

Trader Behavior vs Market Sentiment – Insights Report

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1. Introduction

The purpose of this analysis is to understand how **crypto trader performance** aligns or diverges from **market sentiment**, as captured by the Bitcoin *Fear & Greed Index*.

Two datasets were provided:

1. **Trader History Data (Hyperliquid)** – individual trades with execution price, size, side, PnL, etc.
2. **Fear & Greed Index** – a daily sentiment indicator ranging from *Extreme Fear* to *Extreme Greed*.

By combining these datasets, we can explore whether trader decisions and outcomes (profitability, trade size, risk-taking) are influenced by market psychology.

2. Methodology

The steps followed were:

1. **Data Cleaning & Preprocessing**
 - Converted Unix timestamps in trader data to readable dates.
 - Standardized sentiment dates and categories (collapsed into *Fear*, *Neutral*, *Greed*).
 - Merged trader data with sentiment data on the date field.
2. **Feature Engineering**
 - Created a binary flag `is_win` (1 if trade PnL > 0, else 0).
 - Aggregated daily statistics: total PnL, average PnL, win rate, average trade size.
 - Produced summaries at both **daily** and **sentiment-level** granularity.
3. **Exploratory Analysis**
 - Visualized trade-level PnL distributions across sentiment classes.

- Compared win rates and trade sizes across *Fear vs Greed*.
- Analyzed daily PnL fluctuations over time.

4. Outputs

- Processed CSV files (csv_files/).
- Visualizations (outputs/).
- This report summarizing findings.

3. Results & Insights

3.1 Profitability (Closed PnL)

- **Trades during Greed periods showed higher variance in PnL**, with both large profits and large losses.
- **Fear periods were more conservative**: smaller average PnL, fewer extreme outcomes.

