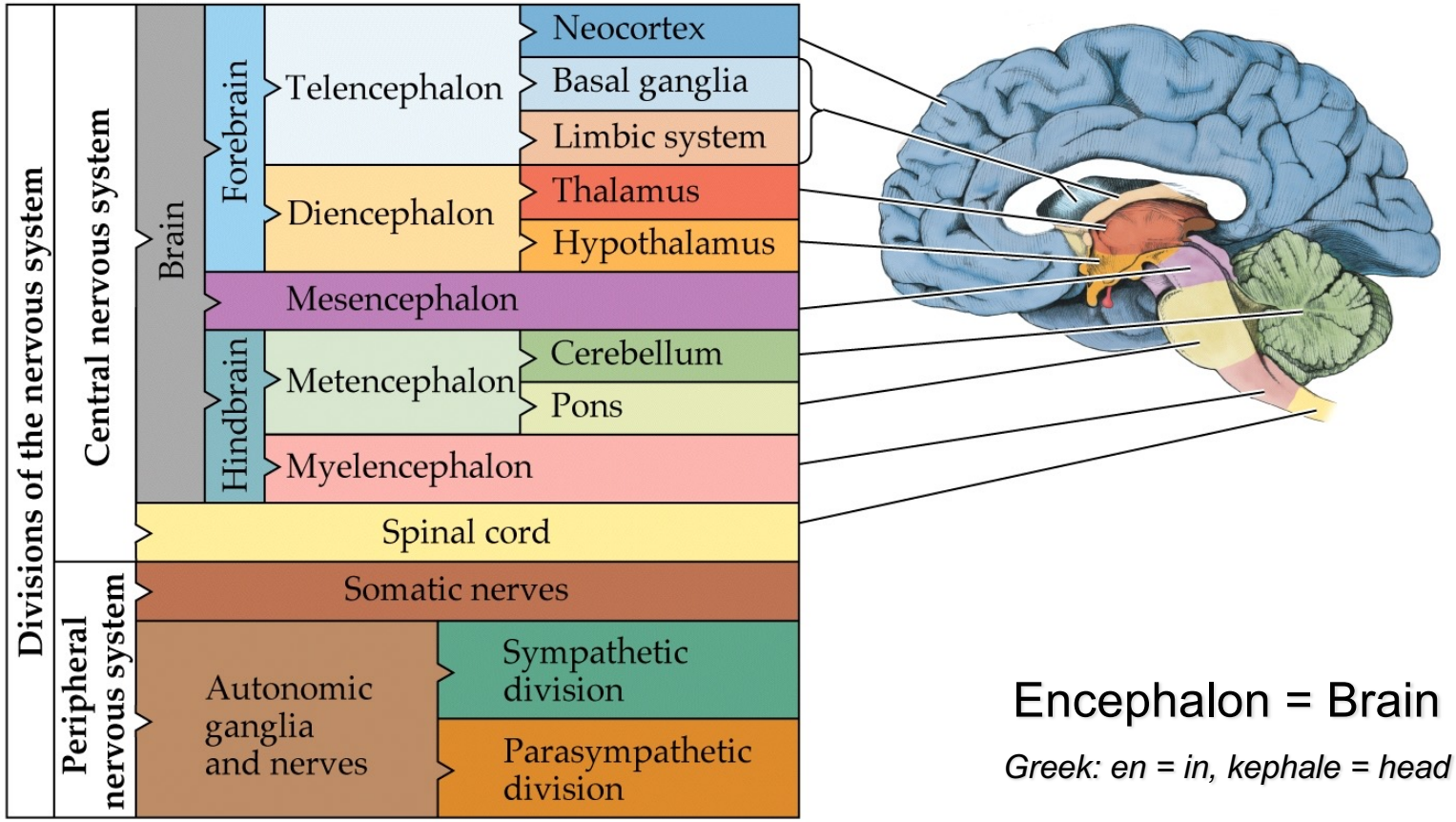
Neuroscience of Habit Formation

Human brains evolved to take in stimuli from the world *(sensation)*, make sense of them *(perception / learning / cognition)*, and then respond to them *(decisions / behavior)*.

Mostly to gain access to food and sex.



