

COGS 164

# Motivation of Cannabis Use

Group 13



# Overview

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Introduction to  
cannabis

2

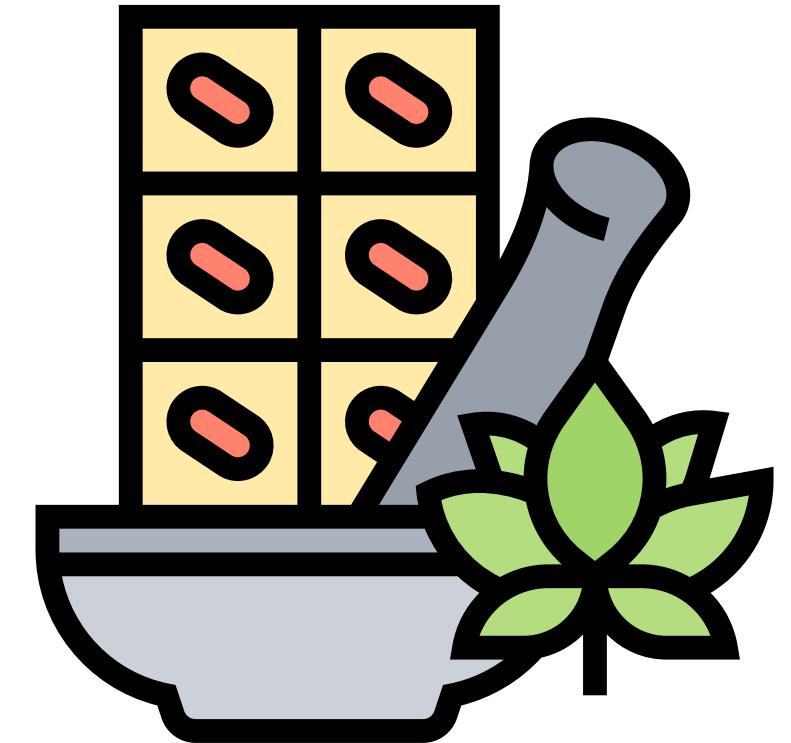
Neurobiology

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# Introduction



## Research Question

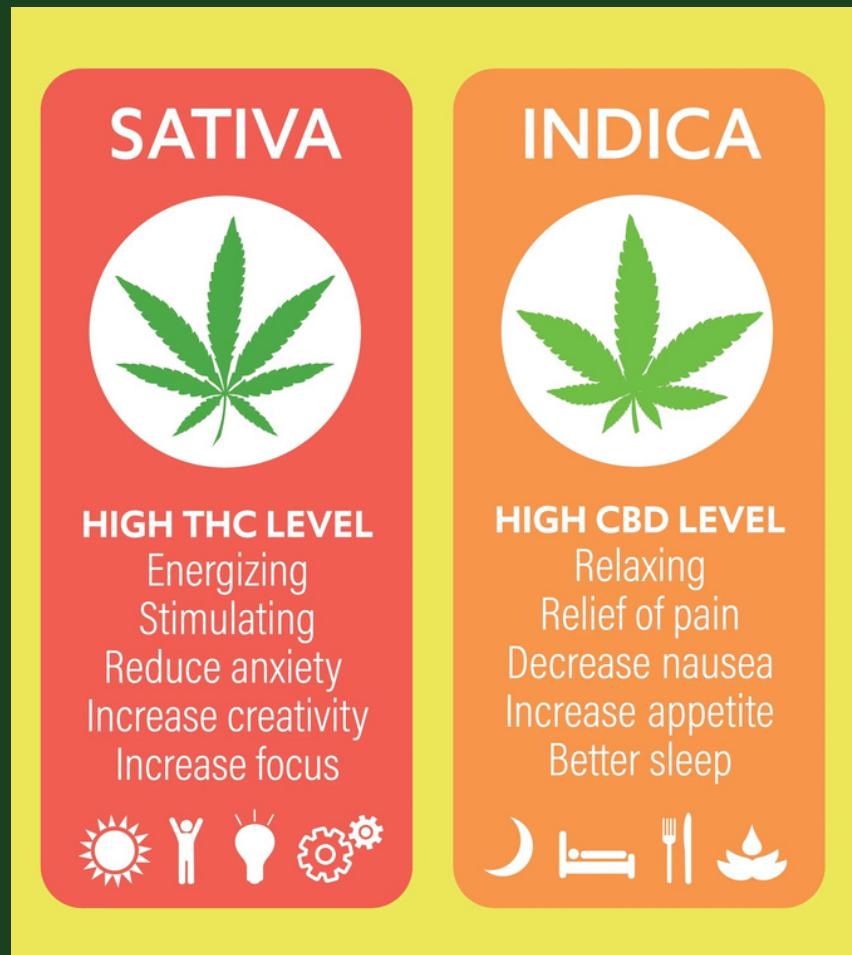
How does an individual's motivation influence the selection of specific cannabis strains, and what is the impact of strain choice on emotional regulation?



## Hypothesis

College students that prefer strains of sativa over indica will display higher levels of emotional dysregulation.

