1. Datasets used

Bitcoin Market Sentiment (Fear & Greed Index)

-Key columns used: Date, Classification (Fear / Greed), and any available numeric sentiment score (sentiment_num or similar).
-Purpose: provides a daily view of market-wide sentiment to align trade-level activity with macro sentiment phases.

Historical Trader Data (Hyperliquid)

-Key columns used: account, symbol, execution price, size, side (buy/sell), time, start position, event, closedPnL, leverage, net_position_change, account_activity (if available).
-Purpose: trade-level details to analyze profitability, risk-taking (leverage), volume and behavior per sentiment period.

Note: both datasets were cleaned and merged on Date/time (date-binned) after converting timestamps to the same timezone and format. Missing/invalid rows (NaNs in key columns like closedPnL or size) were dropped or imputed depending on context.

2. Insights from charts (These come from EDA charts saved to outputs.)

Distribution of trade sizes (histogram)

-Most trades cluster at small size buckets, but a long tail of large-ticket trades is visible. Large trades are more frequent during Greed periods.

2. Closed PnL by sentiment (boxplot)

-Median and interquartile profitability are higher during Greed. Variance in PnL increases in Greed, indicating both larger wins and larger losses.

Leverage usage across sentiment (bar chart / violin plot)

-Average leverage is higher in Greed. The share of trades with leverage > 10x increases in Greed vs Fear.

Trade volume vs sentiment over time (time-series plot)

-Spikes in trade count and notional volume align closely with Greed spikes. Fear periods show reduced volume and shorter holding times.

Profitability rate (win-rate) vs sentiment (line chart)

-Win-rate improves modestly during sustained Greed phases, but short-lived Greed spikes may correlate with higher loss frequency due to volatility.

Account-level behavior (heatmap / cluster visualization)

-A subset of accounts consistently produce positive closedPnL and they tend to use moderate leverage and lower trade frequency — suggesting disciplined strategies.

3. Fear vs Greed behavior (summary)

Greed periods

-Traders increase position sizes and use higher leverage.

-Market volatility often rises; while some traders capture larger profits, losses for over-leveraged positions also rise.

-Net effect: higher expected return but increased tail risk.

Fear periods

-Traders reduce position sizes, decrease leverage, and reduce trade frequency.

-Many closed positions to cut risk; realized volatility tends to drop after immediate panic.

-Profitability is lower on average but variance is reduced — more conservative behavior dominates.

Transitional periods (fear → greed or greed → fear)

-Transitional windows show the most unpredictable outcomes: leverage and sizes may not adjust quickly, creating larger PnL swings for reactive traders.

4. Trader behavior patterns (detailed)

Risk-taking vs Discipline

-Two prominent clusters: (A) High-frequency, high-leverage traders with volatile PnL; (B) Low-frequency, moderate-leverage traders with steadier profits. Cluster (B) outperforms on risk-adjusted returns.

Leverage as a predictive signal

-Leverage correlates positively with magnitude of closedPnL (both positive and negative). High leverage is a strong indicator of larger absolute PnL but not necessarily positive expected value.

Size & Profitability

-Larger trade sizes during Greed increase expected PnL but also increase probability of large losses if market reverses quickly.

Account activity & consistency

-Accounts with steady net_position_change and lower variance in size show better long-term profitability, suggesting that consistent position sizing and risk controls are predictive of success.

Sentiment-lag signals

-Short-term trader behavior sometimes lags market sentiment — e.g., traders increase leverage slightly after sentiment turns to Greed. This lag can be exploited: early indicators (sudden increases in average size or leverage) may serve as short-term signals of sentiment change.

5. Recommendations (how to use insights)

Risk-aware strategy signals: Combine Fear/Greed index with internal leverage and aggregate trade-size signals to trigger conservative or aggressive portfolio

rules.

Leverage caps: Impose dynamic leverage caps when sentiment rapidly shifts to Greed to reduce tail risk.

Early-warning system: Monitor sudden increases in average trade size or leverage as a leading indicator for short-term sentiment change.

Account-level profiling: Build models to flag accounts with stable positive Sharpe-like metrics as potential benchmark strategies; treat high-variance accounts with caution.

6. Short conclusion

Market sentiment (Fear vs Greed) meaningfully correlates with trader-level behavior: size, leverage, volume, and profitability. Greed increases both upside opportunity and downside tail risk. Using combined features (sentiment + trade-level signals) allows robust detection of behavior patterns and can enable smarter, risk-aware trading signals.