Subdivisions of the Brain

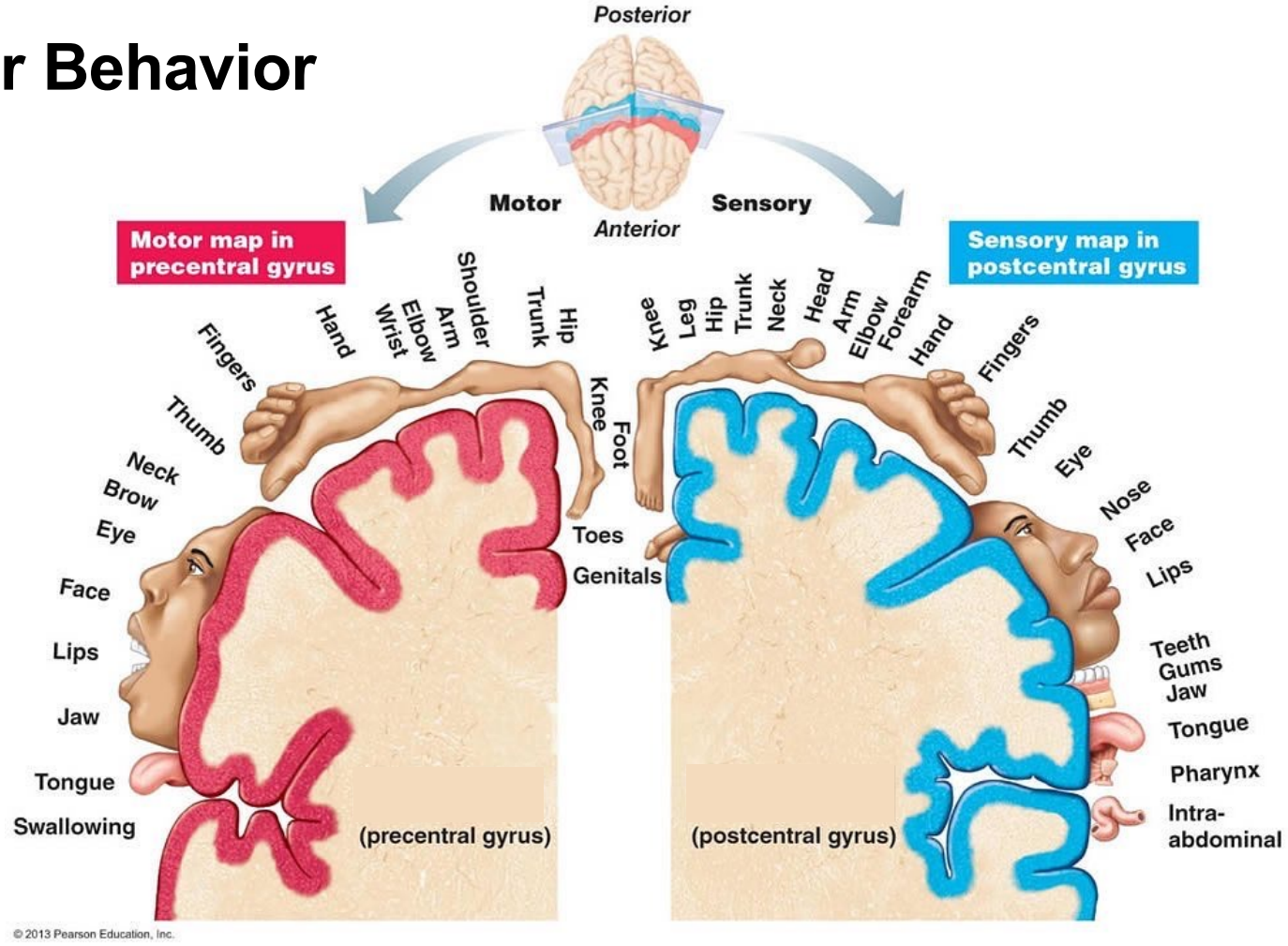


Encephalon = Brain

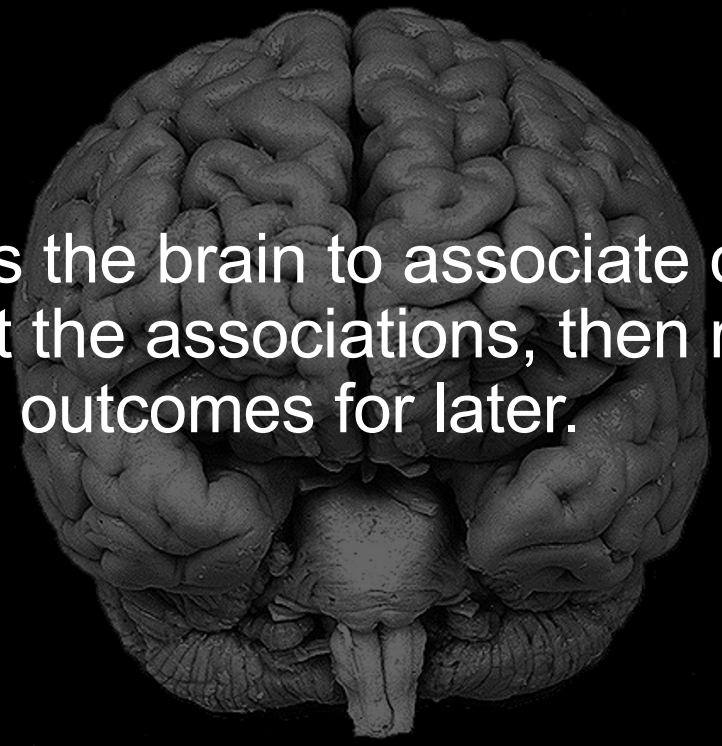
Greek: en = in, kephale = head

Sensation & Motor Behavior

Homunculus
(Little Man)



Neuroscience of Habit Formation



Learning requires the brain to associate cues, make predictions about the associations, then remember the associations and outcomes for later.

Learning

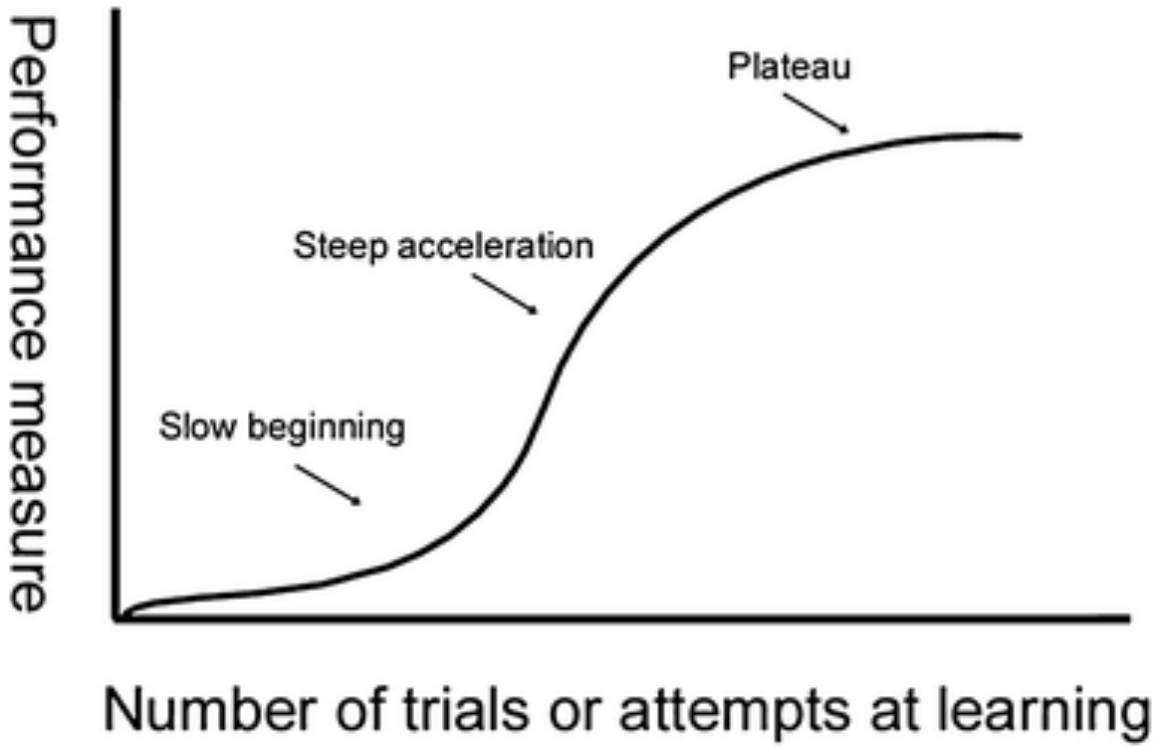
Operant Conditioning

Subject learns behavior by associating it with consequences.

