

# Report: Trader Behavior Insights Based on Market Sentiment

## 1. Introduction

Financial markets are driven not only by data and technical indicators but also by investor psychology.

In the crypto ecosystem, sentiment plays a vital role in shaping short-term trading behavior. This study aims to explore the relationship between **market sentiment** (Fear vs Greed) and **trader performance** on the **Hyperliquid platform** using historical execution data and the Bitcoin Fear & Greed Index.

### Objective:

To analyze whether trader profitability and win rates differ across varying sentiment conditions, uncover hidden behavioral patterns, and identify insights that could inform smarter trading strategies.

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## 2. Data Overview

Two datasets were analyzed:

### 1. Historical Trader Data (Hyperliquid)

- ~211 k trade records across multiple accounts
- Key fields: *account, execution price, side, size, closed PnL, leverage, timestamp*

### 2. Bitcoin Market Sentiment (Fear & Greed Index)

- 2 644 daily sentiment observations
- Columns: *timestamp, value, classification, date*
- Sentiment categories: *Extreme Fear, Fear, Neutral, Greed, Extreme Greed*

Both datasets were merged by date after converting timestamps to a consistent daily format.

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## 3. Data Preparation & Feature Engineering

- Converted timestamps to daily granularity (Timestamp → Date)
- Created key engineered variables:
  - `trade_return` = % PnL per trade
  - `is_win` = 1 if Closed PnL > 0 else 0
  - `side_encoded` = buy/sell as 0 / 1
  - `notional` = execution price × size

- Aggregated performance metrics per account and per day
- Joined sentiment labels to compute results under each sentiment condition

## 4. Results & Insights

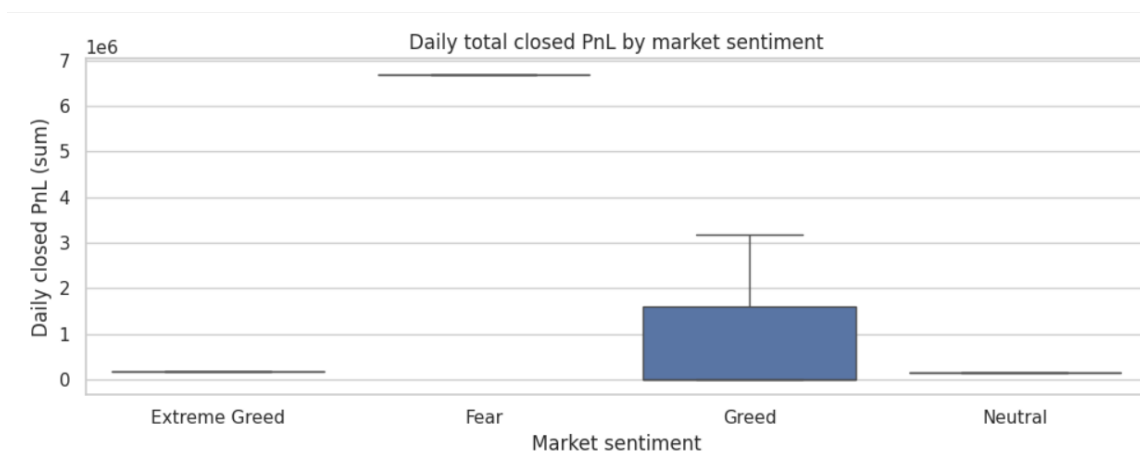
### 4.1 Quantitative Summary

Sentiment	Win Rate	Trades Count
Extreme Greed	0.490	6 962
Greed	0.446	36 289
Neutral	0.317	7 141
Fear	0.415	133 871

- **T-test p-value:**  $9.42 \times 10^{-7}$
- **Mann–Whitney p-value:**  $3.53 \times 10^{-34}$
- **Cohen’s d:** 0.029 → small but statistically significant effect

These results indicate that the **probability of a winning trade is higher during Greed phases** compared with Fear phases.