# Background



THINK IT.  
WANT IT.  
GET IT



## Cannabis

ORIGIN

TERPENES

CHEMOVARS

## Cognitive Effects

IMPAIRMENT

SHORT TERM

LONG TERM

## Motivation

ENJOYMENT

CONFORMITY

EXPERIMENTATION

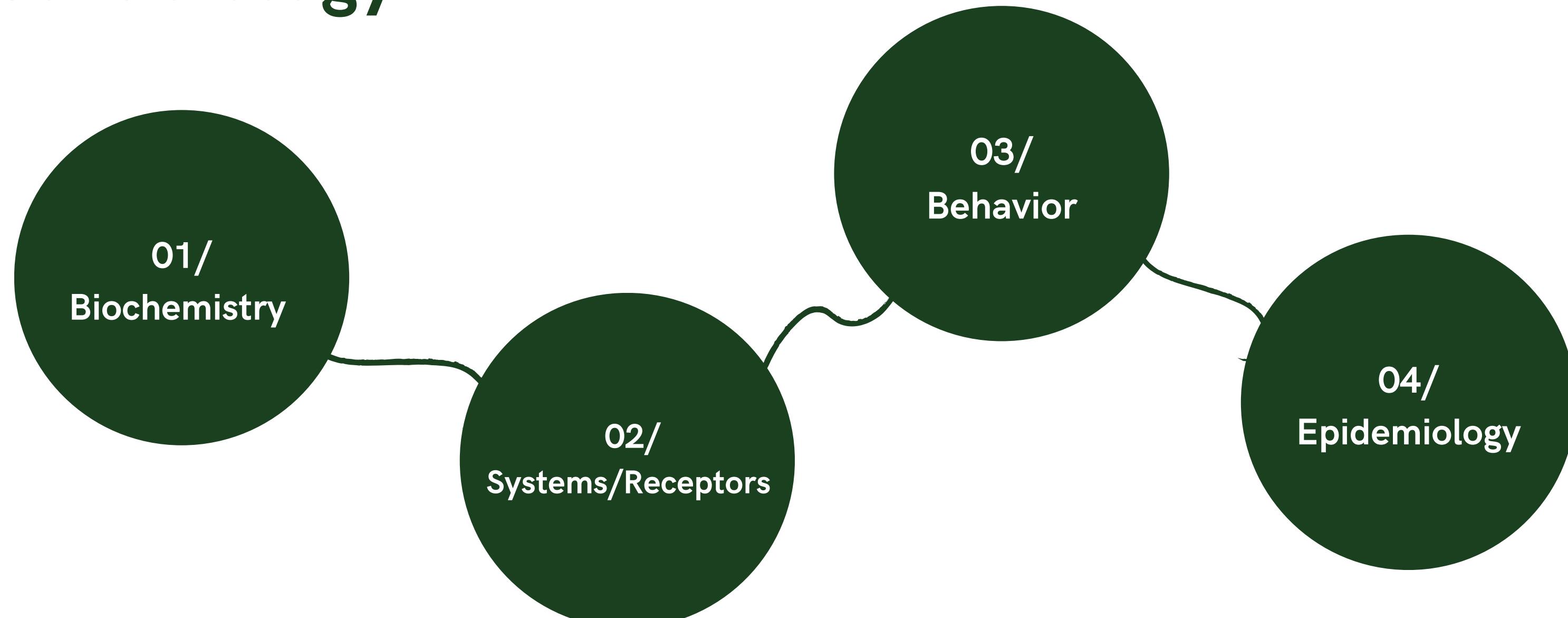
## Self Medication

COPING

BOREDOM

COSTS

# Neurobiology



# 01/ Biochemistry Basics

## • Tetrahydrocannabinol (THC)

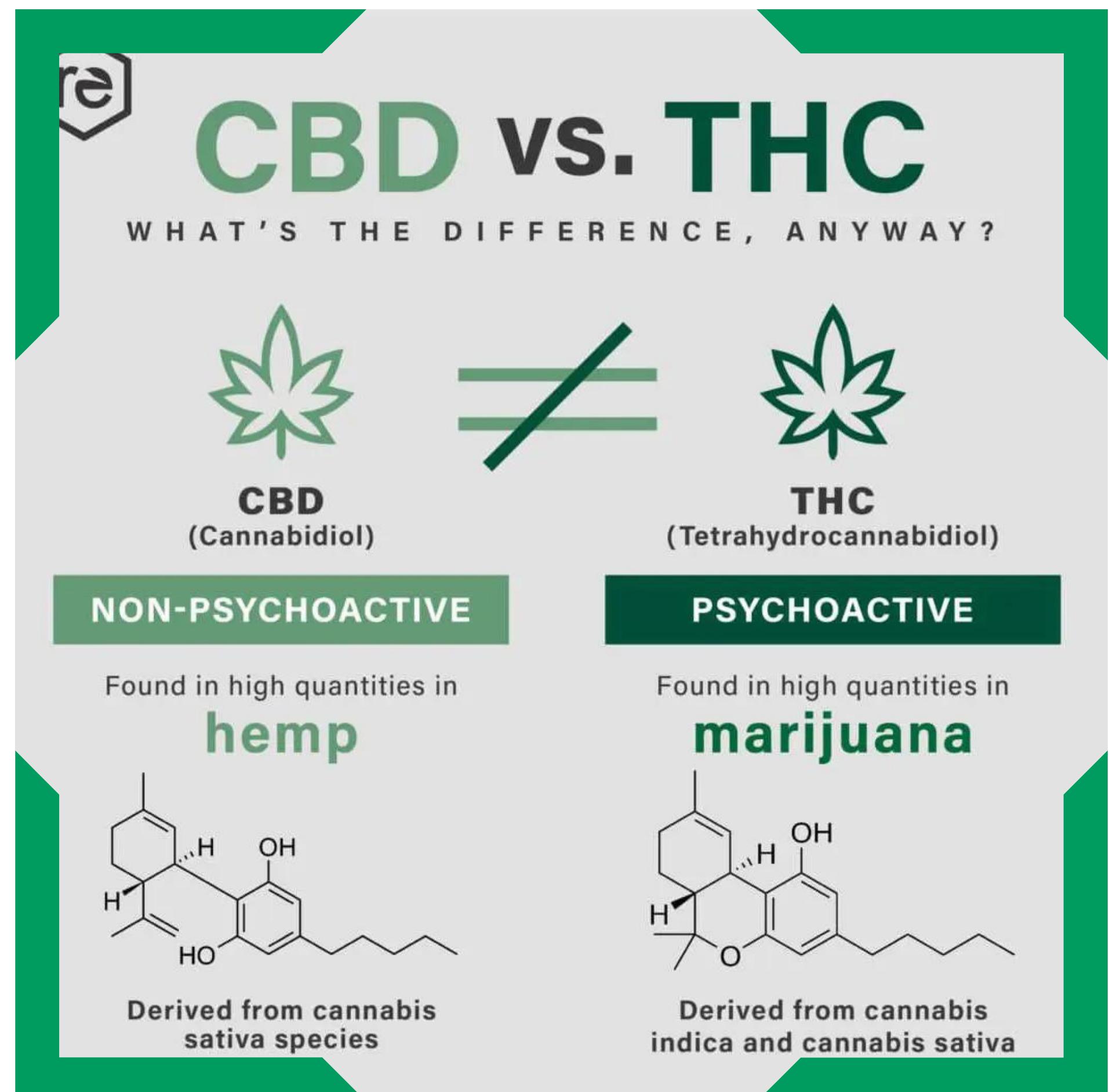
- Primary psychoactive compound
- Mimics natural endogenous cannabinoids

