



# Cannabis Strains & Characteristics

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## An Analysis of Leafly

June 21, 2019

# Executive Summary

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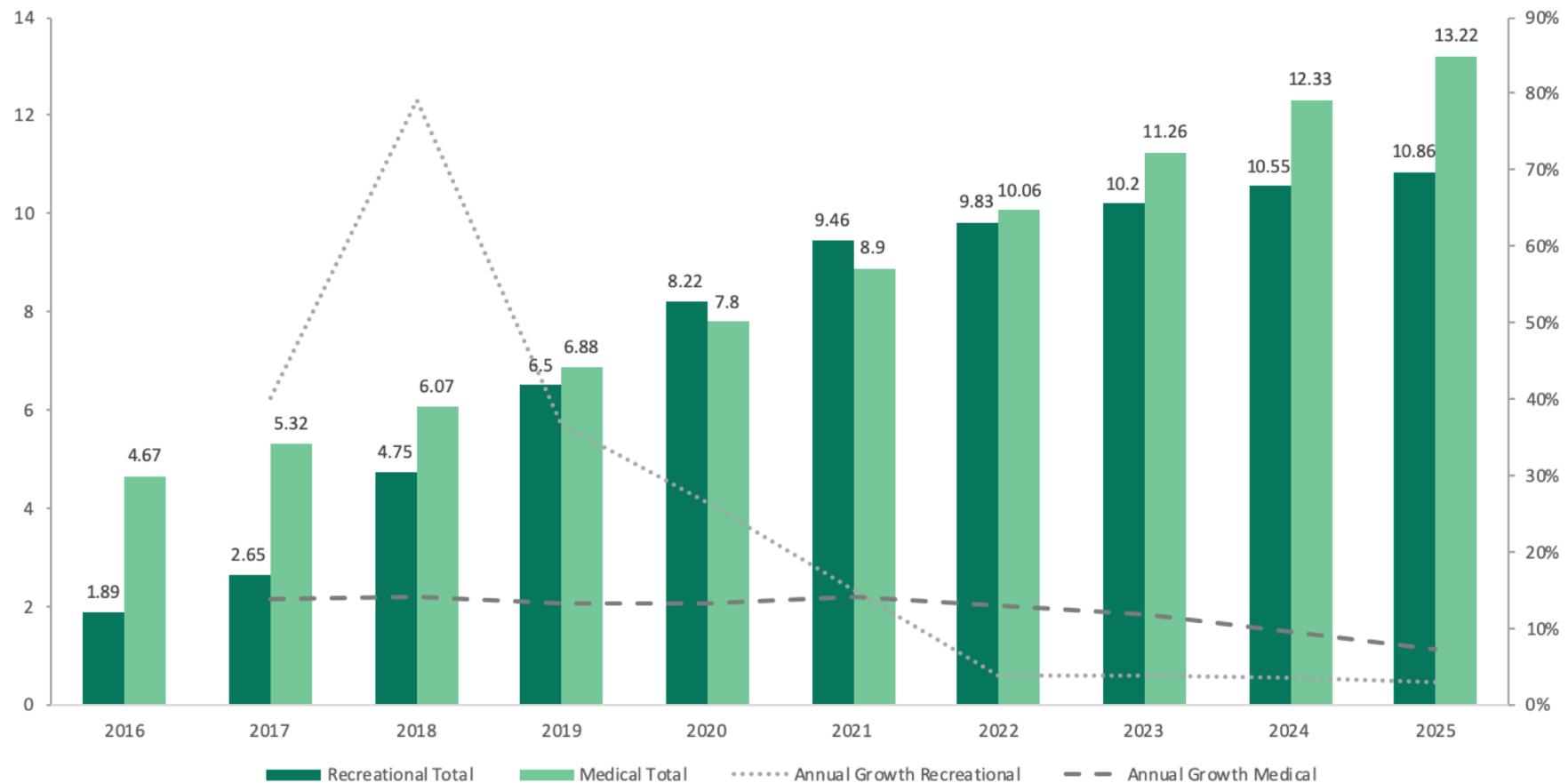
- The cannabis industry is a burgeoning industry with positive, sustained growth.
- Leafly, headquartered in Seattle, Washington, was founded in 2010 as a cannabis destination site.
- Leafly maintains reviews and ratings across a variety of dimensions for nearly 3,000 separate strains of cannabis available throughout the United States.

## *Highlights*

- Strains are distributed across three types with hybrids representing over 55% of the sample over indica and sativa.
- There are over 300,000 reviews and associated ratings.
- The top medicinal uses for cannabis are for stress, depression, and pain.
- The top effects descriptors include relaxed, happy, and euphoric.
- Negative side effects include dry mouth, dry eyes, and anxiety.
- Flavor profiles are broad and range from diesel and ammonia to fruit and cheese.