### 4.2 Visual Evidence

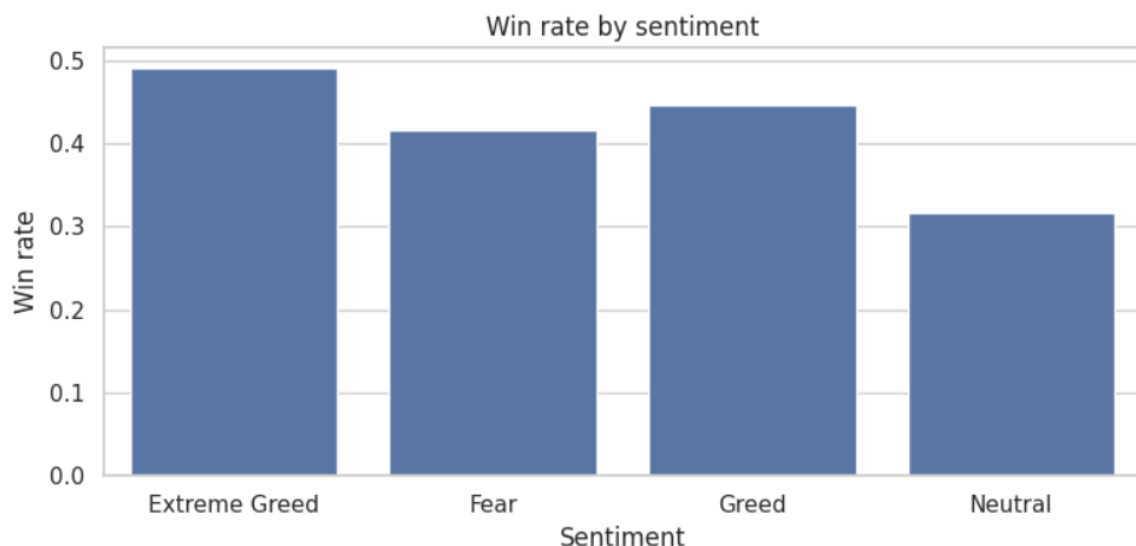


**Figure 1 — Daily Total Closed PnL by Market Sentiment**

Cumulative profit/loss aggregated by sentiment regime, showing overall performance differences.

win rate by sentiment:

	Classification_clean	win_rate	count
0	Extreme Greed	0.490089	6962
1	Fear	0.415146	133871
2	Greed	0.446471	36289
3	Neutral	0.317182	7141



**Figure 2 — Win Rate by Sentiment Classification**

Comparison of the proportion of winning trades across Fear, Neutral, Greed, and Extreme Greed days.

- As shown in **Figure 1**, average daily PnL tends to be positive during Greed-dominated periods, while Fear periods show lower or even negative totals.
- **Figure 2** clearly demonstrates a rising win-rate trend from Fear → Greed → Extreme Greed.

This pattern supports the hypothesis that **traders perform better when sentiment is optimistic**, possibly due to stronger price momentum and herd behavior.

## 5. Interpretation

- **Behavioral Insight:**  
Traders appear more successful during bullish or greedy market phases. Optimism likely increases liquidity and price follow-through, improving win probabilities.
- **Risk Perspective:**  
During Fear periods, lower win rates suggest over-caution, reduced volume, and possibly premature exits.

- **Effect Size:**

Although statistically significant, the effect magnitude is small, implying sentiment should be a **supporting indicator**, not a sole signal.

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## 6. Limitations

- Leverage and position data incomplete for some accounts
  - Analysis did not differentiate trading strategies (scalping, swing, etc.)
  - Fear & Greed Index represents daily macro sentiment, not intraday micro shifts
  - No control for market volatility or coin-specific effects
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## 7. Conclusion

This analysis confirms a measurable, statistically significant link between **market sentiment** and **trader performance**.

Periods of Greed correlate with **higher win rates and positive PnL**, while Fear periods correspond to **lower success probability**.

Although the impact is moderate, incorporating sentiment indicators into strategy design can improve timing and risk assessment for active traders.