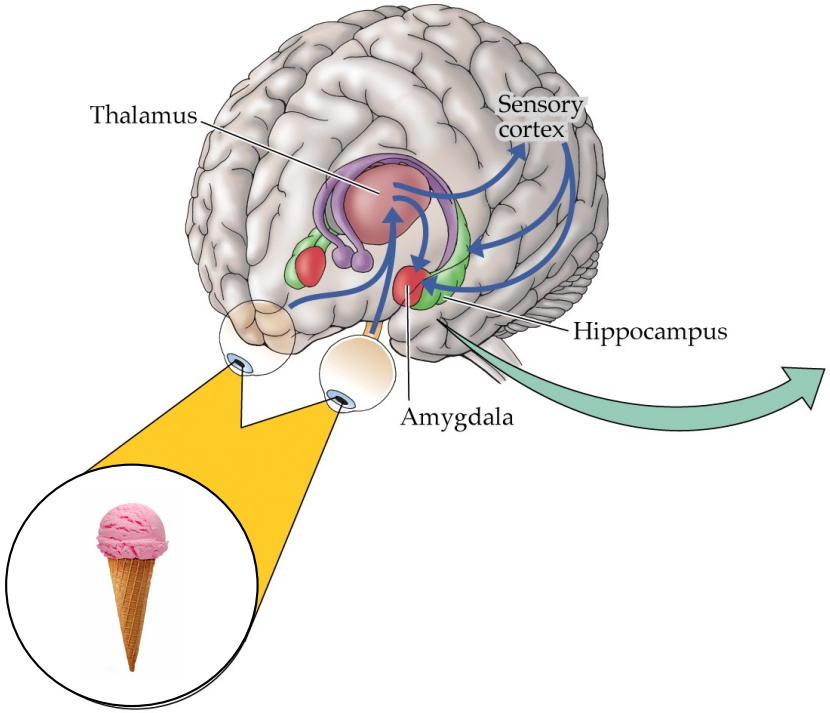
Classical Conditioning

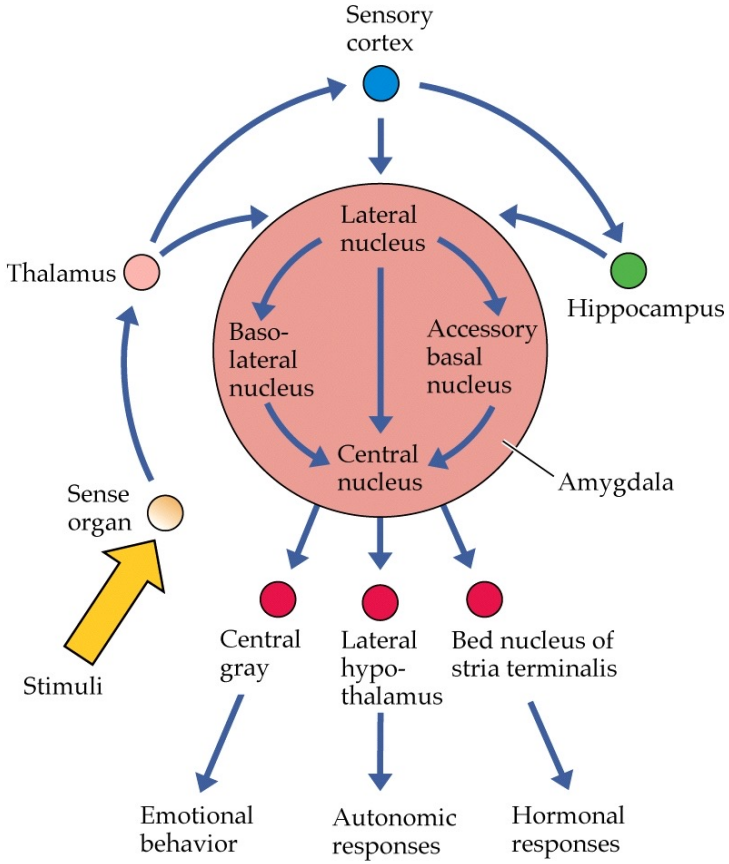
Subject learns to associate two unrelated stimuli with each other.

Learning Curve

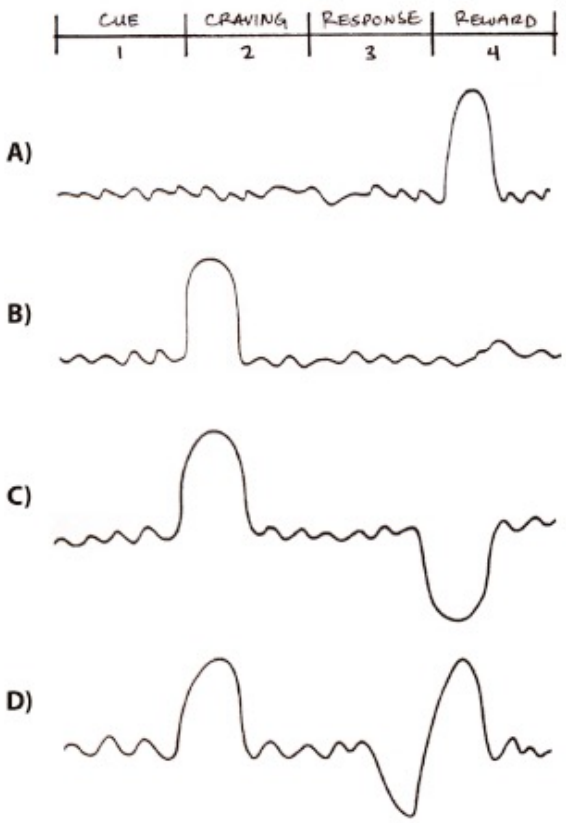


The Emotional Brain





Dopamine Spike



Trial 1: REWARD (Acquisition)