## • Cannabidiol (CBD)

- Non-psychoactive compound
- FAAH enzyme inhibition, increases anandamide

## • Endocannabinoid System (ECS)

- Widespread system within nervous system that serves as a neuromodulator to several receptor sites (dopamine, serotonin, glutamate, GABA, and most classical neurotransmitters)



The infographic is titled "re CBD vs. THC" with the subtitle "WHAT'S THE DIFFERENCE, ANYWAY?". It features two large green cannabis leaf icons: one for CBD (Cannabidiol) and one for THC (Tetrahydrocannabinol). A large green diagonal line separates the two. Below each leaf is its name and a color-coded category: CBD is labeled "NON-PSYCHOACTIVE" in a green box, and THC is labeled "PSYCHOACTIVE" in a dark green box. Underneath each category, it states where the compound is found: CBD is found in high quantities in "hemp", and THC is found in high quantities in "marijuana". At the bottom, the chemical structures of both compounds are shown, along with the text "Derived from cannabis sativa species" for CBD and "Derived from cannabis indica and cannabis sativa" for THC.

**CBD**  
(Cannabidiol)

**NON-PSYCHOACTIVE**

Found in high quantities in  
**hemp**

Derived from cannabis sativa species

**THC**  
(Tetrahydrocannabinol)

**PSYCHOACTIVE**

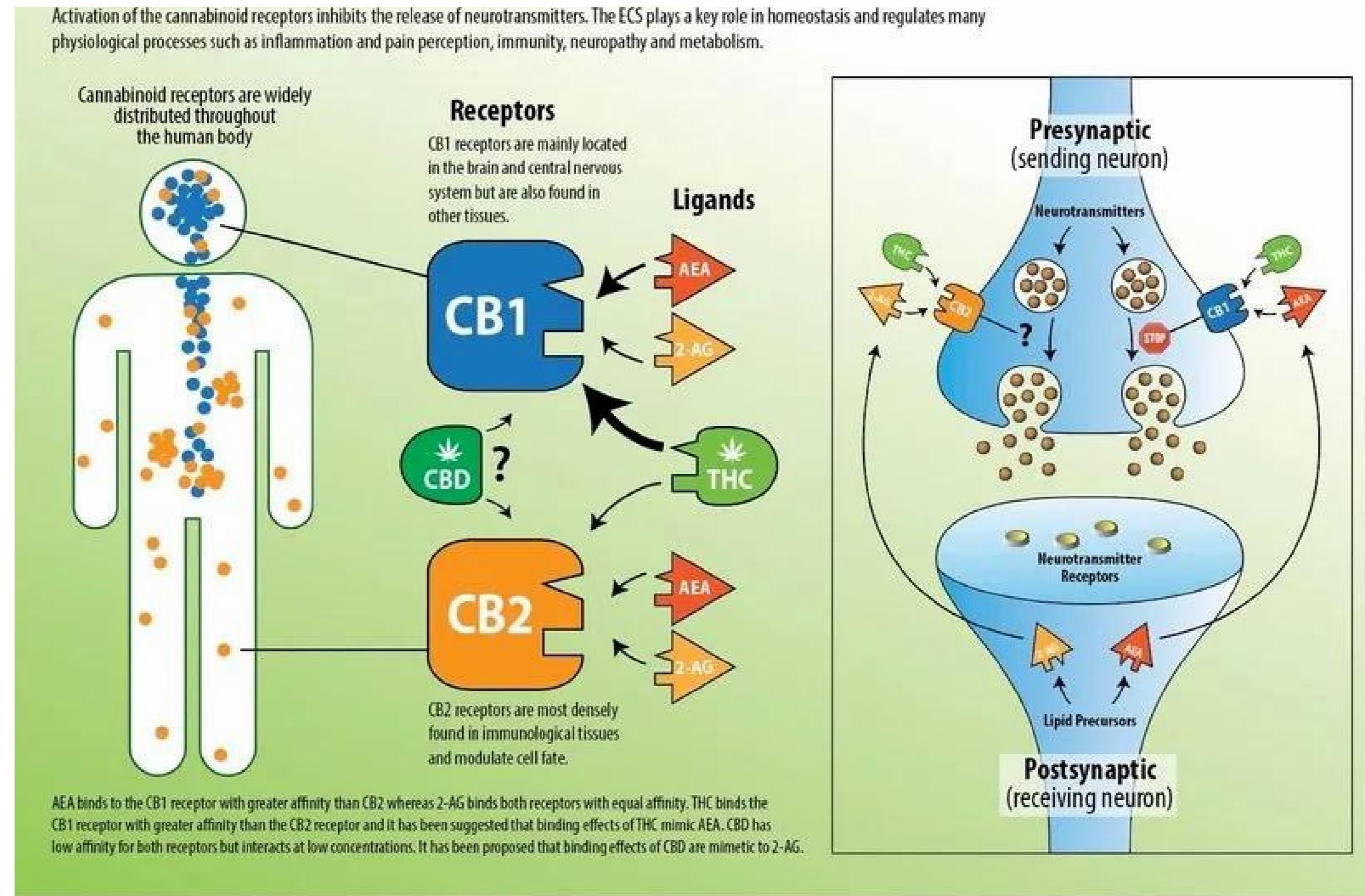
Found in high quantities in  
**marijuana**

