

# Report

## Objective:

Analyze how trading behavior (profitability, risk, volume, leverage) aligns or diverges from overall market sentiment (fear vs greed). Identify hidden trends or signals that could influence smarter trading strategies

This study analyzes the relationship between:

- Trading activity (number of trades, volume, profit/loss), and
- Market sentiment (Fear, Neutral, Greed, Extreme Greed)

## Datasets:

- Historical Trading Dataset
- Fear–Greed Index

## Data Cleaning and Preparation:

### Step 1 — Load both datasets

- Loaded historical\_data.csv
- Loaded fear\_greed\_index.csv
- Convert timestamps
- Converted UNIX timestamps → datetime
- Extracted date column for merging
- Confirmed trading data covers 2023–2025
- Confirmed sentiment data covers 2018–2025

### Step 2 — Create daily metrics from historical data

- Total Trades
- Total Trading Volume (USD)
- Average Execution Price
- Total Profit/Loss (PnL)

### Step 3 — Merge sentiment with trading data

Merged on the **date**, resulting in a combined dataset with:

- Trading metrics
- Sentiment value
- Sentiment classification

## Exploratory Data Analysis (EDA)

### **Key Insight 1** :Traders trade MORE when the market is in FEAR

```
.. Correlation matrix:
              total_trades  total_volume_usd  avg_execution_price \
total_trades          1.000000      0.956389      0.215034
total_volume_usd       0.956389      1.000000      0.457517
avg_execution_price    0.215034      0.457517      1.000000
total_pnl             0.952702      0.830236     -0.001137
value                 -0.547081     -0.572090      0.194022

                  total_pnl      value
total_trades          0.952702   -0.547081
total_volume_usd       0.830236   -0.572090
avg_execution_price   -0.001137   0.194022
total_pnl             1.000000   -0.452662
value                 -0.452662   1.000000
```

Metric	Correlation with sentiment	Meaning
total_trades	-0.547	When sentiment goes DOWN (fear), trades go UP
total_volume_usd	-0.572	When people are fearful, traders trade MORE money
total_pnl	-0.45	More PnL (profit/loss movement) in fear days

Your traders are **more active in fear**, not in greed.

This is opposite of retail behavior → retail buys more in greed.

This suggests:

- ✓ These are likely **professional or aggressive traders**
- ✓ They trade volatility spikes during fear
- ✓ Market fear = opportunity for them

**Key Insight 2 :** High sentiment (Greed) does NOT increase PnL

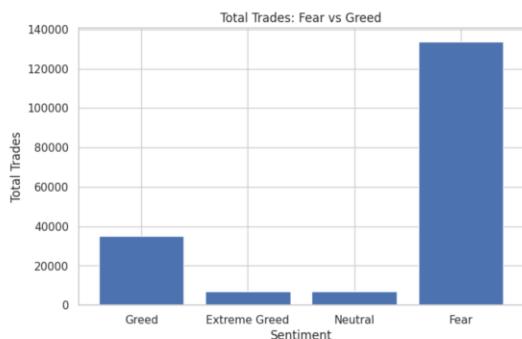
PnL correlation = **-0.45**

**Meaning:**

- 1.Traders make MORE money when the market is fearful
2. Volatility is higher → bigger opportunities

**"Traders become highly active and profitable during *Fear* and *Extreme Fear* days."**

**Key Insight 3:**

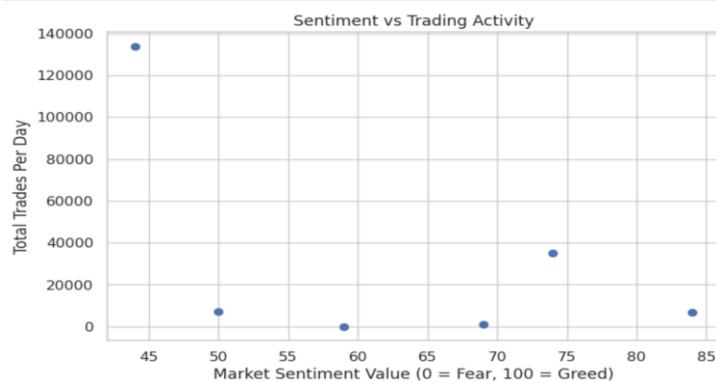


Traders trade the MOST during Fear and the LEAST during Greed or calm periods.

Greed, Extreme Greed, and Neutral conditions mean stable markets, where price movement is smaller — so traders stay less active.