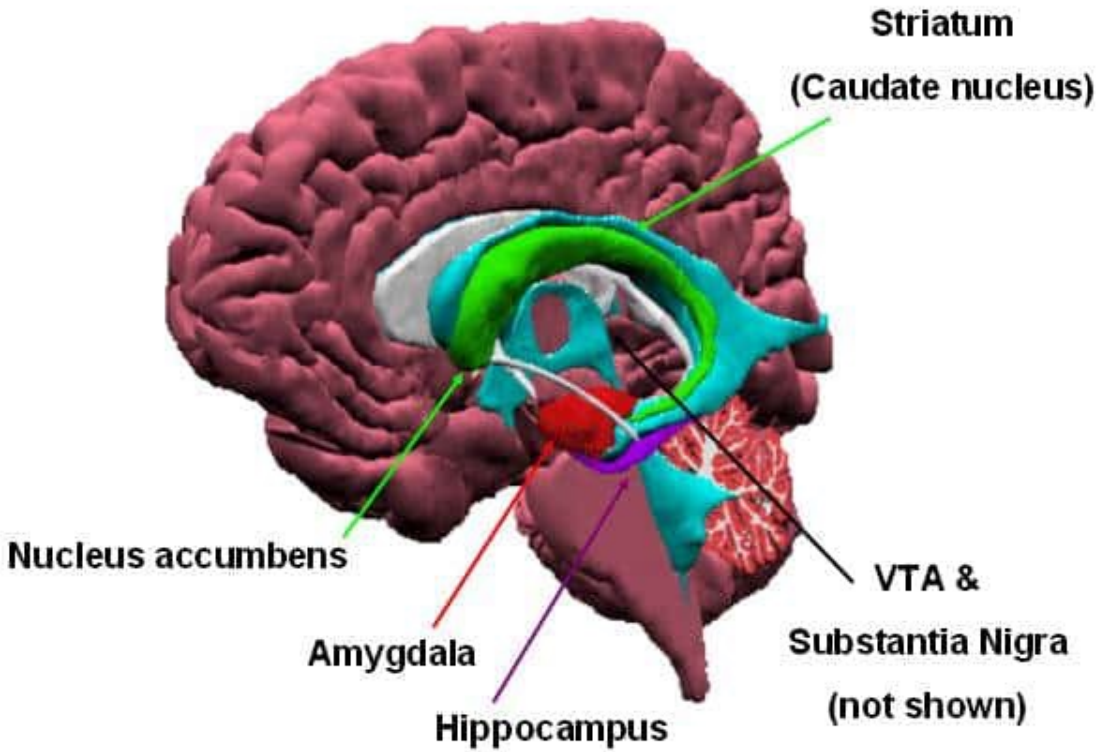
Trial 2: Anticipation

NO Reward: Disappointment (Extinction)