Derived from cannabis indica and cannabis sativa

# 02/ Systems/Receptors

## Impacted Systems

- Endocannabinoid System (ECS)
- CB1 & CB2 Receptors
  - Lowers rate of glutamate, increases dopamine, serotonin, and GABA release
- Occipital Lobe
- Cerebellum
- Hippocampus
- Limbic System
- Nucleus Accumbens



# 03/ Behavior

## Emotional Regulation

### • Drive

- Achievement and Accomplishing Tasks
- Prefrontal Cortex, Nucleus Accumbens, Hypothalamus, VTA, ACC

### • Soothing

- Self-Care and Safeness
- Prefrontal Cortex, Down-regulation of Amygdala, ACC, insula

### • Threat

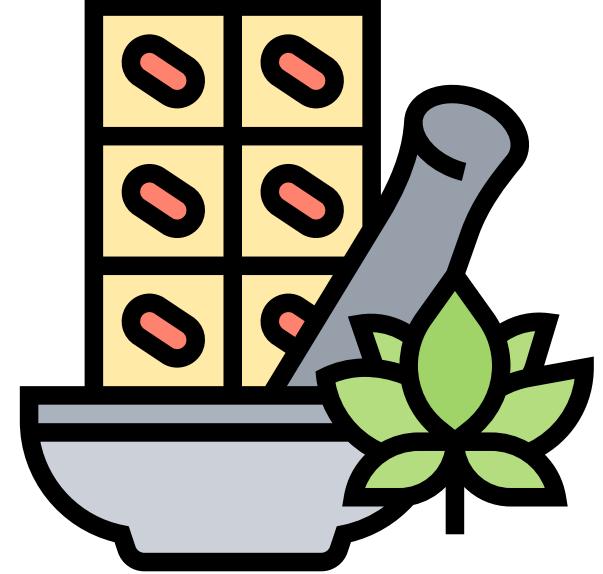
- Protection and Threat Management
- Prefrontal Cortex, Up-regulation of Amygdala, Hypothalamus,

## THREE CIRCLES OF EMOTIONAL REGULATION

According to Paul Gilbert's model, people often switch between three different systems to manage their emotions.



# 04/ Epidemiology



## Key Factors

### Demographics

- 44% of US college students tried marijuana at least once.
- Slightly more common among males.
- Higher prevalence among first and second-year college students.

### Social

- Peer influence and perceived benefits impact marijuana use.

### Psychosocial

- Marijuana is used to cope with mental health issues.

# Methodology



## Participants:

- X participants, ages 18-25  $n(x) = x$ 
  - Recruitment: through verbal promotion via word-of-mouth, social media platforms

## Design:

- Repeated Measures Design
  - IV is the strain choice either indica or sativa
- Quasi-Experimental Design
  - Quasi IV based on strain familiarity/knowledge
    - Between-Subjects

# Methodology

## **2 Surveys:**

- Emotional regulation quiz by Eddins Counseling Group
- Relative Associations of Strain Preference

