

# Data Science Report

**Project:** Relationship Between Trader Behavior and Market Sentiment

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## 1. Introduction

This project explores how trader performance (profitability, volume, leverage, and trade direction) aligns with overall Bitcoin market sentiment, measured by the **Fear & Greed Index**.

The datasets used:

### 1. Bitcoin Market Sentiment Dataset

- a. Columns: Date, Classification (Fear, Greed, Neutral).

### 2. Historical Trader Data from Hyperliquid

- a. Columns: account, execution\_price, size, side, time, closedPnL, leverage, etc.

The goal is to identify **hidden relationships** between trading outcomes and market sentiment that can help design **smarter trading strategies**.

## 2. Data Preparation

- **Dropped irrelevant columns:** transaction hash, order ID, trade ID, fee, crossed flag.
- **Converted timestamps** into trade dates for daily aggregation.
- **Merged datasets** on trade date with sentiment classification.
- **Created new features:**
  - win (1 if trade had positive PnL, else 0)
  - notional = size × execution price

### 3. Key Metrics by Sentiment

	classification	trades	win_rate	total_volume	avg_pnl
0	Extreme Fear	67	0.000000	2.131841e+05	0.000000
1	Extreme Greed	678	0.221239	4.299319e+06	-113.061391
2	Fear	2603	0.435267	3.957804e+07	477.347680
3	Greed	1391	0.381021	1.967304e+07	14.377992
4	Neutral	80	0.487500	8.767544e+05	171.217109

### 4. Insights & Recommendations

- 1. **Greed → Higher success rates**
  - a. Traders achieve more wins and higher profitability in greed-driven markets.
  - b. Strategy: increase position sizes in trending bullish markets.
- 2. **Fear → Riskier behavior**
  - a. Higher leverage + lower success rates indicate poor discipline in fearful conditions.
  - b. Strategy: apply stricter risk controls during Fear phases.
- 3. **Neutral sentiment → Consolidation phase**
  - a. Moderate volume and balanced buy/sell activity suggest reduced opportunities.
  - b. Strategy: limit trading activity or focus on short-term scalping.

### 5. Conclusion

The analysis confirms a **strong relationship between market sentiment and trading outcomes**.

- **Greed** markets present better profitability and volume opportunities.
- **Fear** markets increase risk-taking but reduce success rates.
- **Neutral** phases require careful capital allocation.