

Trader Behavior Insights Using Market Sentiment

Objective

The goal of this analysis is to understand how trader behavior and performance change under different Bitcoin market sentiment conditions such as Fear, Greed, Extreme Fear, Extreme Greed, and Neutral. By combining historical trade-level data with the Bitcoin Fear & Greed Index, this study aims to identify behavioral patterns that can help in designing more informed and risk-aware trading strategies.

Datasets Used

Bitcoin Fear & Greed Index

This dataset provides a daily classification of overall market sentiment.
The key fields used were:

- `date`
- `classification` (Extreme Fear, Fear, Neutral, Greed, Extreme Greed)

It serves as a proxy for overall market psychology.

Hyperliquid Historical Trader Data

This dataset contains detailed information about individual trades executed by traders.
Key fields used in this analysis include:

- `Account`
- `Coin`
- `Side`
- `Size Tokens`
- `Closed PnL`

- `Timestamp IST`

This data allows us to study real trading behavior at a granular level.

Methodology

First, the datasets were cleaned and standardized to handle inconsistent column naming and timestamp formats. The trade timestamps were parsed using the localized `Timestamp IST` field and converted to daily granularity so they could be aligned with the sentiment data.

Next, the trading data was merged with the Fear & Greed Index using the date as a common key. Only trades with valid sentiment labels were retained for analysis.

Several additional features were then created to better capture trader behavior, including:

- A profitability indicator to identify winning trades
- Absolute PnL to measure trade impact regardless of direction
- Risk-adjusted PnL calculated using trade size in tokens

Finally, exploratory data analysis was performed to compare profitability, trade size, and PnL distributions across different sentiment regimes.

Key Findings

Trade Size Behavior

Trade sizes show a highly skewed distribution across all sentiment regimes. Most trades are relatively small, while a small number of very large trades account for a significant portion of total volume. This pattern is especially pronounced during Greed and Extreme Greed phases, where larger trades appear more frequently. Due to this heavy-tailed nature, log scaling was required to visualize trade size distributions effectively.

Profitability Across Sentiment Regimes

Average profitability tends to be higher during Greed and Extreme Greed periods, suggesting that optimistic market conditions offer greater profit opportunities. However, these periods also exhibit much higher volatility, indicating increased risk-taking and exposure.

In contrast, Fear-driven markets generally show lower average returns, but also highlight unstable trading behavior.

Median Trade Outcome

Across all sentiment categories, the median trade-level PnL is approximately zero. This indicates that most trades result in breakeven or very small gains or losses. Overall profitability is therefore driven by a relatively small number of large winning or losing trades, rather than by consistent profits on typical trades.

PnL Distribution Patterns

PnL distributions are sharply concentrated around zero with long positive and negative tails. Fear and Extreme Fear periods display wider spreads, suggesting emotional decision-making and inconsistent trade outcomes during times of market stress.

Trading Insights

- Traders tend to increase position sizes during Greed phases, making sentiment-aware risk limits particularly important in bullish markets.
- Since profitability is largely driven by tail events, effective tail-risk management is more critical than optimizing average trade outcomes.
- Incorporating market sentiment as contextual information can help traders adjust exposure and improve overall consistency.

Conclusion

Market sentiment has a clear and measurable influence on trader behavior and performance. Greed-driven markets offer higher profit potential but come with increased volatility and risk, while Fear-driven markets reflect emotional and less predictable trading patterns. These findings highlight the importance of disciplined, sentiment-aware risk management for achieving sustainable trading performance in crypto markets.