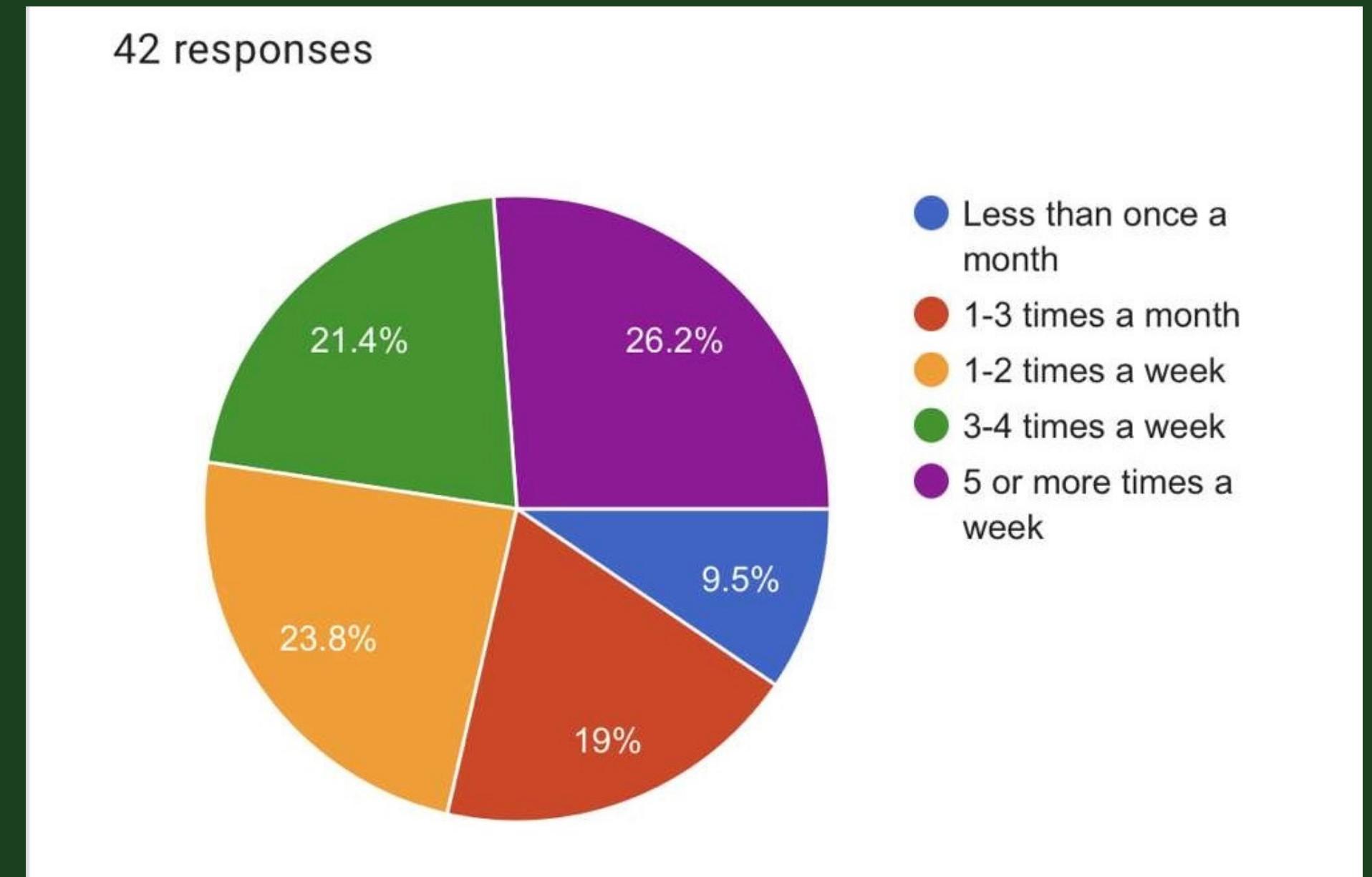
## **Procedures:**

1. Subjects are given the Emotional Regulation Test
  - a. Linear Scale questions from almost never, about half the time, almost always, sometimes, most of the time
2. Subjects are given the Relative Associations of Strain Preference Test
  - a. The question types range from linear scale questions with strongly agree, agree, neutral, disagree, strongly disagree, or MC, checkboxes, and short answer
3. Observe and compare subjects' strain preferences to Emotional Regulation Scores

# Data Analysis: Pearson Coefficient

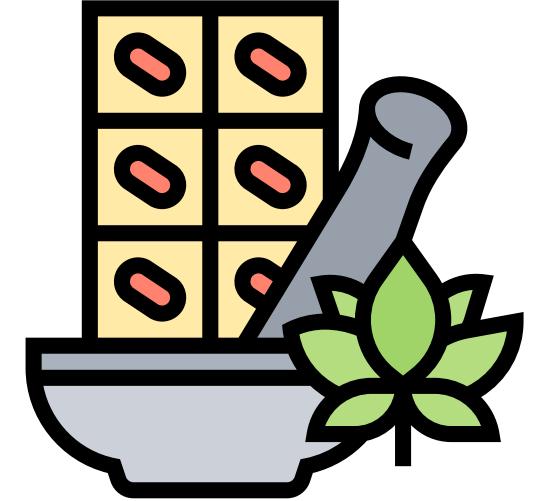
- The Pearson correlation coefficient between emotional regulation scores and the frequency of cannabis use is 0.932 indicating a **strong positive correlation between the two variables**

- The p-value suggests that the **observed correlation is statistically significant** and is highly unlikely to have occurred by chance



```
Pearson correlation coefficient: 0.9322257037264334  
P-value: 1.0541163548656986e-19
```

# Data Analysis



- Next being observed is the strain used to achieve relaxation or calmness vs emotional regulation score. Pearson correlation score of -0.11 suggests there is no correlation nor is it statistically significant
- This suggests that using different strains has no effect on emotional regulation score

```
from scipy.stats import pearsonr

emotional_scores = [21, 20, 32, 22, 30, 28, 27, 34, 44, 35, 43, 52, 46, 37, 27, 28, 31, 26,
strain_used = ['Hybrid', 'Hybrid', 'Hybrid', 'Hybrid', 'Hybrid', 'Indica', 'Indica',
               'Indica', 'Indica', 'Indica', 'Indica', 'Indica', 'Indica', 'Indica']

# Mapping strain categories to numerical values
strain_mapping = {'None': 0, 'Sativa': 1, 'Indica': 2, 'Hybrid': 3}
numerical_strain_used = [strain_mapping[strain] for strain in strain_used]

# Calculate the Pearson correlation coefficient
corr_coeff, p_value = pearsonr(emotional_scores, numerical_strain_used)

print("Pearson correlation coefficient:", corr_coeff)
print("P-value:", p_value)
```

Pearson correlation coefficient: -0.11967134674291911  
P-value: 0.4446487873652959

# Data Analysis

Which strain do you typically use when seeking to achieve relaxation or calmness?



