

Trader Behavior Insights

Trader Behavior & Market Sentiment Analysis

This report explores the relationship between trader performance and overall market sentiment in the Bitcoin market. Two datasets were used: **Historical Trader Data (Hyperliquid)** – 211,224 trades with details like execution price, size, side, PnL. **Bitcoin Fear & Greed Index** – 2,644 records with daily market sentiment classifications. The goal is to uncover how trading outcomes (profitability, leverage, win rates, risk) align or diverge from market sentiment, and to identify hidden trends that can inform smarter trading strategies.

Methodology:

- Data cleaning: timestamps, standardized sentiment, proxy leverage.
- Feature engineering: win_flag, notional, lagged sentiment.
- Exploratory Data Analysis: distributions, leverage, win rates.
- Hypothesis testing: Levene and ANOVA.
- Modeling: regression and classification.
- Risk analysis: VaR & CVaR at 95%.

Key Findings:

- **Profitability & Sentiment:** Extreme Greed had highest PnL (~67) and win rate (~46%), Neutral lowest (~34).
- **Leverage:** Fear phases showed highest leverage, Neutral moderate.
- **Lagged Sentiment:** Yesterday's Extreme Greed → higher PnL (~62) and win rate (~46%) today.
- **Hypothesis Tests:** ANOVA $p=2.57e-07$, Levene $p=5.5e-07$ → profitability and variance differ significantly across sentiments.
- **Regression:** Linear regression failed ($R^2 = -0.059$).
- **Classification:** Accuracy 91.7%, Precision 0.83, Recall 0.99 → effective win/loss predictor.
- **Risk:** Extreme Fear highest downside risk (CVaR ~582), Extreme Greed lowest (~135).

Relationship between trader performance and market sentiment in the Bitcoin market.

