

Unveiling Popularity Shifts in Natural Nootropics: A Time Series Clustering of Reddit Discussions

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INTRODUCTION & AIM

Introduction

- **Natural nootropics:** foods or compounds believed to enhance cognitive performance.
- Growing interest in **nutrition science**, wellness communities, and the public.
- **Reddit (r/Nutrition)** offers a unique, time-resolved record of discussions.

Aim of the study

- Explore how public interest in natural nootropics **evolved over the last decade**.
- Identify fluctuations, convergence, and divergence in discussions across compounds.
- Reveal patterns of social amplification, market influence, and scientific attention.
- Understand how **food-related trends emerge, peak, and fade** in digital communities.

METHODOLOGY

- **Data.** Posts and comments (≈1.7 M, 2016–2024) were collected from r/Nutrition.
- **Term extraction.** The 15,000 most frequent words were tokenized, semantically filtered, and grouped, yielding ~150 food-related nootropic terms (Table 1).
- **Selection and time series.** The 40 most frequent terms (>99% of mentions) were analyzed as monthly frequencies, normalized by active users and standardized.
- **Analysis.** Terms were clustered using TimeSeriesKMeans with Dynamic Time Warping (DTW) to identify synchronized trends. Cluster centroids and an MDS projection illustrated temporal relationships.
- **Interpretation.** An expert conducted an internet search to identify real-world events, publications, or product launches that could explain peaks in public interest.

Table 1. Term Grouping by Lemmatization and Morphological Variants

Normalized Terms	Total Count	Grouped Variants
health	133684	health
energy	58321	energy
omega	35891	omega, omega3, omega6, omegas
focusing	42508	focusing, focussing, focused, focus, focuses
thinking	24897	thinking
coffee	24365	coffee, coffees
tea	21783	tea, teas
brain	19936	brain, brains
clear	17535	clear
mind	17199	mind, minds
greens	14423	greens
drinks	14186	drinks
caffeine	14735	caffeine, caffeinated, caffeine
pepper	13426	pepper, peppers

RESULTS & DISCUSSION

- Temporal clustering revealed four characteristic trajectories of public attention toward natural nootropics (**Figures 2,3, Table 2**)
- Clusters show cyclical attention patterns, varying in timing and composition
- Semantic analysis confirms clusters are cognition-related and food-focused.
- Collective dynamics indicate synchronized shifts in online discourse.

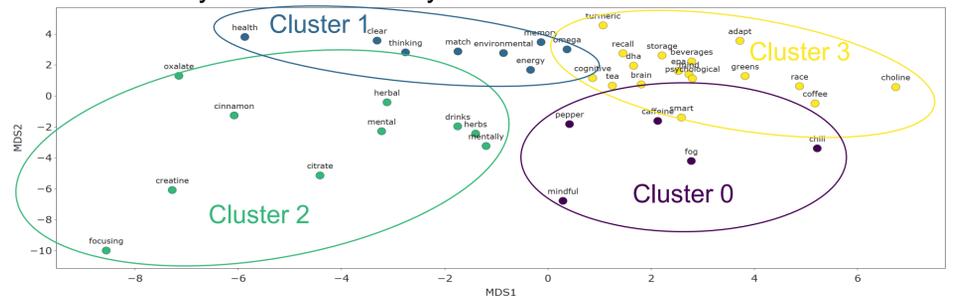


Figure 2. MDS Projection of Clustering Results

Table 2. Distribution of Terms Across Clusters

Cluster 0	Cluster 1	Cluster 2	Cluster 3
caffeine	health	focusing	coffee
pepper	energy	drinks	tea
chili	omega	mental	brain
mindful	thinking	creatine	mind
fog	clear	cinnamon	greens
	match	herbs	dha
	environmental	oxalate	epa
	memory	mentally	storage
		herbal	race
		citrate	
			beverages
			turmeric
			smart
			choline
			adapt
			cognitive
			recall
			psychological

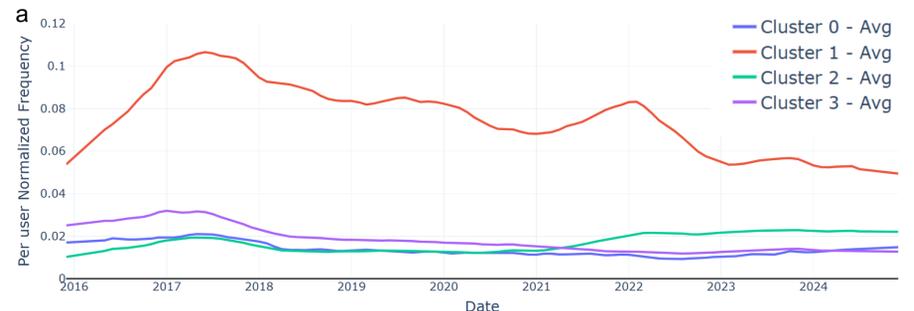


Figure 3. Average Time Series per Cluster (a) All Clusters; (b) Excluding Cluster 1 for Improved Visibility

CONCLUSIONS

- Online discussions of natural nootropics follow **recurring attention cycles**.
- Periods of scientific and market attention coincide with peaks in public interest.
- Each cycle ends with skepticism and **declining attention**.

FUTURE WORK / REFERENCES

- Expand analysis to other subreddits
- Explore cross-subreddit trend dynamics
- Develop early-warning models for emerging trends