# Market Overview

- The U.S. cannabis industry has experienced consistently positive growth since 2016 as illustrated below<sup>1</sup>:



<sup>1</sup>Source: The Cannabis Industry Annual Report.

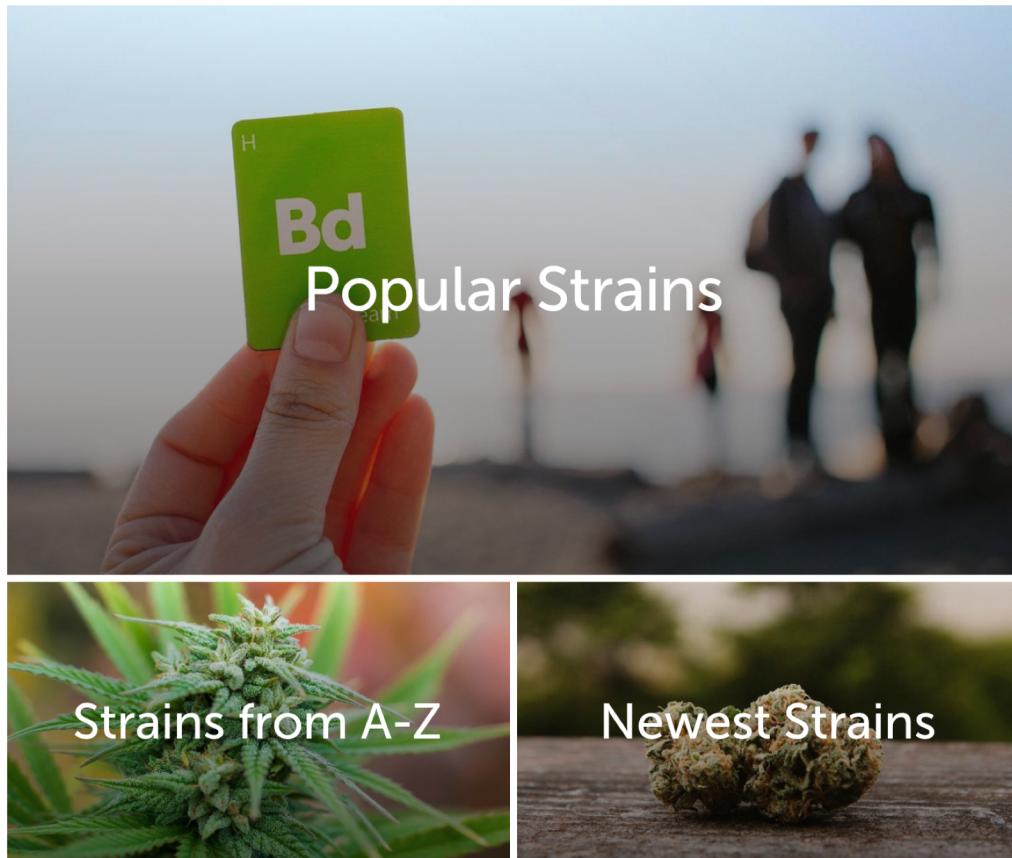
# Project Description

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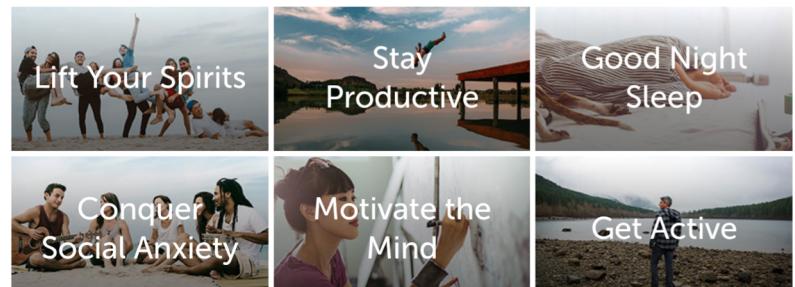
# Project Description

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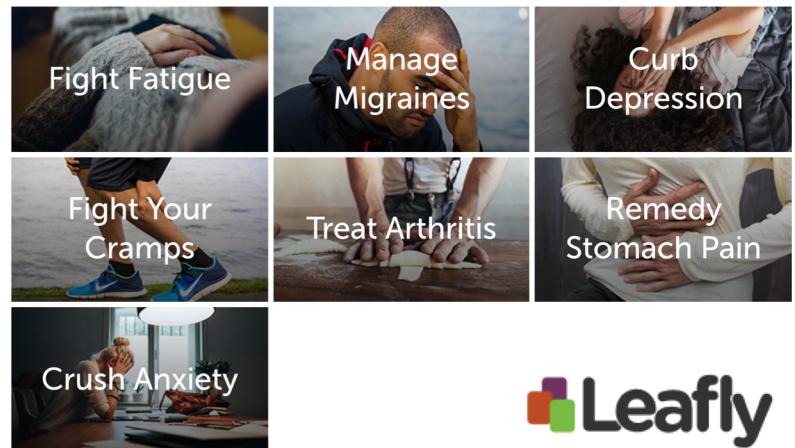
- Leafly.com is a cannabis enthusiasts site that includes user experiences, medical uses, product characteristics, and dispensary locations for nearly 3,000 strains of cannabis and related products including CBD oils.