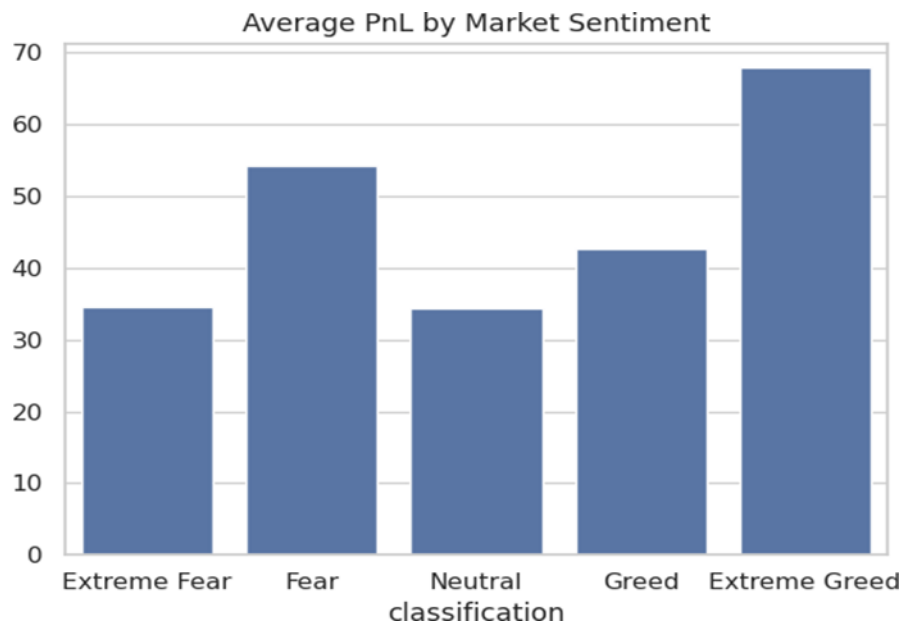


Figure 1: Average PnL by Market Sentiment

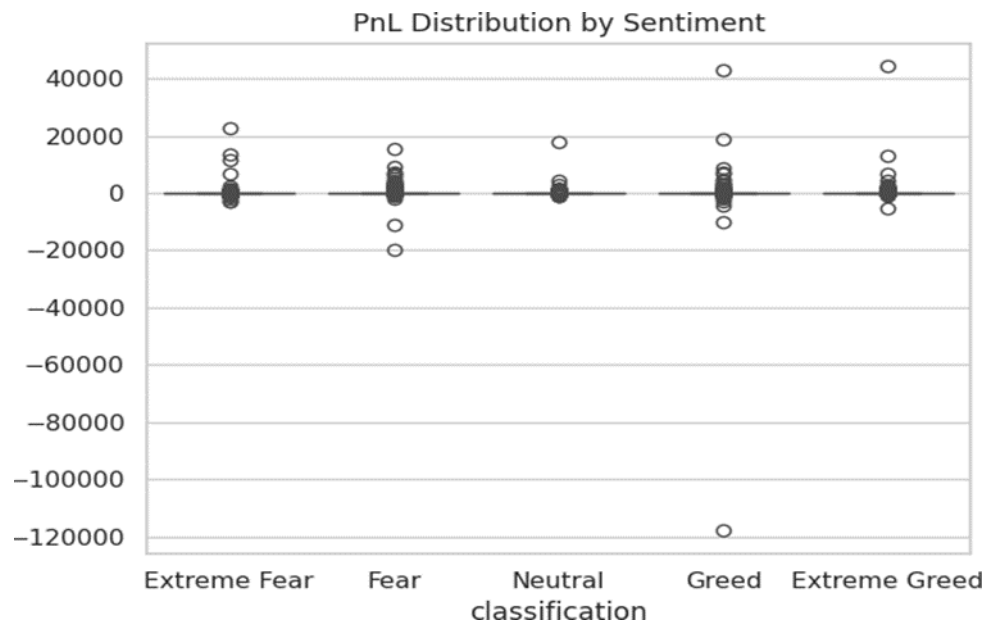


Figure 2: PnL Distribution by Sentiment

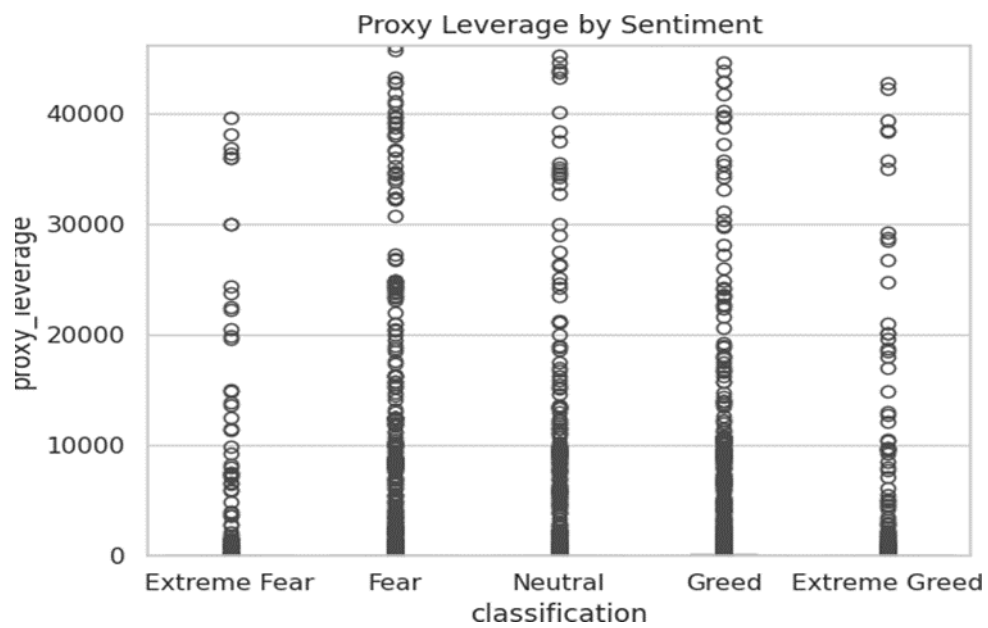


Figure 3: Proxy Leverage by Sentiment

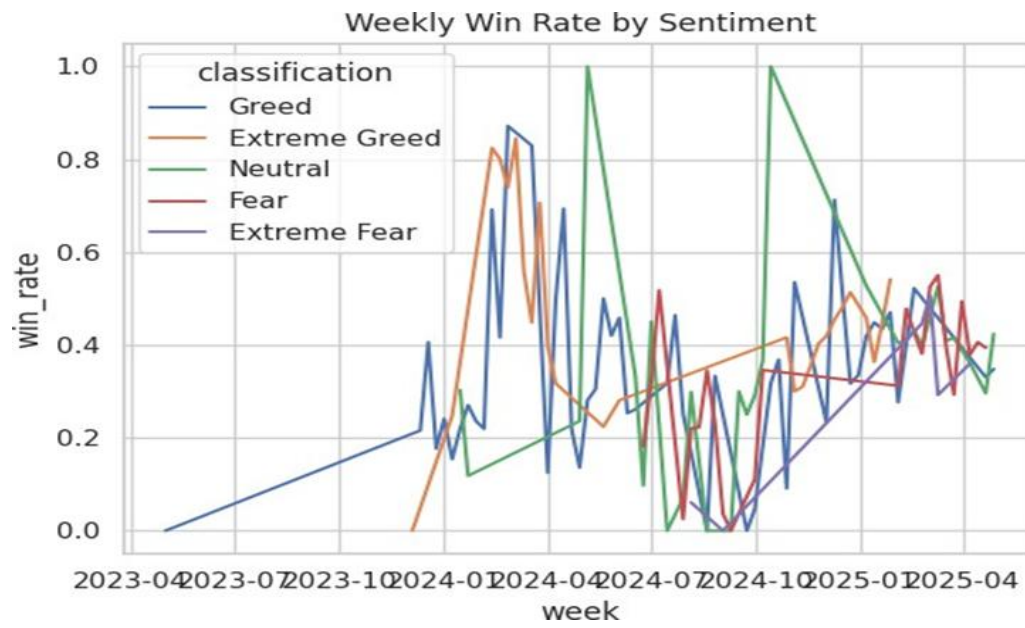


Figure 4: Weekly Win Rate by Sentiment

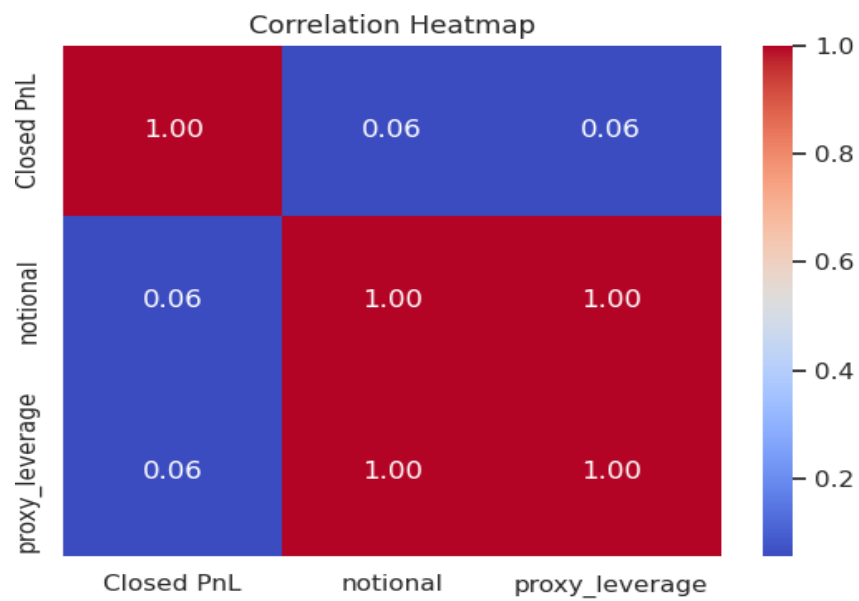