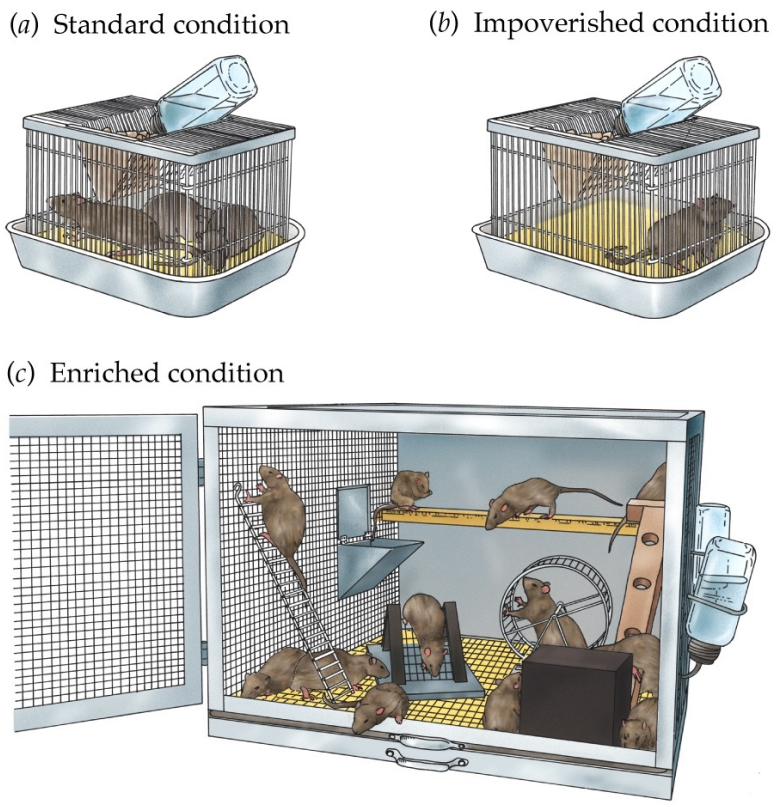
Delayed Reward

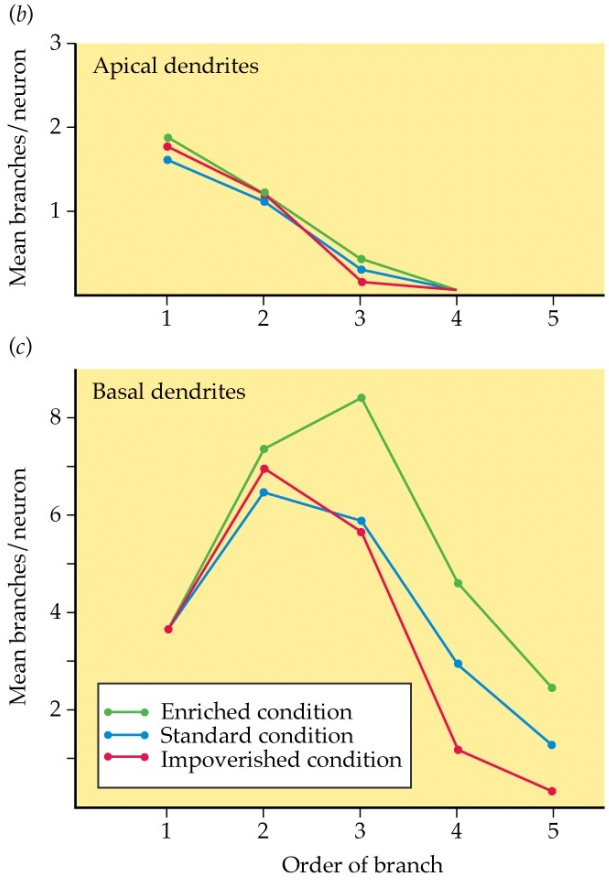
https://jamesclear.com/

Dopamine System

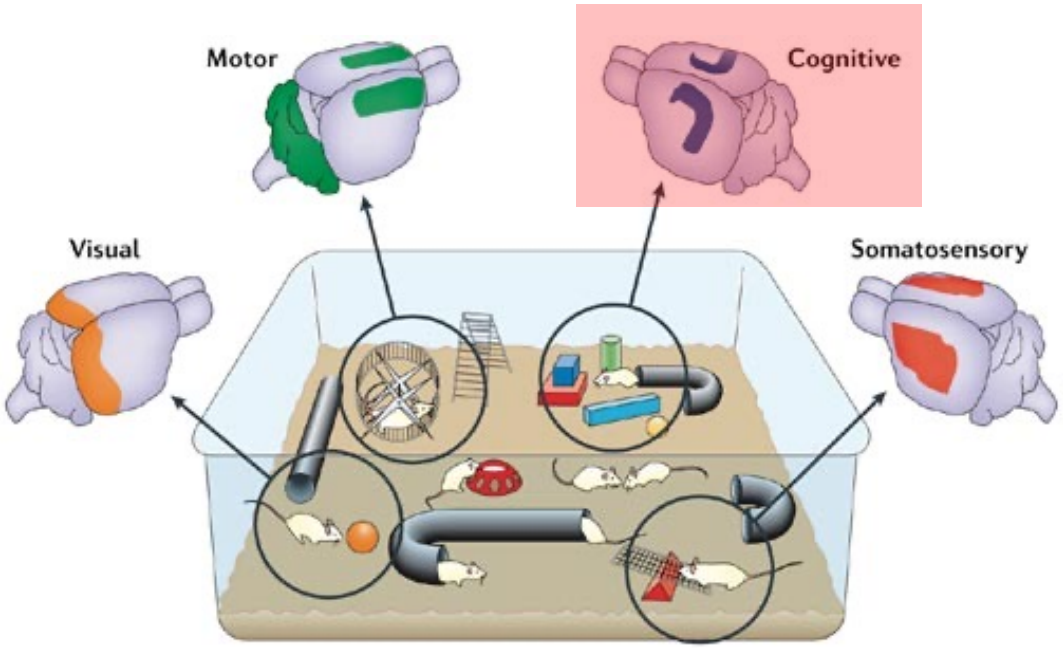


The structure of the brain can change by being in a stimulating environment / context



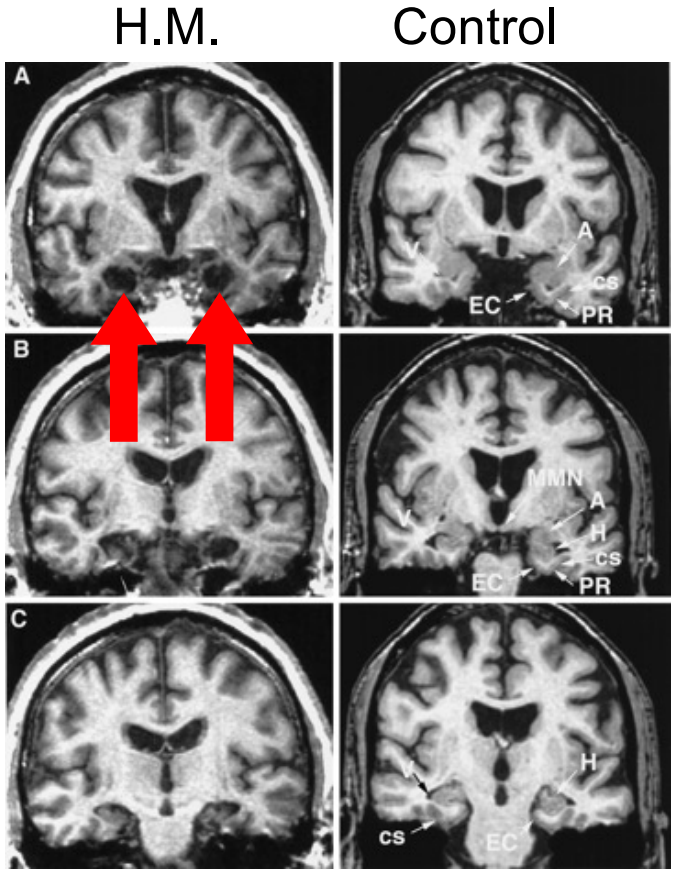


Some of the specific areas of the brain that are changed by different components of enrichment.



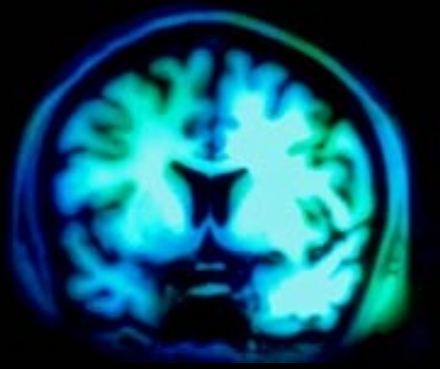
Forming Memory
Patient: H.M.

- Damage the **hippocampus** or frontal lobes results in anterograde amnesia
- Helped us discover different types of memory and relevant brain areas