## Moods & Activities



## Medical i



# Project Description

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- The data indicated in the table below was extracted using Selenium and Scrapy in order to provide an overview *by strain* of cannabis types, their desirable characteristics, and medical uses.
  - Further research is needed with respect to specific chemical & biological characteristics and consumption patterns by geographic region which might lead to novel agricultural and industrial use applications.

Field	Scraped	Description
Name	x	
Type	x	
Average Rating	x	
Number of Reviews	x	
User Reviews		
Effects	x	
- Relative Value		
Medical Uses	x	
- Relative Value		
Negatives	x	
- Relative Value		
Flavor Profile	x	
Lineage		
Difficulty		
Height		
Yield		
Flowering		
Stretch		

# Data & Analytics

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# Data & Analytics

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- The total number of records obtained was 2963 of which 2,779 were used for purposes of analysis<sup>1</sup>:

Strain Data Preview:

	Name	Leafly_Name	Type	Number_of_Reviews	Rating	Flavor_1	Flavor_2	Flavor_3	Effect_1	Effect_2	...	Negative_1	Negative_2	Negative_3
0	\$100 OG	100	Hybrid	509.0	4.0	Earthy	Diesel	3. Pungent	Happy	Uplifted	...	Dry Mouth	Dizzy	Dry Eyes
1	'98 Aloha White Widow	Awh	Hybrid	11.0	4.7	NaN	NaN	NaN	Creative	Relaxed	...	Dry Mouth	Anxious	Dizzy
2	1024	124	Sativa	49.0	4.5	Tropical	Mint	3. Sweet	Energetic	Uplifted	...	Dry Mouth	Dry Eyes	Dizzy
3	12 Year OG	12y	Hybrid	2.0	3.0	Diesel	NaN	NaN	Focused	Creative	...	Anxious	Dizzy	Dry Eyes
4	13 Dawgs	13d	Hybrid	11.0	4.1	Diesel	Apricot	3. Citrus	Sleepy	Euphoric	...	Anxious	Dry Eyes	Headache
5	22	22	Hybrid	9.0	3.6	NaN	NaN	NaN	Energetic	Focused	...	Headache	NaN	NaN
6	24k Gold	24k	Hybrid	219.0	4.6	Orange	Citrus	3. Sweet	Happy	Relaxed	...	Dry Mouth	Dry Eyes	Dizzy
7	3 Bears OG	3bs	Indica	7.0	4.4	Diesel	Sweet	3. Butter	Relaxed	Giggly	...	Dry Mouth	Dry Eyes	Headache
8	3 Kings	3k	Hybrid	326.0	4.4	Earthy	Diesel	3. Pine	Happy	Relaxed	...	Dry Mouth	Dry Eyes	Headache
9	303 OG	303	Indica	82.0	4.3	Diesel	Earthy	3. Woody	Relaxed	Focused	...	Dry Mouth	Dry Eyes	Dizzy

