

# Trader Behaviour vs Market Sentiment Analysis

## Executive Summary

This analysis examines how trader performance and risk-taking behaviour on Hyperliquid correlates with overall Bitcoin market sentiment (Fear vs. Greed). By integrating historical data on individual traders with the Bitcoin Fear & Greed Index, we find strong patterns that distinguish profitable market regimes from difficult ones.

Main Finding: Market sentiment is not linearly predictive of profitability, but when categorized into regimes (Fear, Neutral, Greed, Extreme Greed), strong behavioural and performance asymmetries emerge, particularly between large ("Whale") and small ("Retail") traders. The bulk of alpha is produced in Greed-driven regimes, while Neutral markets are a performance trap.

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## Data Description

### 1. Bitcoin Market Sentiment Dataset

- **Source:** Fear & Greed Index
- **Columns:** Date, Classification (Fear / Neutral / Greed / Extreme Greed)
- Used to define discrete market regimes rather than raw sentiment scores.

### 2. Historical Trader Data

- **Granularity:** Trade-level execution data
  - **Key fields:** account, symbol, execution\_price, size, side, time, closedPnL, leverage, start\_position, event
  - Trades were enriched with USD notional size and aligned temporally with sentiment regimes.
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## Methodology

### 1. Data Cleaning & Alignment

- Parsed timestamps and merged trader data with daily sentiment classifications.
- Normalized trade size into USD terms for comparability.

### 2. Feature Engineering

- Created categorical sentiment regimes.
- Segmented traders by trade size (Retail vs Whale behaviour).
- Applied capped medians and distributional analysis to reduce outlier bias.

### 3. Evaluation Metrics

- Closed PnL (total and per-trade)

- Win rate
  - Profit factor
  - Trade size distributions
  - Correlation analysis between sentiment, size, and profitability
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## Key Findings

### 0. Volume–PnL Asymmetry During Extreme Greed

- Trading volume increases by **~40% during Extreme Greed**, indicating heightened participation and confidence.
- However, **average PnL drops by ~15%** in the same regime, driven by excessive leverage and overcrowded positioning.

**Insight:** This highlights late-cycle behaviour where risk increases faster than returns. A contrarian approach—reducing leverage during Greed—appears structurally superior.

#### 1. The “Whale” Logic Is Confirmed (Trade Size Engineering)

- Strong positive correlation (**0.61**) between Size USD and relative\_trade\_size.

**Insight:** Identified Whale trades are not just large in dollar terms, but disproportionately large relative to each asset’s normal trade size—clear evidence of high-conviction positioning.

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### 2. Sentiment Score Is a Weak Direct Driver

- Continuous sentiment (value) shows near-zero correlation (–0.02 to 0.02) with trade size, relative size, and Closed PnL.

**Insight:** Traders do not materially adjust execution risk based on the exact sentiment score. Sentiment acts as a macro regime filter, not a micro trade trigger.

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### 3. Size Does Not Guarantee Profit

- Correlation between Size USD and Closed PnL is weak (**0.14**).

**Insight:** Large trades are not inherently more profitable. Many Whale-sized trades likely represent hedging, inventory management, or low-edge positioning.

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### 4. Sentiment Is Regime-Based, Not Linear

- Raw sentiment values show **near-zero correlation** with profitability.
  - Alpha emerges only when sentiment is treated as **distinct market regimes**, not a continuous signal.
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## 2. Greed Drives the Majority of Profits

- Greed and Extreme Greed account for nearly all realized PnL in the dataset.
- Extreme Greed delivers the highest and most consistent returns, outperforming Neutral markets by ~2x.
- PnL time series shows a clear inflection in late 2024, coinciding precisely with Greed regimes.

## 3. Neutral Markets Are a Structural Trap

- Neutral sentiment consistently produces:
  - Lowest win rates (~32%)
  - Largest losses for Whale traders
  - Compressed trade size distributions
- Indicates "choppy", directionless price action where strategies fail to scale.

## 4. Fear Offers Risk-Adjusted Opportunity

- While nominal profits are lower than Greed, Fear regimes show superior profit factors.
- Whale traders maintain positive returns during Fear, suggesting disciplined accumulation when Retail participation declines.

## 5. Whale vs Retail Behaviour Divergence

- Whales capture outsized gains during Greed (~\$5,000 per trade median), while Retail remains near flat.
- Retail traders show low volatility but fail to monetize trending markets.
- During Fear, Whales remain profitable while Retail hesitates.

## 6. Size Does Not Equal Skill

- Win rate declines as trade size increases (~45% → 38.5%).
- Suggests emotional sizing or over-leveraging at higher notional exposure.
- Traders are most accurate when risk is lowest.

## 7. Whale vs Retail Behaviour by Sentiment Regime

### Whale Behaviour

- **Neutral Sentiment Is a Trap:** Whales suffer their largest losses during Neutral regimes, while Retail remains flat—suggesting overexposure in directionless markets.
- **Greed Is the Whale's Playground:** Highest average profits occur during Greed, benefiting from clear momentum.
- **Fear Resilience:** Whales remain profitable during Fear, consistent with disciplined dip accumulation.

### Retail Behavior

- **The Flatline Effect:** Retail PnL is consistently small relative to Whales, indicating limited market impact.

- **Consistency Over Impact:** Lower volatility but inability to monetize trends.

## 8. Why Median PnL Matters More Than Mean

- **Mean PnL:** Skewed upward by rare, extreme outliers—shows Greed as dominant.
- **Median PnL (5th–95th percentile capped):** Reveals Extreme Greed as the most sustainable regime for the typical trader.

By filtering out tail events, Extreme Greed delivers ~2× higher median profitability than Neutral markets, while Neutral regimes consistently underperform.

## 9. Statistical Validation

- Two-sample T-test between Fear and Greed PnL distributions yields **p-value < 0.001**.

**Insight:** Profitability differences across sentiment regimes are statistically significant, not random.

## 10. Strategic Implications

1. **Contrarian Risk Scaling:** Reduce leverage during Extreme Greed despite rising volume.
2. **Avoid Neutral Regimes:** Historically worst risk-adjusted outcomes, especially for Whales.
3. **Sentiment as Context, Not Signal:** Defines *when* to deploy capital, not execution size.
4. **Track Whale Accumulation During Fear:** Potential early-cycle indicator.

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## Conclusion

This analysis shows that how and when traders participate in the market matters more than how often they trade. Market sentiment by itself does not directly predict profits, but it strongly influences trader behaviour, risk-taking, and outcomes when viewed as clear regimes (Fear, Neutral, Greed, Extreme Greed).

The data highlights three practical truths. First, **Neutral markets are the most dangerous**, especially for large traders, as they lead to overtrading and poor risk-adjusted performance. Second, **Greed and Extreme Greed generate the majority of profits**, but Extreme Greed offers the most consistent returns for the typical trader once extreme outliers are removed. Third, **larger trade size does not guarantee higher profits**, confirming that leverage and timing matter more than capital alone.

Overall, successful trading on Hyperliquid appears to be less about predicting price direction and more about **selective participation**—scaling risk only during favourable sentiment regimes and reducing exposure when market conditions lack clear conviction. Using sentiment as a *contextual filter* rather than a trading signal provides a more robust and sustainable framework for real-world trading strategies.

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