Figure 5: Correlation Heatmap

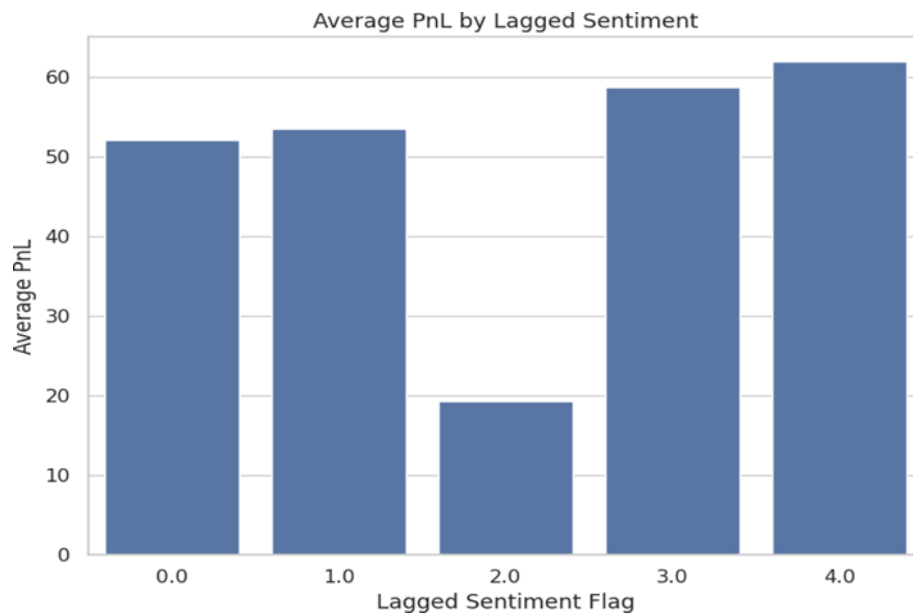


Figure 6: Average PnL by Lagged Sentiment

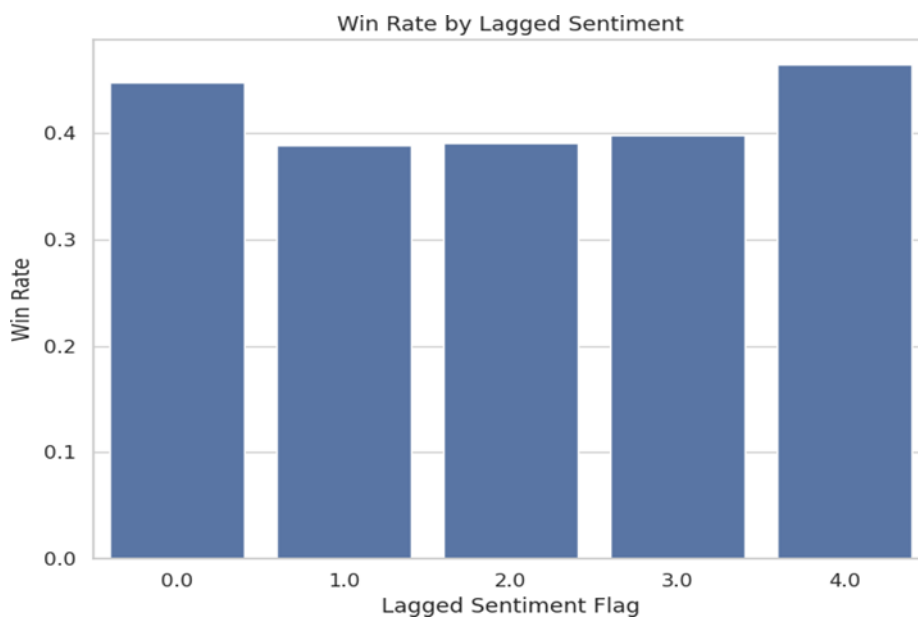


Figure 7: Win Rate by Lagged Sentiment

Conclusion:

- Market sentiment strongly influences trading outcomes.
- Extreme Greed → higher profitability, higher win rates, and lower downside risk.
- Extreme Fear → higher leverage, lowest win rates, and highest losses.
- Momentum effect observed: yesterday's sentiment impacts today's performance.
- Classification models (win/loss) are more effective than regression for this dataset.

Business Implication: Incorporating sentiment signals into risk management (e.g., reducing leverage during fear, exploiting greed-driven momentum) can improve trading strategies.