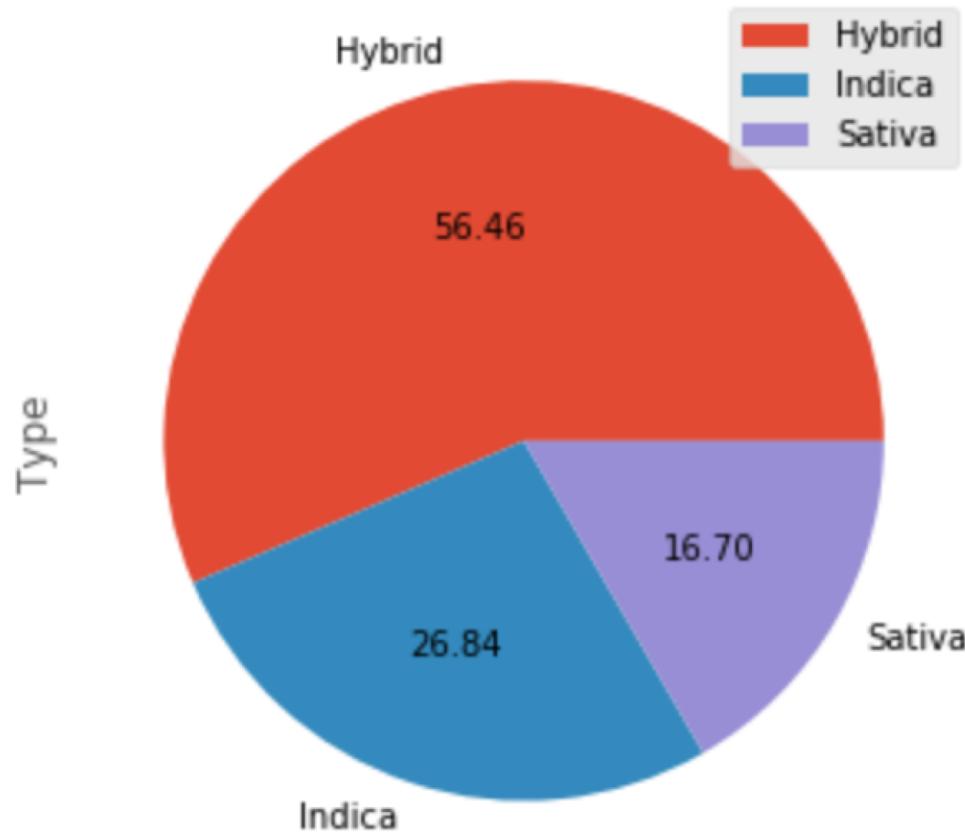
<sup>1</sup>A total of 184 strains were eliminated of which 13 were due to [client] ignored response, i.e., no data was obtained, and 171 had no reviews. It remains to be determined whether further elimination may be required.

# Data & Analytics

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## Type

- The below graphs illustrate the data's type characteristic:

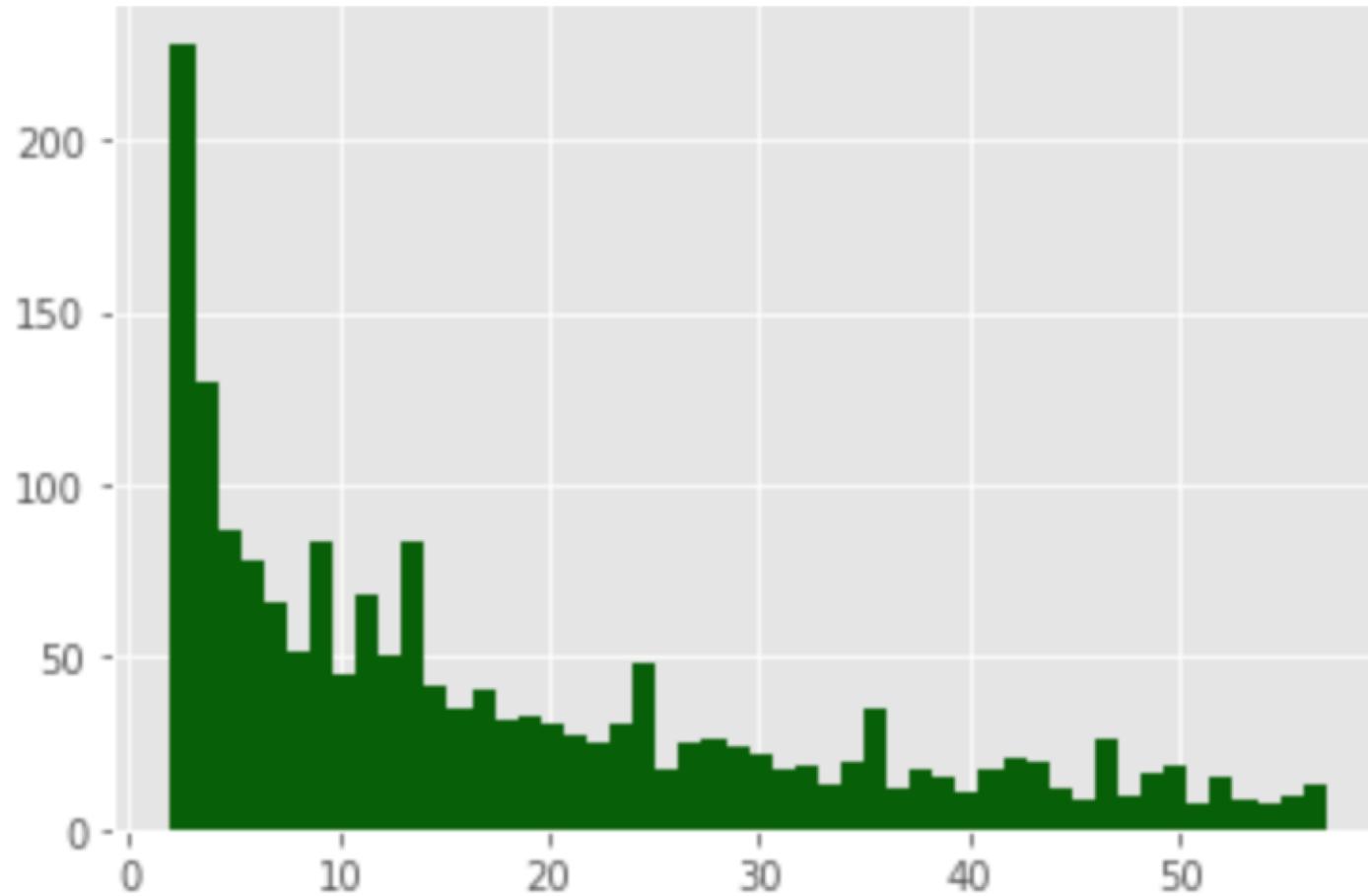


# Data & Analytics

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## Reviews

- There are 313,503 reviews distributed as follows:

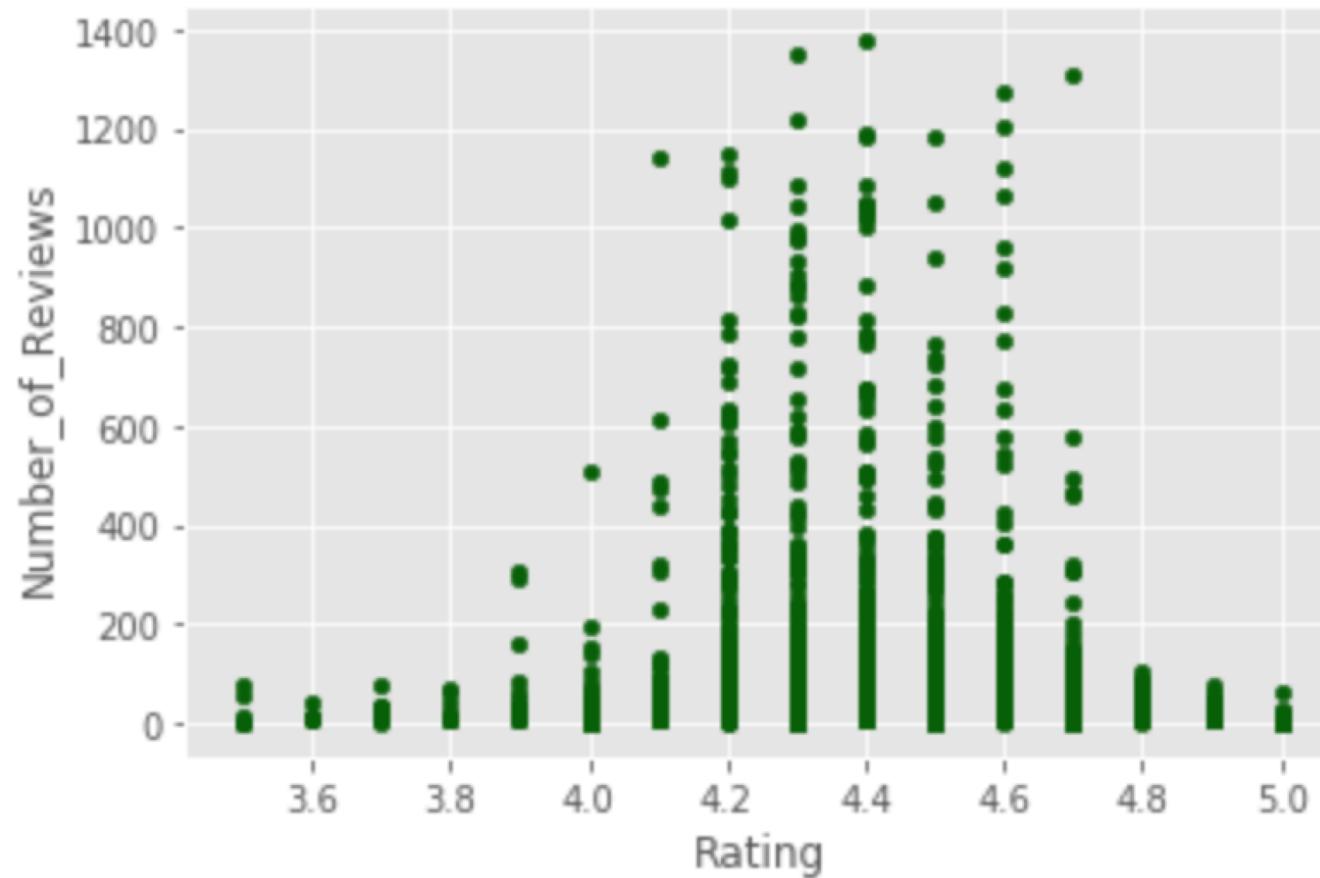


# Data & Analytics

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## Reviews & Ratings

- The following illustrates the relationship between ratings and reviews:

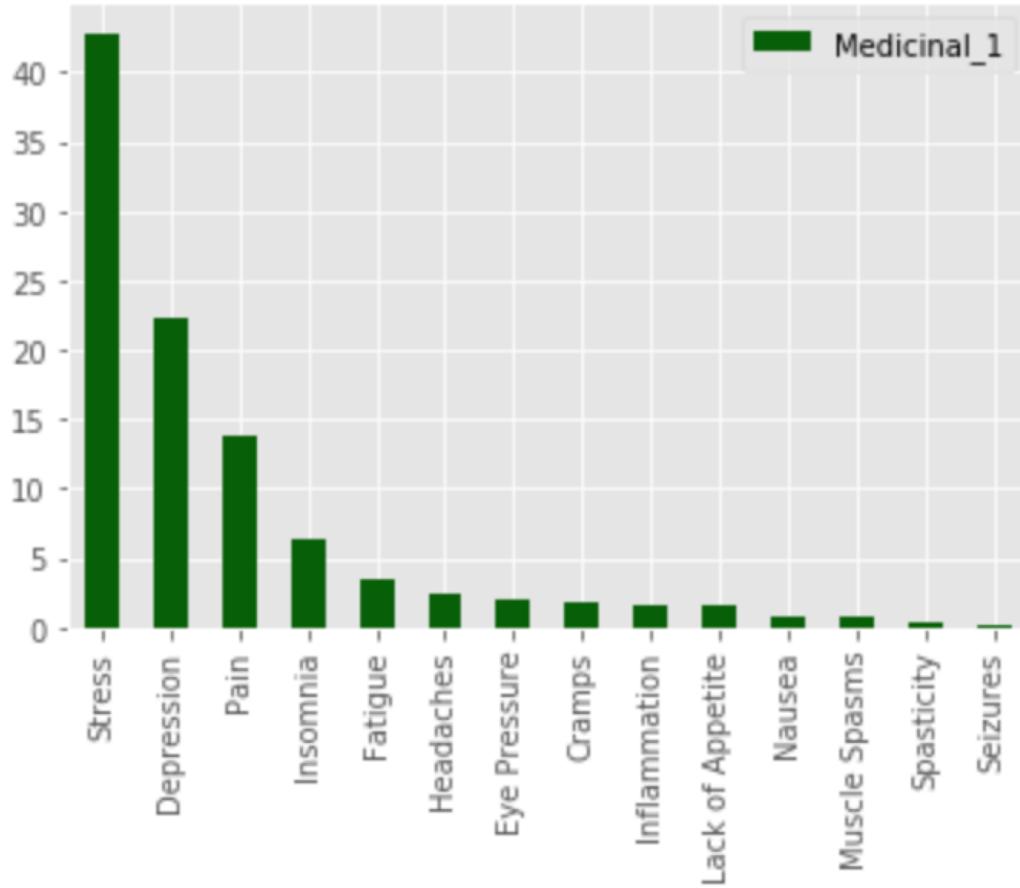


<sup>1</sup>For those within three (3) standard deviations of the mean.

# Data & Analytics

## Medicinal Uses

- The following illustrates medicinal uses:



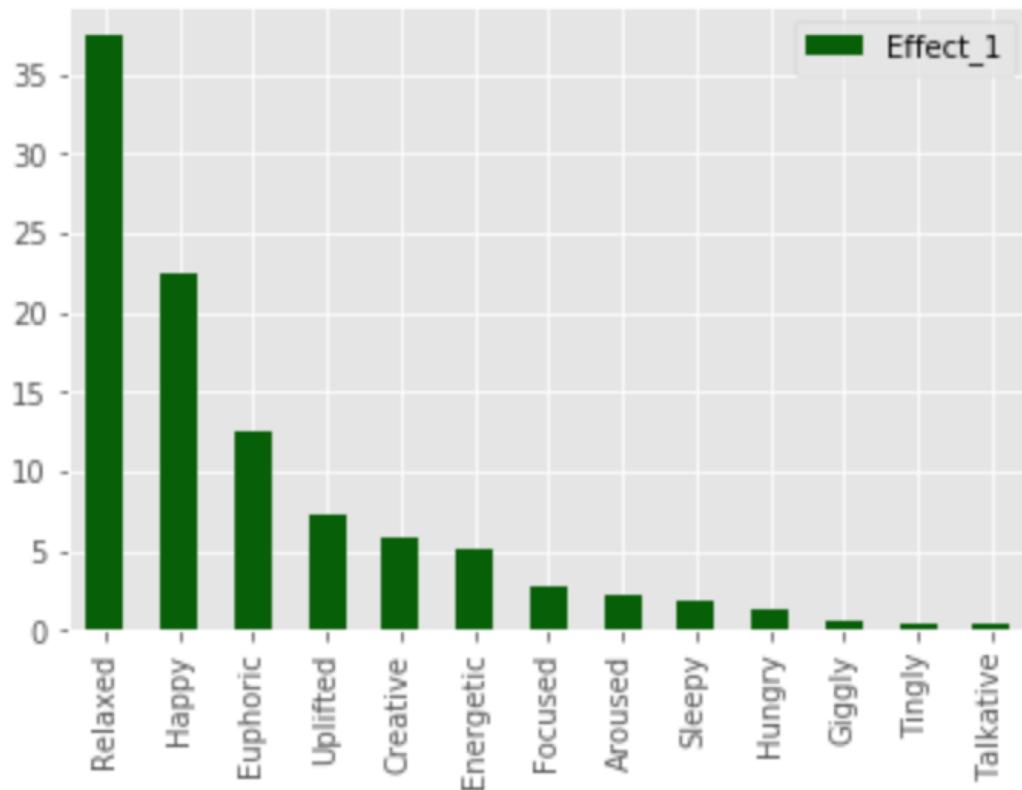
Stress	42.851593
Depression	22.299922
Pain	13.830614
Insomnia	6.332556
Fatigue	3.418803
Headaches	2.369852
Eye Pressure	1.942502
Cramps	1.825952
Inflammation	1.631702
Lack of Appetite	1.554002
Nausea	0.854701
Muscle Spasms	0.699301
Spasticity	0.310800
Seizures	0.077700

# Data & Analytics

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## Effects

- The following illustrates reported effects:



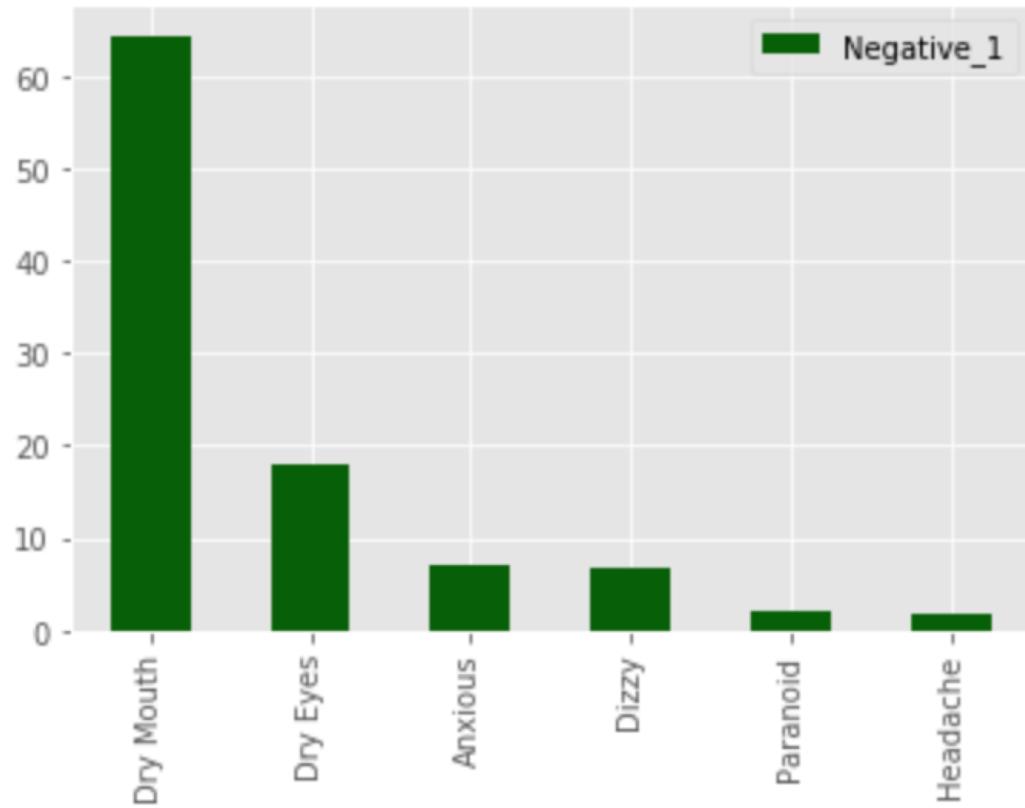
Relaxed	37.462798
Happy	22.395833
Euphoric	12.537202
Uplifted	7.254464
Creative	5.766369
Energetic	5.022321
Focused	2.790179
Aroused	2.157738
Sleepy	1.822917
Hungry	1.339286
Giggly	0.595238
Tingly	0.446429
Talkative	0.409226

