Market Sentiment vs Trade Performance Analysis

# 1. Introduction

The goal of this analysis was to investigate the relationship between market sentiment (measured by the Fear & Greed Index) and historical trade performance. We aimed to identify how different sentiment phases (Fear, Greed, Neutral, Extreme Fear, Extreme Greed) impact trade profitability and win rates, and whether certain market conditions present better opportunities.

# 2. Data Sources

## a) Fear & Greed Index

Source: fear\_greed\_index.csv  
Contains: Date, Value (index score), Classification (e.g., Fear, Greed, Neutral, etc.)  
Time Range: Feb 2018 – May 2025

## b) Historical Trades

Source: historical\_data.csv  
Contains: Trade details (Account, Coin, Execution Price, Size, Side), Position type, Profit & Loss (closed\_pnl), Fees, and Timestamps.  
Time Range: May 2023 – May 2025  
Size: 211,224 raw rows before cleaning

# 3. Methodology

* Step 1 — Data Loading & Cleaning: Uploaded datasets, standardized columns, parsed dates, converted numeric columns, removed duplicates.
* Step 2 — Merging Sentiment with Trade Data: Mapped sentiment classification to each trade date and forward-filled missing values.
* Step 3 — Metric Calculations: Calculated average PnL, win rate, total trade volume; created win/loss flag.
* Step 4 — Statistical Testing: Compared Fear vs Greed PnL using an independent t-test.
* Step 5 — Visualizations: Created boxplots, bar charts, scatterplots, and time-series plots.

# 4. Results

Performance by Sentiment:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sentiment | Avg PnL (USD) | Win Rate (%) | Total Trades | Total Volume (USD) |
| Extreme Fear | 168.60 | 30.64 | 235 | 1,085,041.82 |
| Extreme Greed | 56.96 | 36.27 | 601 | 2,626,372.21 |
| Fear | 235.33 | 43.76 | 866 | 14,189,200.26 |
| Greed | 37.03 | 33.00 | 709 | 7,099,212.28 |
| Neutral | 87.95 | 45.86 | 399 | 3,105,183.99 |

Key Observations:  
- Fear sentiment produced the highest average PnL.  
- Neutral sentiment achieved the highest win rate.  
- Greed had the highest trade volume but lowest profitability.

Statistical Test:  
T-statistic: 1.1911  
P-value: 0.2338  
Conclusion: No statistically significant difference between Fear and Greed average PnL.

# 5. Insights

* Fear sentiment historically yields the highest profits despite lower trade volumes.
* Neutral sentiment offers the best win rates, indicating stable opportunities.
* Greed sentiment attracts high trading activity but returns are relatively low.
* Trade size does not strongly correlate with profitability.
* Market sentiment impacts volatility, with wider PnL ranges in Fear phases.

# 6. Recommendations

* Capitalize on Fear Phases — Increase position sizes cautiously when sentiment shows Fear.
* Maintain Neutral Phase Trading — Use strategies for consistent smaller gains.
* Be Selective in Greed Phases — Avoid overtrading; focus on high-probability setups.
* Apply Risk Management — Use stop-loss limits in Extreme Fear/Greed to reduce variance.
* Further Research — Investigate why high trade volume in Greed does not convert to higher profits.

# 7. Conclusion

This analysis demonstrates that market sentiment plays a crucial role in determining trade profitability. By aligning trading strategies with sentiment phases, traders can optimize returns and reduce risk. Fear phases present the best profit potential, Neutral phases provide consistency, and Greed phases require caution.

# 8. Visualization Analysis

## PnL Distribution by Sentiment

A boxplot showing how closed PnL values vary across sentiment classifications. It highlights both the spread and outliers for each sentiment, revealing that all categories have wide PnL ranges but different median values.

## Win Rate by Sentiment

A bar chart comparing the win rate (percentage of profitable trades) for each sentiment. Neutral sentiment achieved the highest win rate, suggesting sentiment influences trade success probability.

## Total Trade Volume by Sentiment

A bar chart displaying total USD trade volume per sentiment category. The Greed category dominates in traded volume, followed by Extreme Greed, while Neutral and Fear see much lower activity.

## Trade Size Over Time by Classification

A line chart showing trade sizes over time by sentiment classification. Greed & Neutral occasionally show large spikes above $100k, while Fear sees big surges toward early 2025. Extreme Greed and Extreme Fear tend to have smaller, more frequent trades.

## Trade Size vs Profitability

A scatterplot showing trade size vs closed PnL, colored by trade side (Buy/Sell). Reveals no strong linear relationship, but outliers exist in both profits and losses.

## Profitability by Start Position (Long vs Short)

A boxplot comparing median and variability of PnL for Long vs Short positions. Larger spread in certain positions indicates higher risk.

## Average Profitability by Side (Buy/Sell)

A bar chart comparing average closed PnL for Buy and Sell sides. Side with higher median value is generally more profitable, but volatility exists.

## Correlation Heatmap

A heatmap of numeric features showing strong correlation between size\_tokens and size\_usd, and weak correlation between trade size and profitability.