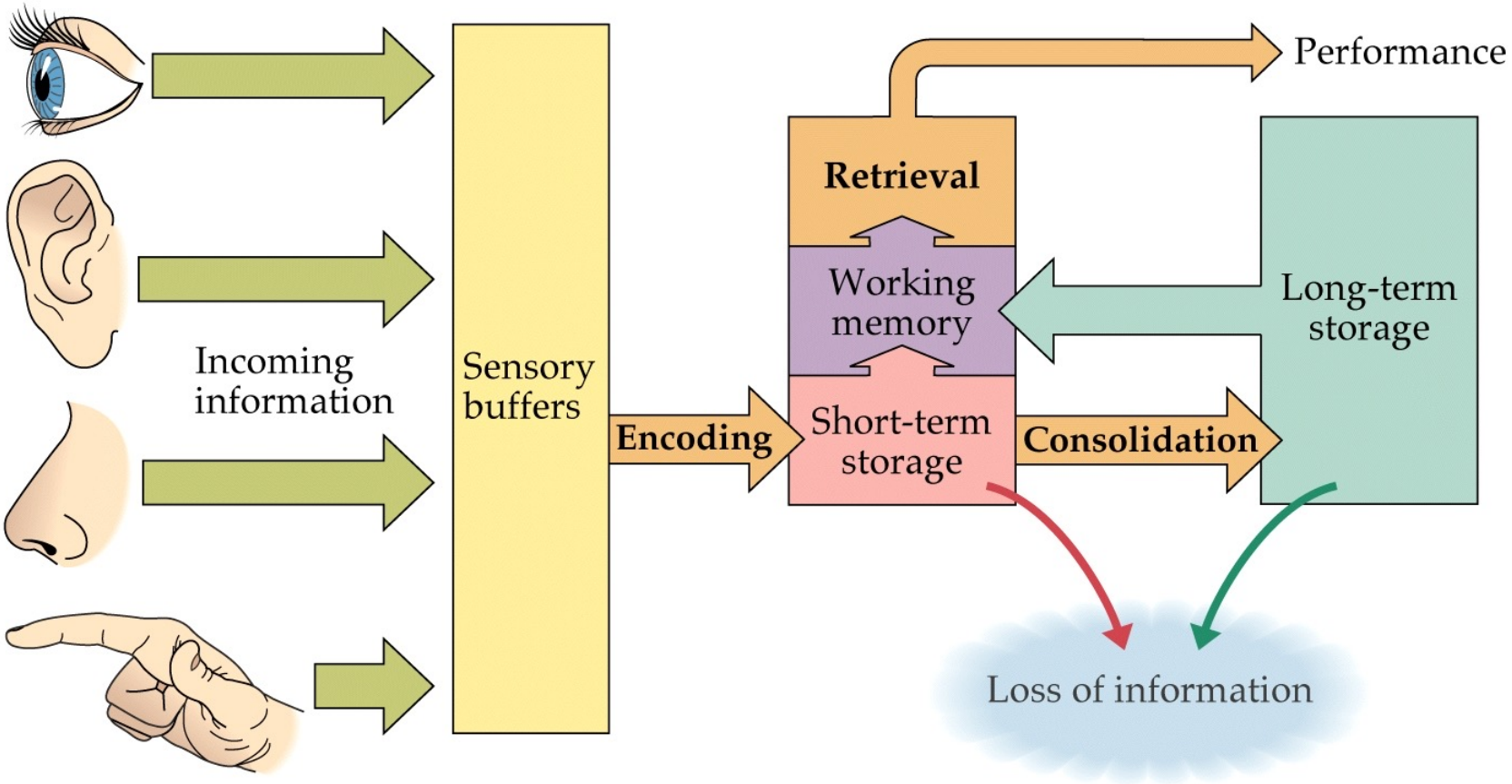
Clive Wearing

- Musician, composer and world-famous expert on Renaissance music.
- 1985, Viral (Herpes Simplex) Encephalitis (brain inflammation)
  - –Destroyed large parts of Medial Temporal Lobe and Inferior Frontal Cortex
- “Just woken up”
- Severe *anterograde* amnesia *(Explicit)*
- Temporally-graded *retrograde* amnesia
- Musical abilities preserved! *(Implicit)*