I don't smoke cannabis

1.8%

I do not seek relaxation

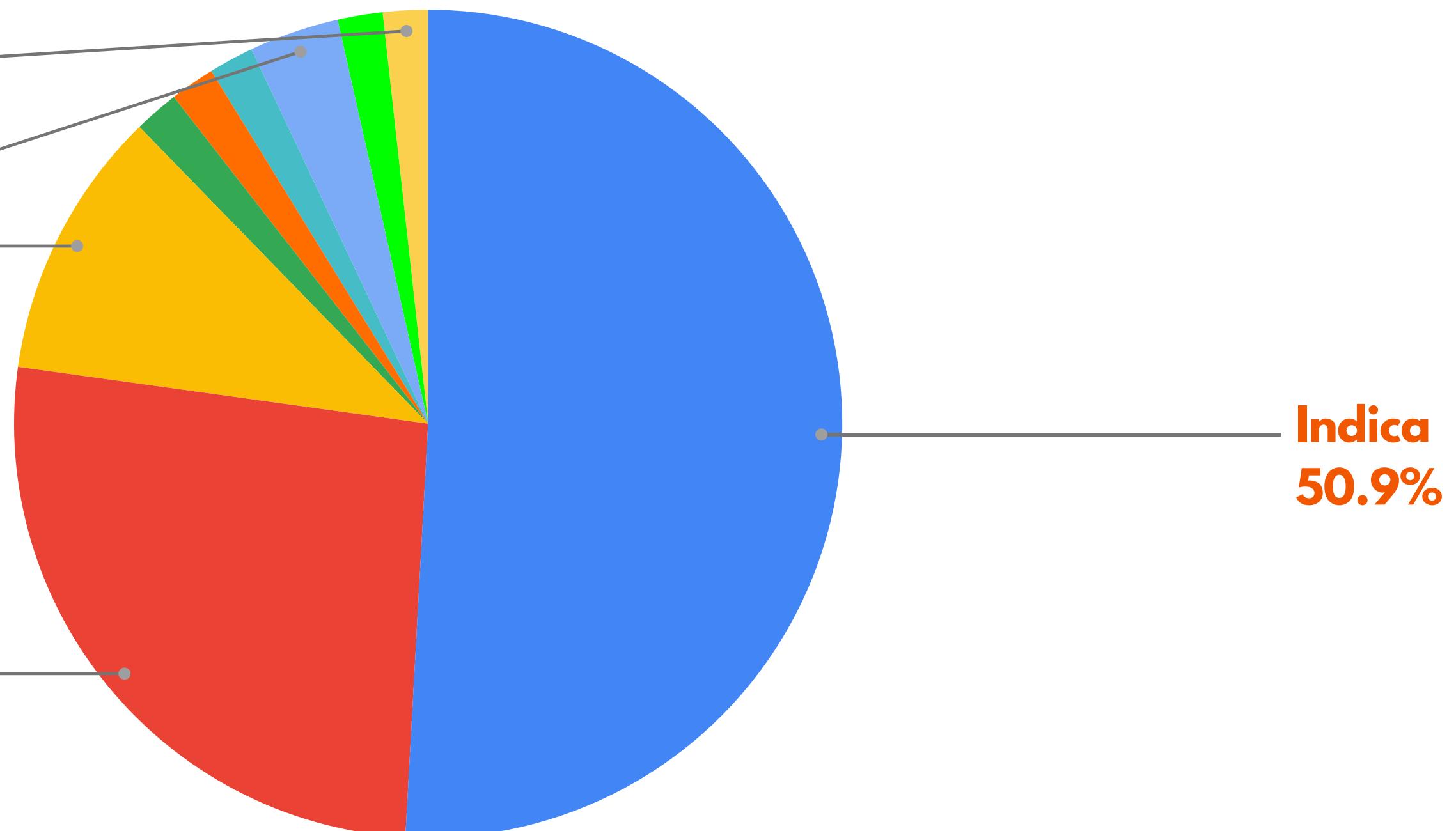
3.5%

**Sativa**

**10.5%**

**Hybrid**

**26.3%**

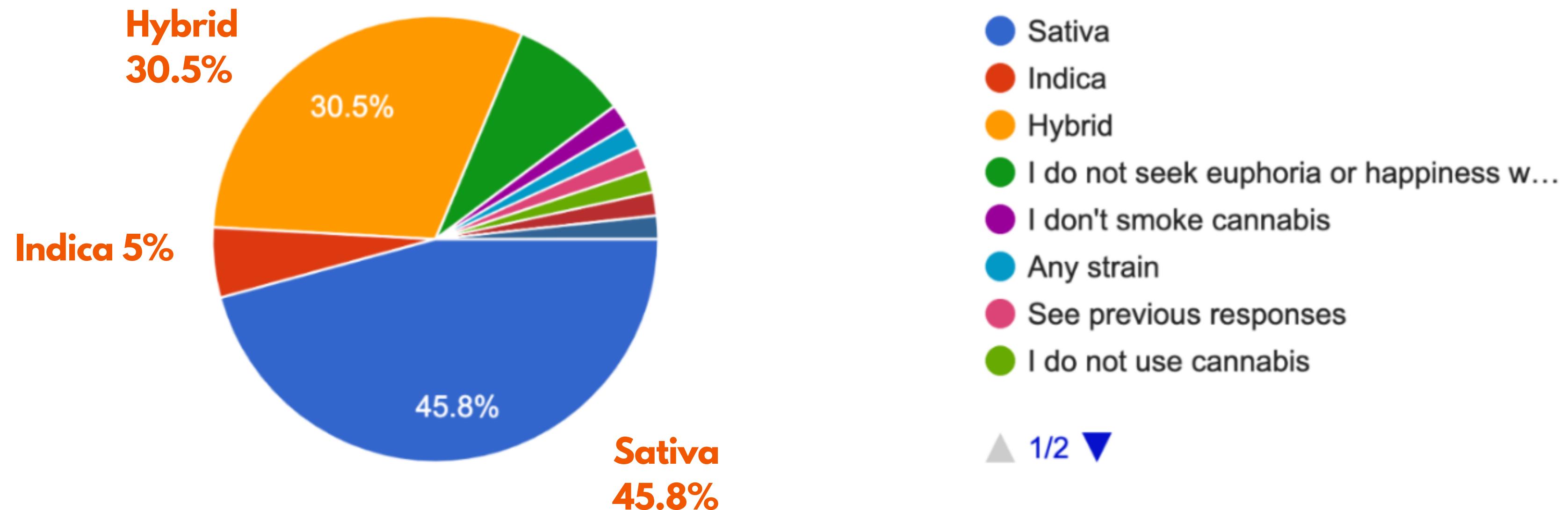


# Data Analysis



Which strain do you typically use when seeking to achieve euphoria or happiness?

59 responses



# Feedback

"Sativa can sometimes make me overthink but rarely (and that has a lot to do with life context at the time)"

"Felt very paranoid after having too much."