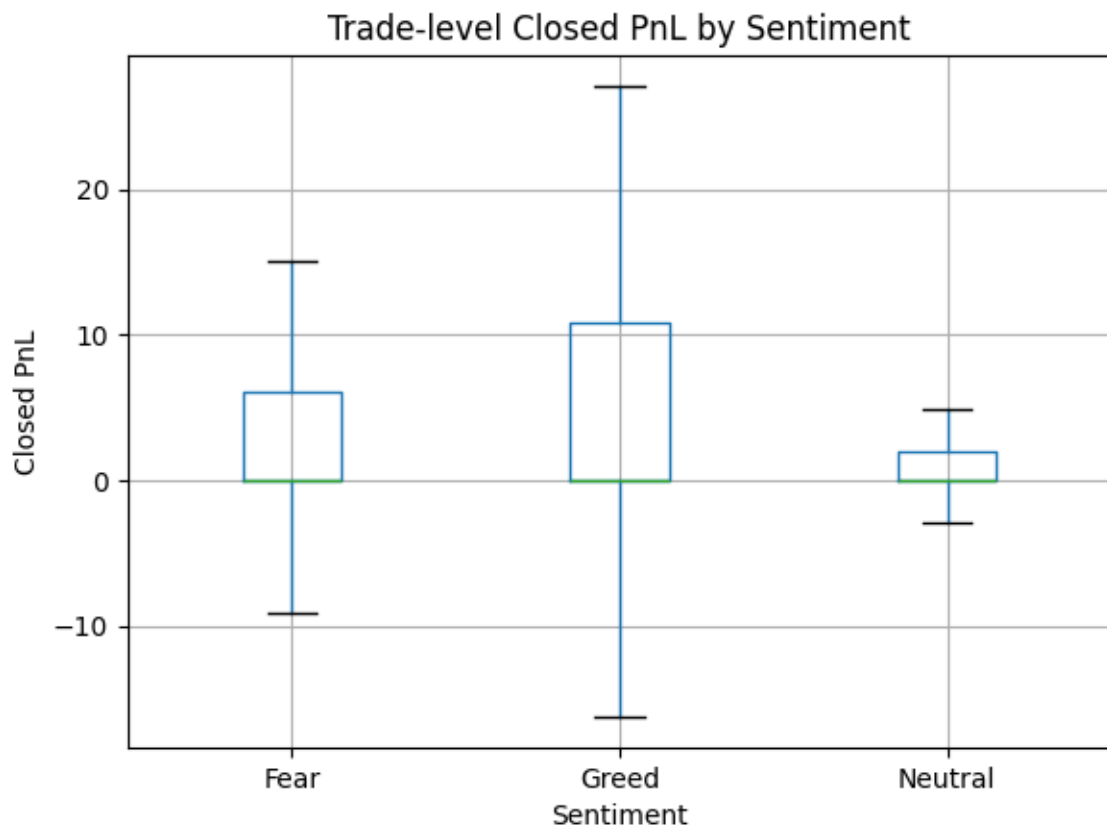


Figure 1: Boxplot – Trade-level PnL by Sentiment

3.2 Win Rates

- Win rates were **not uniform across sentiments**.
- **Greed periods showed a higher average win rate** compared to Fear.
- This suggests traders may ride stronger market trends when sentiment is optimistic.

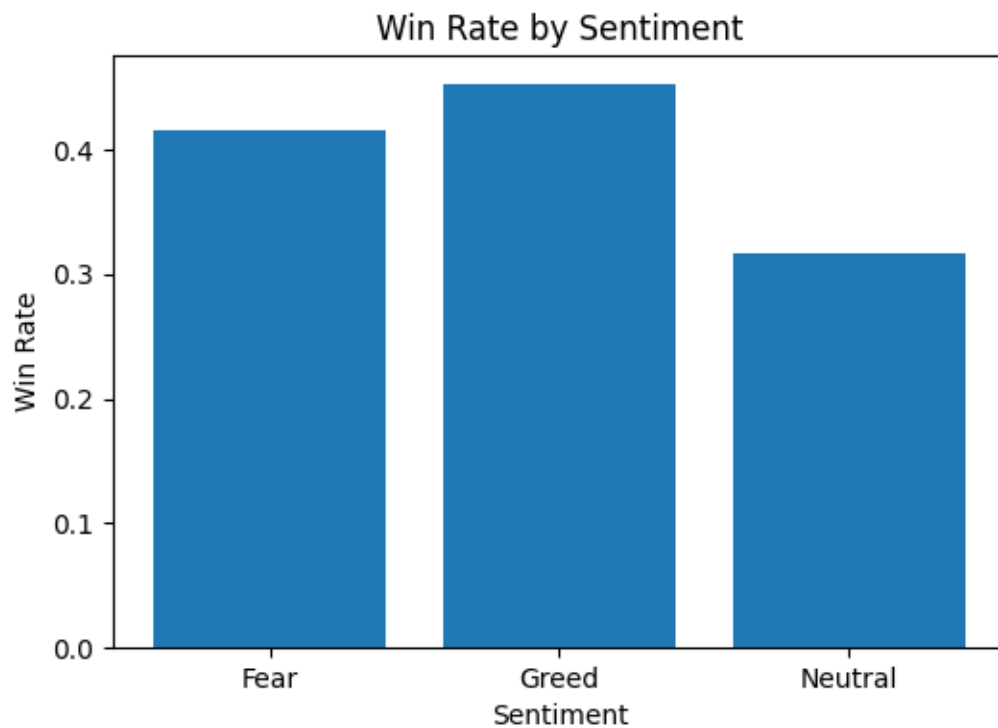


Figure 2: Bar chart – Win Rate by Sentiment

3.3 Trade Size & Risk

- **Trade sizes (in USD) were larger during Greed.**
- In Fear periods, traders tended to reduce exposure and position sizes.
- This indicates **risk appetite is sentiment-driven**.

