Trader Behavior and Market Sentiment

Hyperliquid Data × Bitcoin Fear–Greed Index

Summary

This study investigates how trader behavior including profitability, risk exposure and trade volume aligns or diverges from overall market sentiment. Two datasets were used: Hyperliquid historical trading data and the Bitcoin Fear Greed Index (FNG).

By merging and analyzing these sources, the report identifies a clear behavioral pattern:

- Trading **volume** and **risk intensity** rise sharply during *Greed* and *Extreme Greed* phases.
- Continuous sentiment analysis reveals that **trader behavior responds to sentiment shifts**, but **returns do not consistently follow the same trend**.

In summary, traders scale up exposure when the market feels euphoric but do not achieve proportionally higher gains.

1. Objective

The purpose of this analysis is to understand how trader behavior varies across different market sentiment phases.

2. Data Overview

2.1 Bitcoin Fear–Greed Index (FNG)

- **Period:** 2018-02-01 → 2025-05-02
- **Columns:** timestamp, value, classification (Extreme Fear, Fear, Greed, Extreme Greed)
- **Frequency:** Daily sentiment indicator (0 = Extreme Fear, 100 = Extreme Greed)

Distribution:

Classification	Days
Extreme Fear	508

Fear	781
Greed	633
Extreme Greed	326
Unlabeled / NaN	396

2.2 Hyperliquid Trader Dataset

- **Period:** 2023-03-28 → 2025-06-15
- **Granularity:** Per-trade
- **Columns:**
  account, coin, execution_price, size_usd, size_tokens, side, timestamp_ist,
  closed_pnl, crossed, start_position, fee, trade_id, order_id, direction, timestamp.
- **Row count:** 211,225 trades

2.3 Combined Dataset

After converting timestamps to a **tz daily key** and merging on date, the intersection of both datasets (2023–2025) provided labeled trades with corresponding sentiment classifications.

3. Data Preparation

1. **Datetime normalization:**
   Both datasets were converted from UTC/IST to timezone-neutral daily timestamps (trade_date_ts, fng_date_ts).

2. **Sentiment standardization:**
   Text values were normalized to four distinct classes — *Extreme Fear*, *Fear*, *Greed*, *Extreme Greed*.

3. **Feature engineering:**

   - is_win = 1 if closed_pnl > 0
   - dollar_volume = trade notional value (size_usd or size × execution_price)
   - risk_intensity = exposure proxy (equal to size_usd when leverage unavailable)

4. Time-Period Consideration

Although the Fear–Greed Index covers 2018–2025, the trading dataset begins only in 2023. Therefore, meaningful analysis was limited to **2023–2025**, the period where both sentiment and trading data

overlap. Earlier sentiment data (2018–2022) was excluded from behavioral analysis since it lacked corresponding trade records.

5. Visual Analysis and Key Findings

(All figures saved under /outputs/.)

5.1 Daily Total PnL by Sentiment

- Greed and Extreme Greed dominate trading activity and overall PnL contribution.
- Fear periods are fewer but occasionally exhibit higher efficiency (PnL per trade).

5.2 Average Metrics by Sentiment

- Dollar volume and risk intensity grow steadily from Fear → Extreme Greed.
- Win rate and average PnL remain nearly constant.
- Confirms that traders take on larger exposure without proportional returns.

5.3 Win Rate by Sentiment

- Minimal variance in win rate between Fear and Greed phases.
- Suggests sentiment affects confidence and trade frequency more than actual success rate.

5.4 Dollar Volume and Risk Exposure

- Clear positive relationship between sentiment level and average exposure.
- Traders amplify position size as optimism increases.

5.5 Trades Per Day by Sentiment

- Distinct spikes in trading frequency during Greed and Extreme Greed days.
- Indicates herd behavior during euphoric market conditions.

5.6 Daily PnL vs Dollar Volume Scatter Plot

- High-volume days cluster within Greed regimes.
- Fear phase points appear sparse but sometimes yield better PnL ratios.

5.7 Cumulative PnL Over Time

- Aggregate profitability rises mainly in Greed-heavy stretches.
- PnL growth is driven more by participation volume than by higher accuracy.

6. Recommendations

1. **Sentiment-Aware Risk Control**
    - Introduce exposure caps when sentiment_value > 75 (Extreme Greed).
    - Scale down leverage or position size during euphoric markets.
2. **Balanced Participation During Fear**
    - Maintain controlled exposure in Fear phases; data shows comparable or better risk-adjusted returns.
3. **Use Sentiment as Context, Not Signal**
    - Employ sentiment metrics for **risk modulation**, not direct entry timing.
4. **Future Expansion**
    - Extend analysis once newer FNG data (post-May 2025) becomes available.
    - Incorporate per-symbol and per-account analysis for deeper behavioral segmentation.

7. Limitations and Future Work

- **Leverage data** absent → risk intensity estimated from notional exposure.\
- **Temporal imbalance** — majority of labeled trades fall under Greed phases.
- **Future enhancement:** include volatility controls, per-symbol beta, and newer sentiment data to validate trends.

8. Conclusion

Across the 2023–2025 observation window, **market greed coincides with higher trading volume and risk exposure** but not with higher profitability.

These results underline a core behavioral finance principle: **sentiment influences actions more than outcomes.**
The study ultimately highlights the value of **sentiment-aware risk management** reducing exposure and maintaining composure during fear-driven downturns.

Prepared by: Shruti Tyagi
Project: Trader Behavior vs. Market Sentiment
Date: 12 October 2025