"Literally so unbelievably anxious and nauseous. I wasn't anxious or sick because of weed before so it was pretty bad. The anxiety was like a constant loop of bad thoughts while the sickness was severe nausea."

"Greened Out"



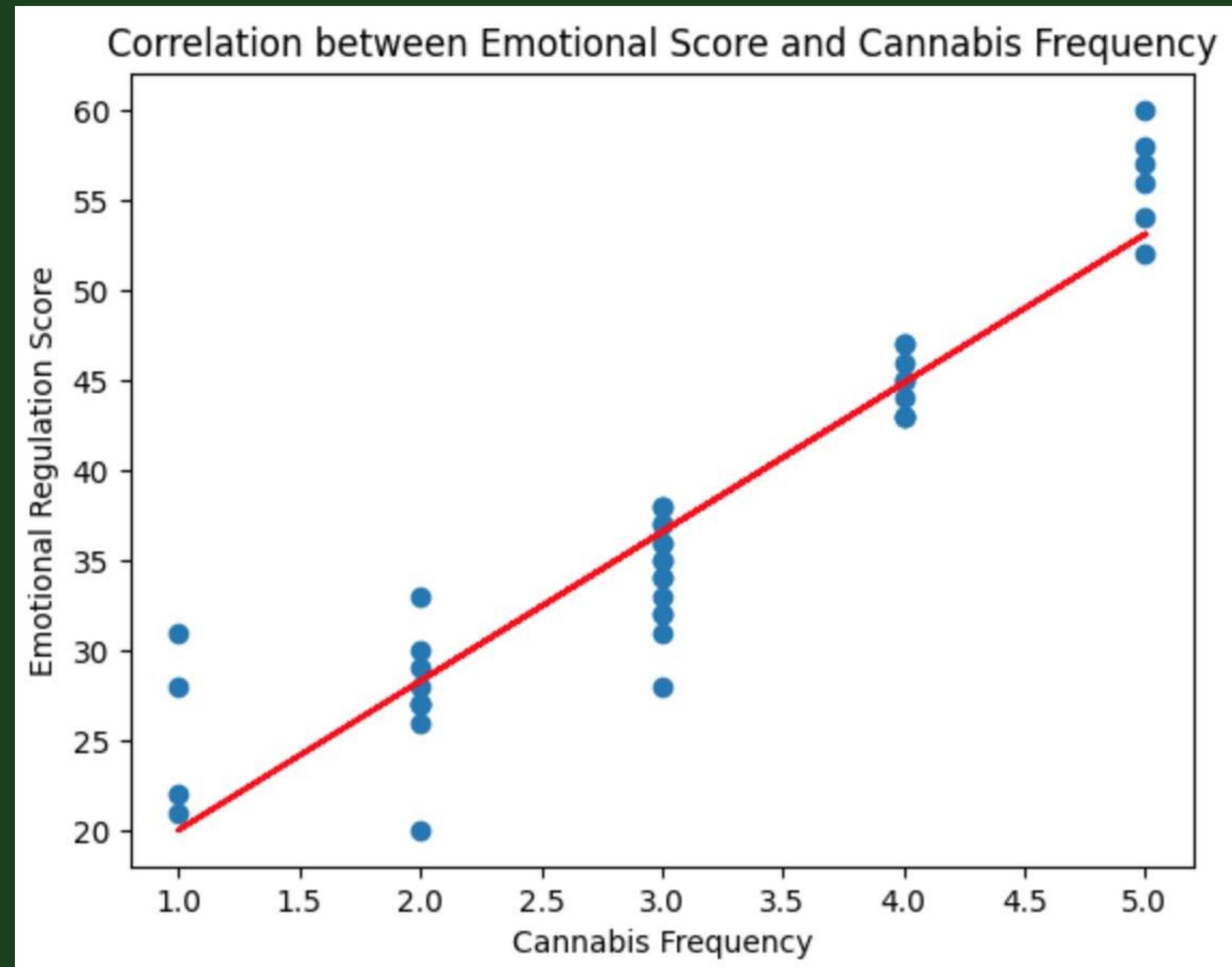
# Conclusions: Emotional Regulation Score

Emotional regulation scores is positively correlated to the frequency of cannabis use. This means that people who smoked cannabis more frequently have been found to be worse at regulating their emotions

There was no correlation between strain selection for calmness and emotional regulation score

There was also no correlation between the importance of strain used to achieve the desired emotional state and the emotional regulation score

