

Trader Behaviour Insights: Bitcoin Sentiment vs. Trader Performance

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1. Executive Summary

This project explores the relationship between cryptocurrency market sentiment and trader behavior using real-world data. Specifically, we combine the Bitcoin Fear & Greed Index with transaction data from the Hyperliquid trading platform to analyze how emotional market states like "Fear" or "Greed" influence trader decisions such as buying, selling, using leverage, or achieving profitable trades.

Our objective is to extract actionable insights that can improve decision-making, highlight behavioral biases in crypto trading, and design smarter, data-driven trading strategies.

2. Dataset Overview

Bitcoin Market Sentiment Dataset

- **Source:** Alternative.me (Fear & Greed Index)
- **Columns:** date, value (0-100), classification (Extreme Fear, Fear, Neutral, Greed, Extreme Greed)
- **Granularity:** Daily sentiment score

Hyperliquid Historical Trader Data

- **Source:** Hyperliquid trading logs
- **Columns:** account, coin, execution price, side (BUY/SELL), timestamp, size, closed PnL, leverage, etc.
- **Granularity:** Transaction-level data

Merged Dataset

- Datasets were joined on timestamp converted to date
 - Final dataset contains over 25,000 rows of sentiment-aligned trade entries
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3. Data Cleaning and Preparation

- Handled missing values and dropped rows with incomplete data
- Renamed inconsistent columns for clarity and usability

- Converted timestamps into human-readable datetime objects
 - Created a date column to match sentiment data
 - Merged both datasets using date as the key
 - Ensured numeric columns were correctly typed (float/integer)
 - Output saved as clean_trader_sentiment.csv
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4. Exploratory Data Analysis (EDA)

4.1 Sentiment Distribution

- **Greed (32%)** and **Neutral (30%)** dominate
- **Extreme Fear** and **Extreme Greed** represent 10-15% each but coincide with volatile behavior

4.2 Most Actively Traded Coins

- **Top Coins:** ETH, BTC, ZETA, ZEN
- **Observation:** Speculative coins (e.g., ZEN) show wild swings in PnL

4.3 Trading Behavior by Sentiment

- **Greed Phase:** Surge in BUY trades, especially in altcoins
- **Fear Phase:** Surge in SELL trades; traders exit risky positions

4.4 PnL by Sentiment

- **Extreme Greed & Fear:** Highest average PnL variability
- **Neutral:** Most stable, lower profit/loss range

4.5 Leverage Insights

- Higher leverage used during "Fear" phases
 - Best average PnL found in leverage range **2x - 4x**
 - Losses spike with **>8x leverage**
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5. Power BI Dashboard Insights

The Power BI dashboard adds an interactive storytelling layer to our analysis. It includes KPIs, bar charts, and slicers based on sentiment, coin, and PnL.

Key Visualizations:

BUY Behavior During Greed

- Dashboard reveals BUY trades surge during **Greed** and **Extreme Greed**
- Speculative coins (e.g., ZEN) are favored during optimism

SELL Behavior During Fear

- Traders SELL more during **Fear** phases, suggesting reactive behavior
- High exit rates seen in BTC and ETH during sentiment downturns

Coin-wise PnL and Leverage Use

- Highest PnL achieved in **ETH** and **ZETA** during Greed
- Highest losses observed in **ZEN** during the same period

Interactive Filters:

- Sentiment slicer allows switching between emotional states
 - Leverage filter reveals risk appetite vs. reward ratio
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6. Insights & Takeaways

- Sentiment **heavily impacts** trading volume and decision-making
 - Greed encourages risky asset allocation and higher trade sizes
 - Fear drives SELL decisions, often prematurely
 - Controlled leverage during moderate sentiment leads to better risk-adjusted returns
 - ZEN shows high volatility; ETH remains the most consistent performer
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7. Tools & Technologies Used

- **Python**: Data cleaning, merging, EDA (Pandas, Seaborn, Matplotlib)
 - **Google Colab**: Interactive notebook environment for execution
 - **Power BI**: For dashboards and interactivity
 - **GitHub**: Project repository and documentation
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8. Final Notes

This project is designed to showcase a data scientist's ability to:

- Handle and clean multi-source datasets

- Discover meaningful patterns through EDA
- Build compelling dashboards for stakeholders
- Demonstrate behavioral finance insights through data

Project Repository: <https://github.com/Abhishikt07/Trader-Behavior-Insights>

Thank you for reviewing this project!