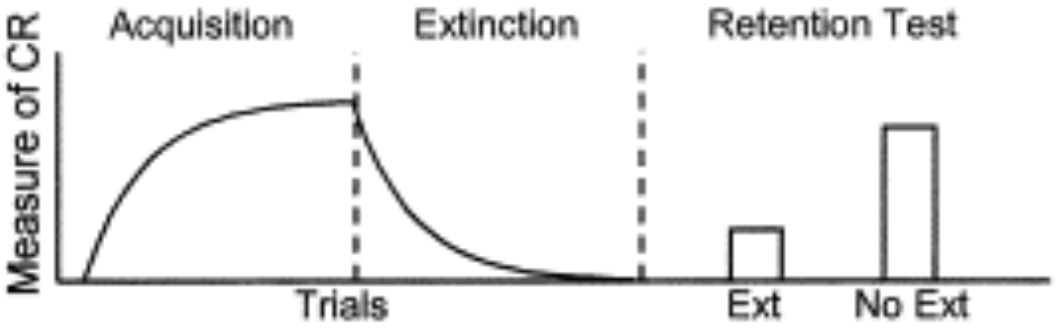
Clive Wearing Video

Expanded Model of Memory

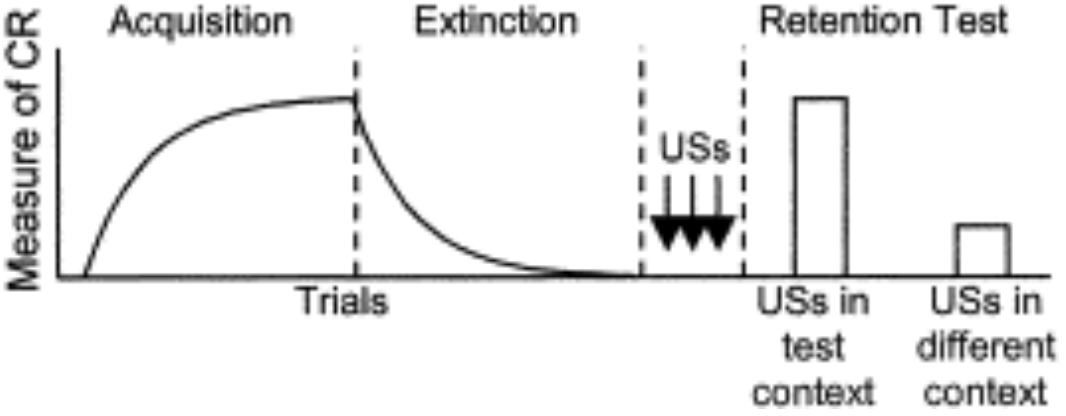


Extinction Effects

Extinction is not the same as forgetting



Reinstatement



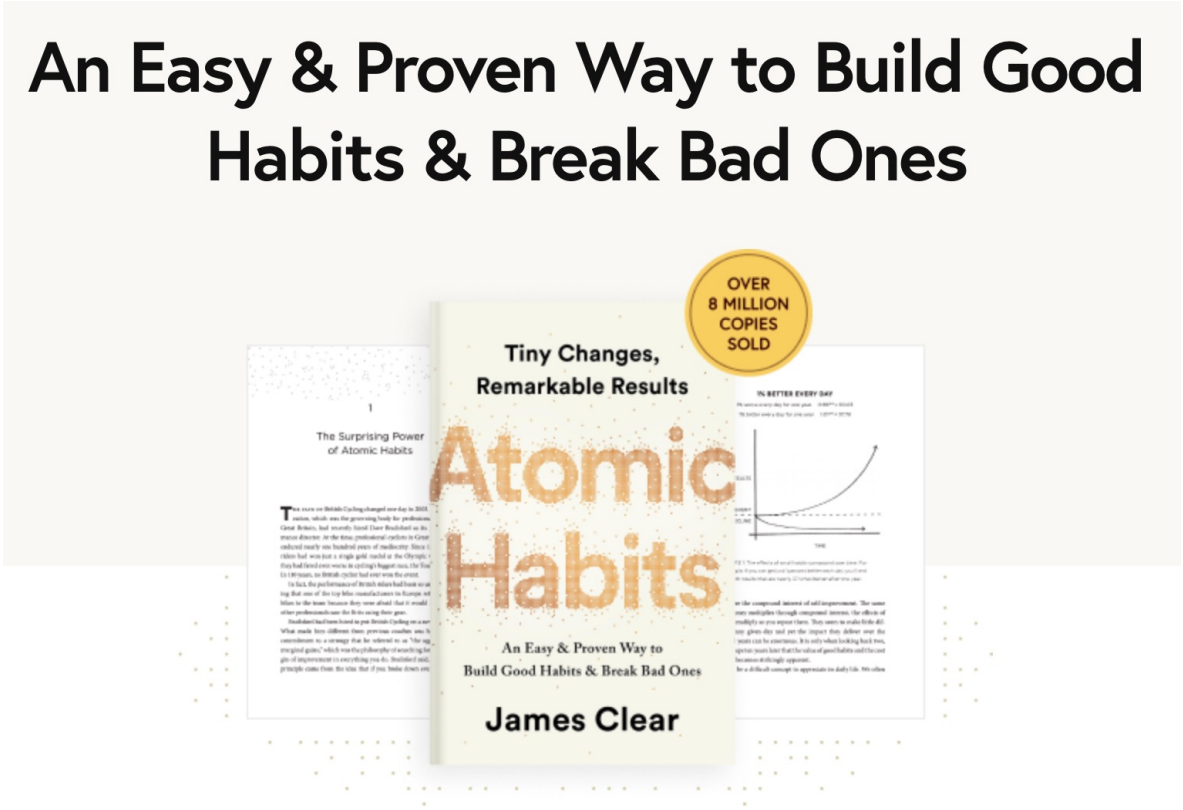

Questions

Habits:

Describe a habit that you would like to establish.

Describe a habit that you would like to break or change.

Adaptation Through Habit Change

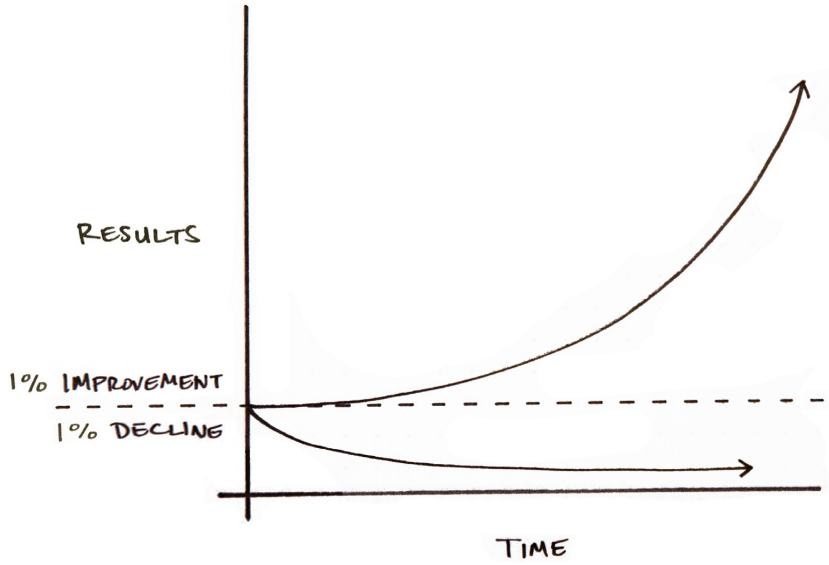


https://jamesclear.com/

Incremental Change

1% worse every day for one year. $0.99^{365} = 00.03$

1% better every day for one year. $1.01^{365} = 37.78$



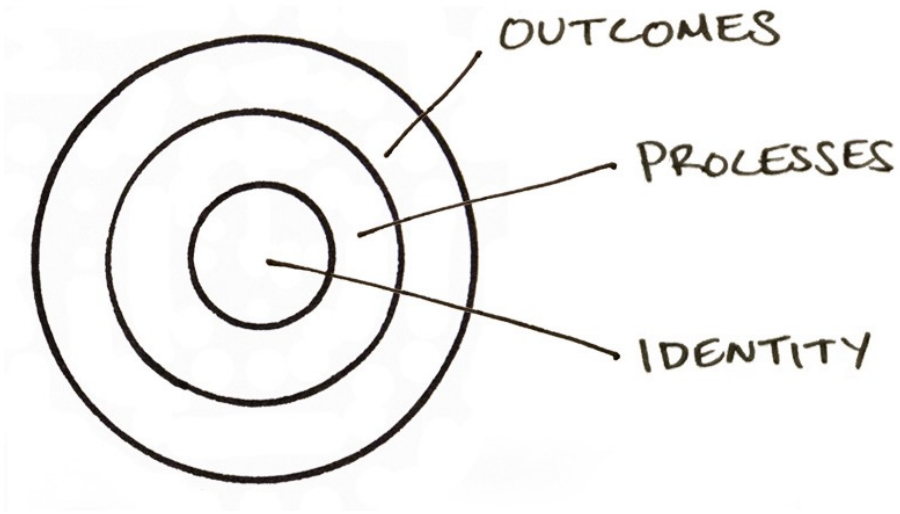
37 TIMES BETTER!

https://jamesclear.com/

3 Layers of Behavior Change

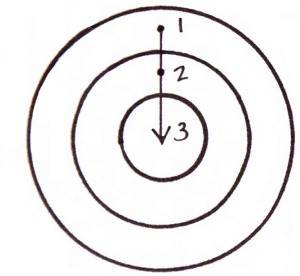
Who are you?

Who do you want to become?