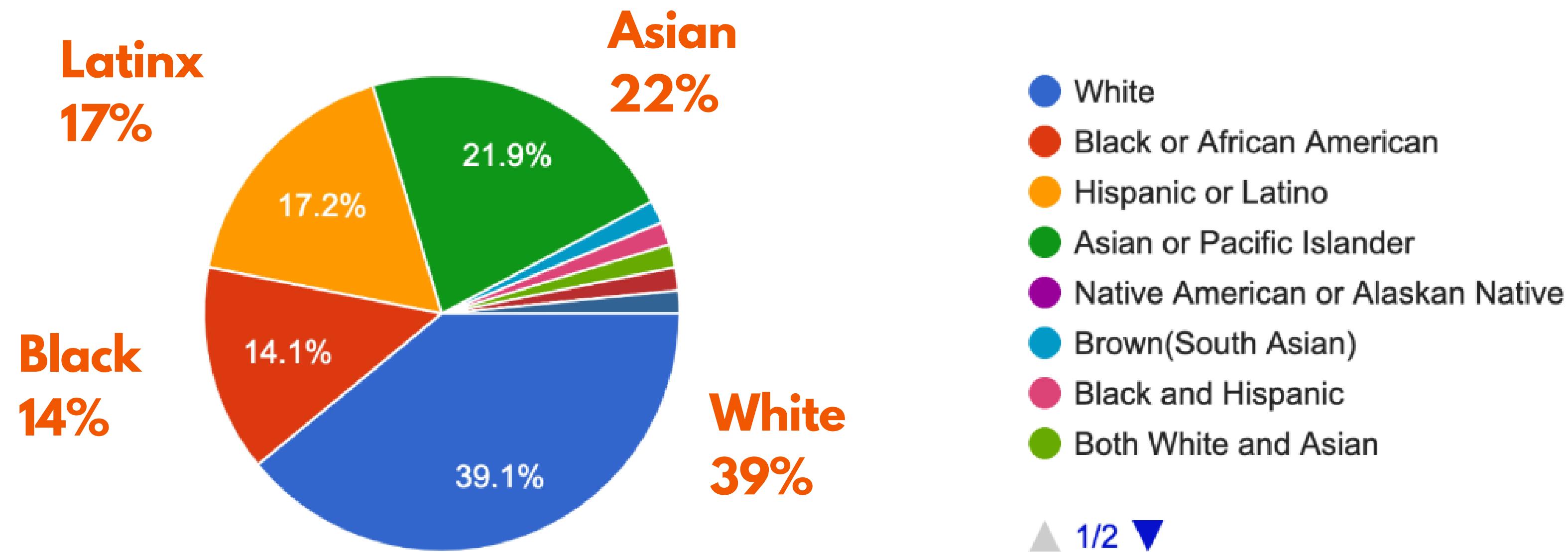
The type of strain appears to have no effect on the emotional regulation score, but the frequency of cannabis smoked has a positive correlation



# Conclusions: Demographic Insights

Ethnicity:

64 responses



# Resources

- Reading #1

Simpson, E. H., & Balsam, P. D. (2015). The behavioral neuroscience of motivation: An overview of concepts, measures, and Translational Applications. *Behavioral Neuroscience of Motivation*, 1–12. [https://doi.org/10.1007/7854\\_2015\\_402](https://doi.org/10.1007/7854_2015_402)

- Patterns of medicinal cannabis use, strain analysis, and substitution effect among patients with migraine, headache, arthritis, and chronic pain in a medicinal cannabis cohort

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5968020/>

- Non-Acute Effects of Cannabis Use on Motivation and Reward Sensitivity in Humans: A Systematic Review

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6062456/>

- Motives Matter: Cannabis use motives moderate the associations between stress and negative affect

<https://www.sciencedirect.com/science/article/pii/S0306460319307701>

- Cannabis, motivation, and life satisfaction in an internet sample

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1435998/>

- Cannabis used in US research differs genetically to the varieties people smoke

<https://www.nature.com/articles/d41586-019-01415-z>

- Cannabis, a complex plant: different compounds and different effects on individuals

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3736954/>

- Scientists say most marijuana strains act basically the same

<https://www.pbs.org/newshour/science/character-favorite-marijuana-strain-may-head>

- Human olfactory discrimination of genetic variation within Cannabis strains

<https://www.frontiersin.org/articles/10.3389/fpsyg.2022.942694/full>

# Resources

- Sativa v. Indica

<https://www.healthline.com/health/sativa-vs-indica#overview>

- The Academic Consequences of Marijuana Use during College

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4586361/>

- Cannabis use amongst college students in 2020

<https://nida.nih.gov/news-events/news-releases/2021/09/marijuana-use-at-historic-high-among-college-aged-adults-in-2020>

- Difference between indica and sativa in the brain

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5576603/>

- How does marijuana produce its effects

<https://nida.nih.gov/publications/research-reports/marijuana/how-does-marijuana-produce-its-effects>

- Short & Long Term Effects

<https://www.cdc.gov/marijuana/health-effects/brain-health.html#:~:text=Marijuana%20use%20directly%20affects%20brain,%2C%20emotions%2C%20and%20reaction%20time.>

- Cognitive Effects

<https://sobernation.com/addiction-treatment/understanding-drug-addiction/>

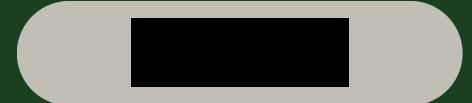
- Motivation

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2723942/>

- Reasons to self medicate

<https://www.aspenridgerecoverycenters.com/causes-of-self-medication/>

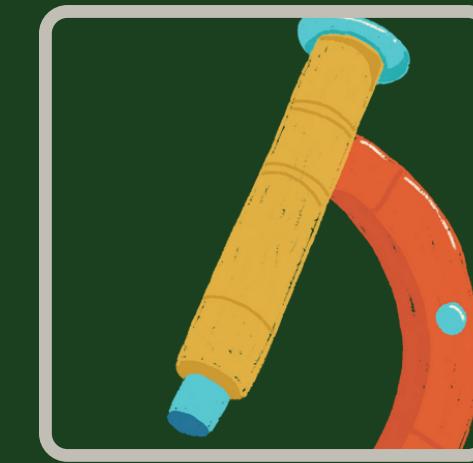
# Our Team



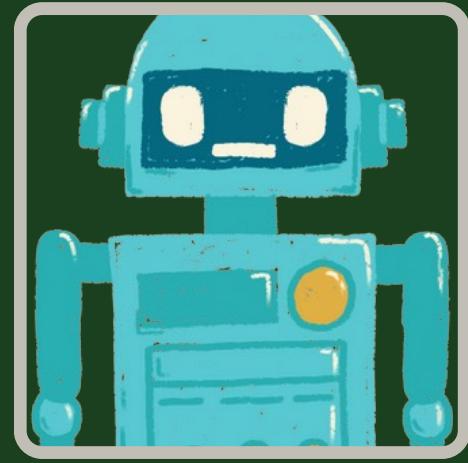
Project Lead



Project Manager



Research Coordinator



Lit Review



Surveys  
& Methods



Data Analyst

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Thanks

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