# Data & Analytics

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## Negatives

- The following illustrates negative effects:

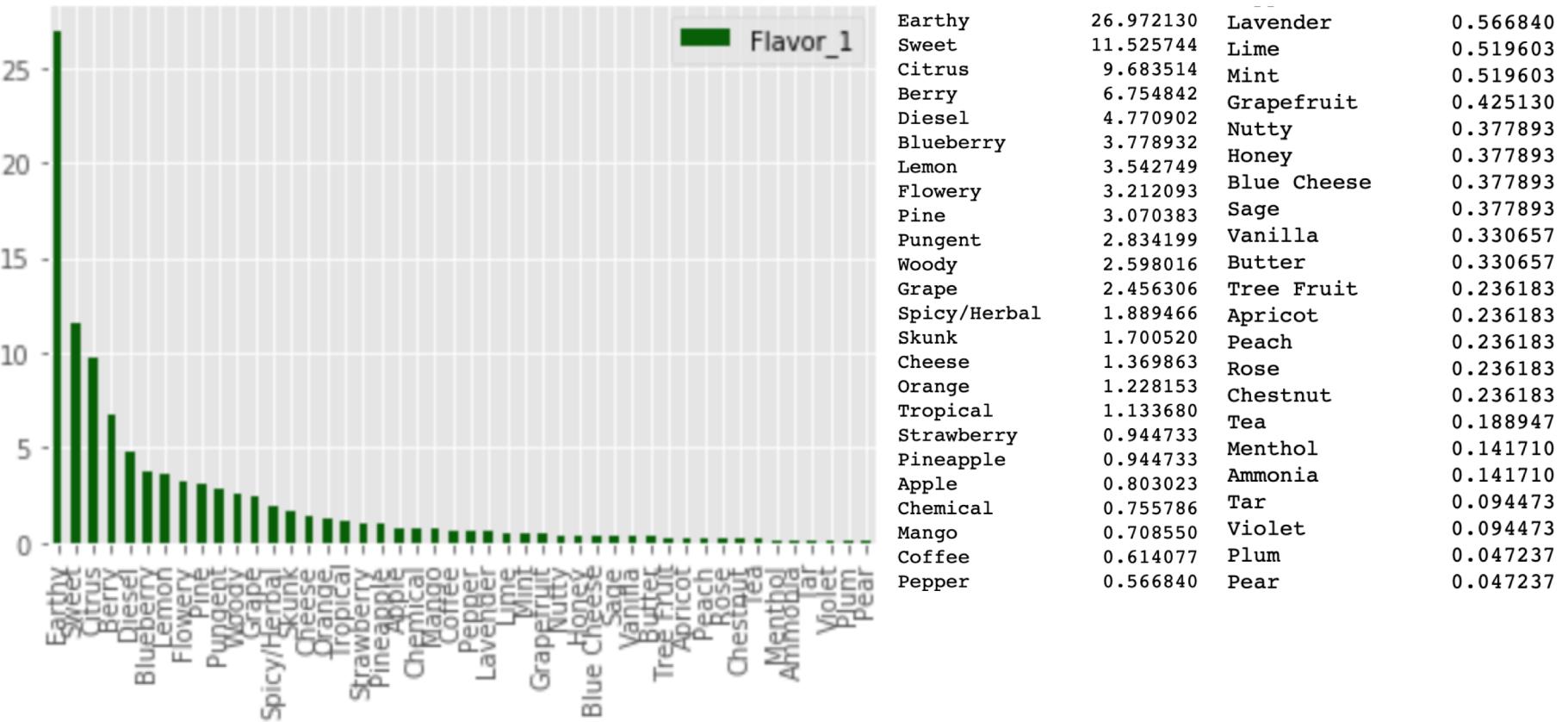


Dry Mouth	64.430894
Dry Eyes	18.008130
Anxious	7.113821
Dizzy	6.666667
Paranoid	2.032520
Headache	1.747967

# Data & Analytics

## Flavors

- The following illustrates the main flavor profiles:



## Next Steps

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# Next Steps

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- Segment each of the following by ratings and type:
  - Medicinal
  - Effect
  - Negative
  - Flavor
- Geographic profiles and distributions
- Growth characteristics and requirements
- Agricultural considerations including an efficiency analysis of fertilization requirements as compared to alternating crops
- Hybridization by strain to maximize various cannabinoids