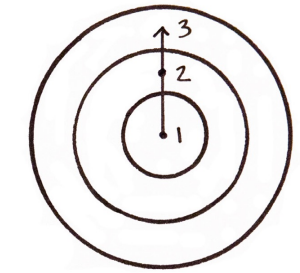
https://jamesclear.com/

OUTCOME-BASED HABITS



Focus on **what** you want to **achieve**

IDENTITY-BASED HABITS



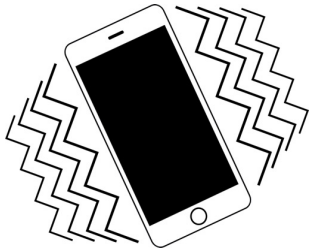
Focus on **who** you wish to **become**

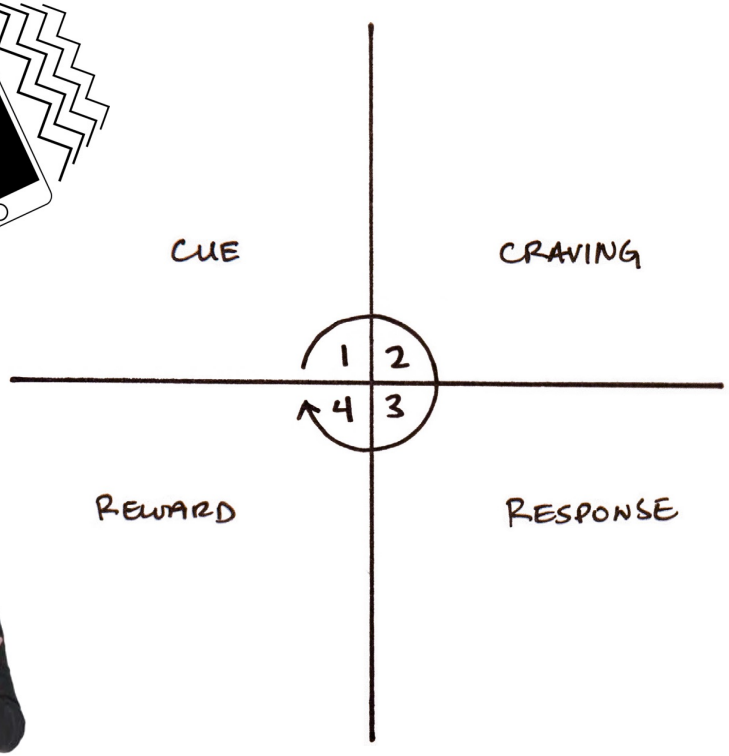
4 Laws of Habit Formation

1. Make it OBVIOUS
2. Make it ATTRACTIVE
3. Make it EASY
4. Make it SATISFYING

https://jamesclear.com/

The Habit Loop





https://jamesclear.com/

Make it Easy

Motivation: Turn up the water, increase friction.
Habit: Release the pinch in the hose, reduce friction.

https://jamesclear.com/

Design Your Environment for Ease

Be Proactively Lazy: Prep the gym bag the night before.
Put it in Your Path: Make the behavior unavoidable.

https://jamesclear.com/

Habit Stacking

After _____ ,

CURRENT HABIT

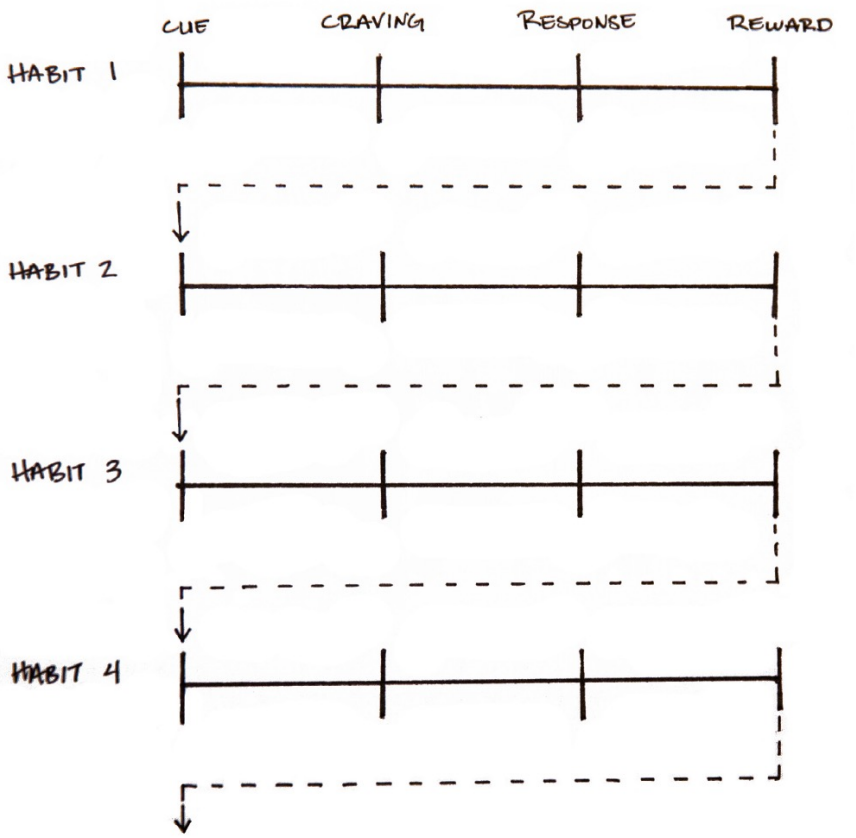
I will _____ .

NEW HABIT

Example: After I turn on the shower, I will do five push ups.

https://jamesclear.com/

Habit Stacking



Once you learn to stack two habits, you can stack multiple habits.

https://jamesclear.com/

How to Create a Good Habit

The 1st Law	Make It Obvious
1.1	Fill out the Habits Scorecard. Write down your current habits to become aware of them.
1.2	Use implementation intentions: "I will [BEHAVIOR] at [TIME] in [LOCATION]."
1.3	Use habit stacking: "After [CURRENT HABIT], I will [NEW HABIT]."
1.4	Design your environment. Make the cues of good habits obvious and visible.
The 2nd Law	**Make It Attractive**
2.1	Use temptation bundling. Pair an action you want to do with an action you need to do.
2.2	Join a culture where your desired behavior is the normal behavior.
2.3	Create a motivation ritual. Do something you enjoy immediately before a difficult habit.

The 3rd Law	Make It Easy
3.1	Reduce friction. Decrease the number of steps between you and your good habits.
3.2	Prime the environment. Prepare your environment to make future actions easier.
3.3	Master the decisive moment. Optimize the small choices that deliver outsized impact.
3.4	Use the Two-Minute Rule. Downscale your habits until they can be done in two minutes or less.
3.5	Automate your habits. Invest in technology and onetime purchases that lock in future behavior.
The 4th Law	**Make It Satisfying**
4.1	Use reinforcement. Give yourself an immediate reward when you complete your habit.
4.2	Make "doing nothing" enjoyable. When avoiding a bad habit, design a way to see the benefits.
4.3	Use a habit tracker. Keep track of your habit streak and "don't break the chain."
4.4	Never miss twice. When you forget to do a habit, make sure you get back on track immediately.

https://jamesclear.com/

How to Break a Bad Habit

Inversion of the 1st Law	Make It Invisible
1.5	Reduce exposure. Remove the cues of your bad habits from your environment.
Inversion of the 2nd Law	**Make It Unattractive**
2.4	Reframe your mindset. Highlight the benefits of avoiding your bad habits.
Inversion of the 3rd Law	**Make It Difficult**
3.6	Increase friction. Increase the number of steps between you and your bad habits.
3.7	Use a commitment device. Restrict your future choices to the ones that benefit you.
Inversion of the 4th Law	**Make It Unsatisfying**
4.5	Get an accountability partner. Ask someone to watch your behavior.
4.6	Create a habit contract. Make the costs of your bad habits public and painful.

https://jamesclear.com/

Framework

Your Adaptive Brain

4 Laws of Habit Formation

Using the Science to Your Advantage

Start with IDENTITY

Follow the Laws & Processes for Good and Bad Habits

Be Proactively Lazy

Design Your Environment for Ease

Take Advantage of the Neuroscience


Questions

Thank You!