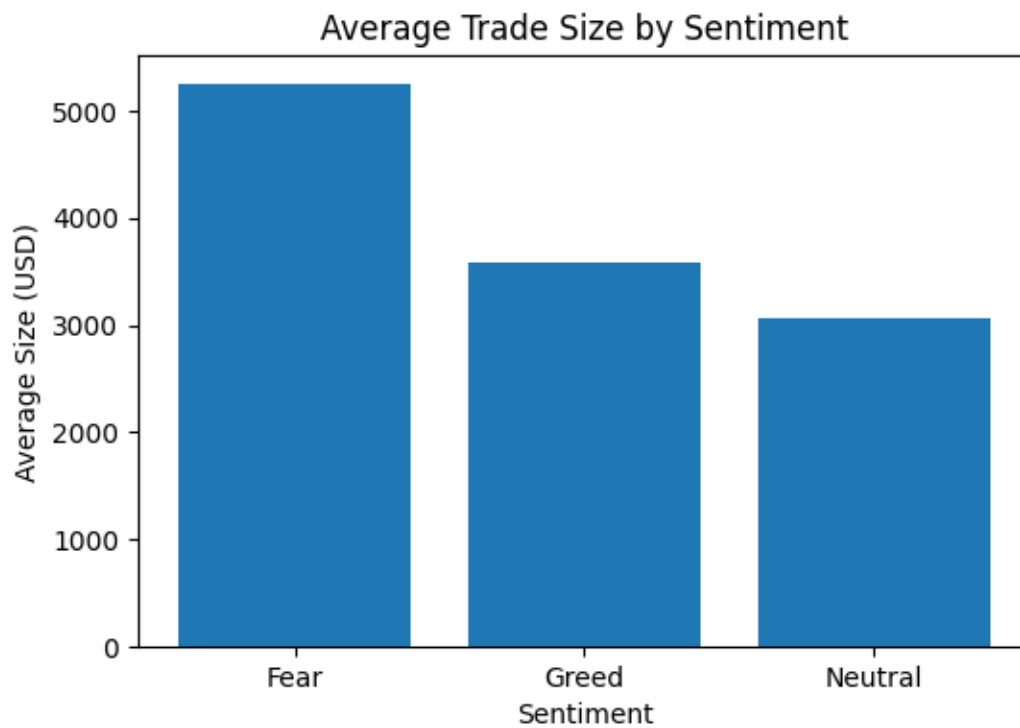


Figure 3: Bar chart – Average Trade Size by Sentiment

3.4 Daily Trends

- Daily total PnL fluctuated significantly with sentiment swings.
- Periods of rapid transition (Fear → Greed, or vice versa) coincided with spikes in volatility.

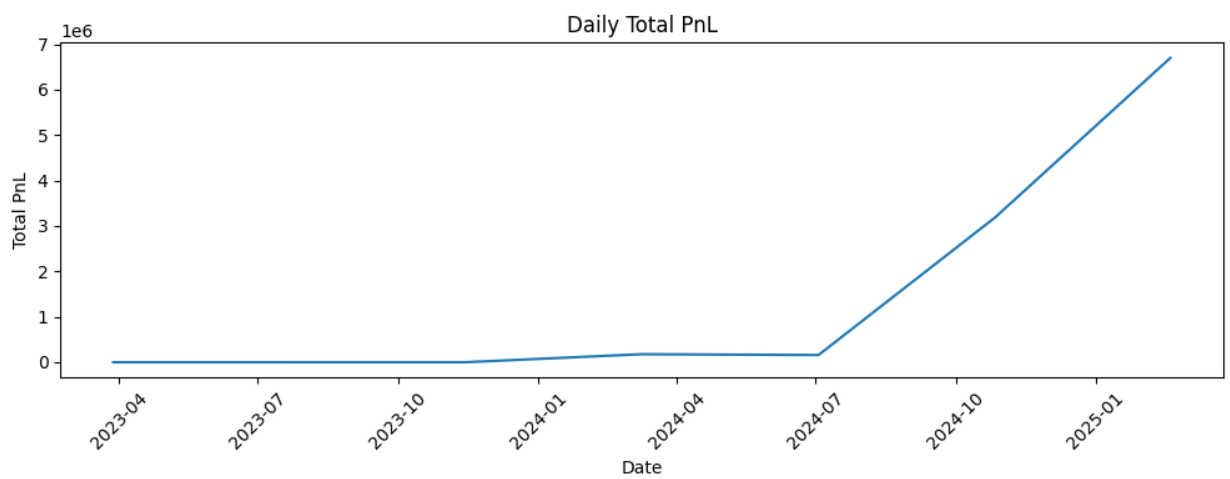


Figure 4: Time-Series – Daily Total PnL

4. Conclusion

This analysis shows that **market sentiment influences trading behavior** in measurable ways:

- Traders are **more aggressive during Greed**, with larger trades and higher win rates.
- **Fear is associated with risk reduction**, smaller trades, and more cautious strategies.
- Profitability is more volatile in Greed, while Fear leads to stability but smaller outcomes.

Implications

- **For trading strategies:** Incorporating the Fear & Greed Index as a signal can help adjust risk. For example, reducing leverage in high-Greed environments to avoid blowups.
- **For further research:** A predictive model could be built using features like sentiment, leverage, and trade size to forecast trade profitability (is_win).