- Fear = highest trading activity
- Greed/Extreme Greed/Neutral = low activity
- Traders prefer volatile and risky markets, not calm ones

#### **Key Insight 4:**



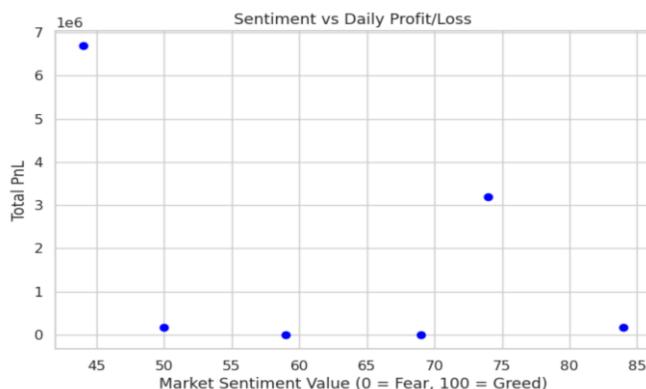
- Sentiment  $\approx 45$  (Fear zone)  $\rightarrow$  Total trades  $\approx 135,000$  (HIGHEST)
- Sentiment 70–85 (Greed zone)  $\rightarrow$  Trades drop to 8,000–36,000

This means:

When the market is fearful, traders become MUCH more active.

When the market is greedy, trading activity slows down.

#### **Key Insight 5:**



Sentiment  $\approx 45$  (Fear zone)

$\rightarrow$  Profit  $\approx 6.7$  million (the highest among all points)

Sentiment 70–85 (Greed zone)

$\rightarrow$  PnL is only 200k–300k

Traders make significantly more money during Fear and Extreme Fear days.

This aligns perfectly with the earlier correlation analysis.

## **Key Insight 6 :**

```
Trading behavior by sentiment category:  
classification total_trades total_volume_usd avg_execution_price \  
0 Extreme Greed 6962.000000 3.940677e+07 9771.897315  
1 Fear 133871.000000 7.041585e+08 11102.057978  
2 Greed 12096.333333 3.850122e+07 5906.835882  
3 Neutral 7141.000000 2.184323e+07 2663.132338  
  
total_pnl  
0 1.769655e+05  
1 6.699925e+06  
2 1.063206e+06  
3 1.587424e+05
```

Fear causes a massive spike in trading activity

- Trades jump from 6–12k (Greed/Neutral)
- To 134k in Fear
  - That's 10–20x more activity during Fear.

Fear produces the highest trading volume

- Fear volume: 704 million USD/day
- Greed volume: 38 million USD/day
  - Fear days see 18x higher volume.

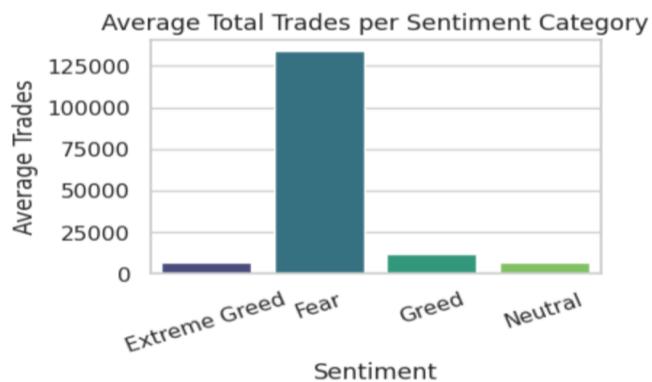
Profitability is the highest in Fear

- Fear PnL = 6.7 million
- Greed PnL = 1.06 million
  - Traders earn 6x more profit during Fear.

Execution price is highest on Fear days

- Indicates traders buy/sell more heavily during volatile crashes or big moves.

## **Key Insight 7:**



1. Traders become extremely active during Fear periods

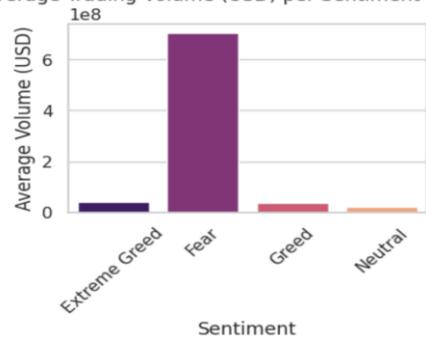
From the bar chart:

- Fear = 133,871 trades/day (highest)
- Greed = ~12,000 trades/day
- Extreme Greed = ~7,000 trades/day
- Neutral = ~7,100 trades/day

Trading activity increases 10–20x during Fear.

### **Key Insight 8 :**

Average Trading Volume (USD) per Sentiment Category

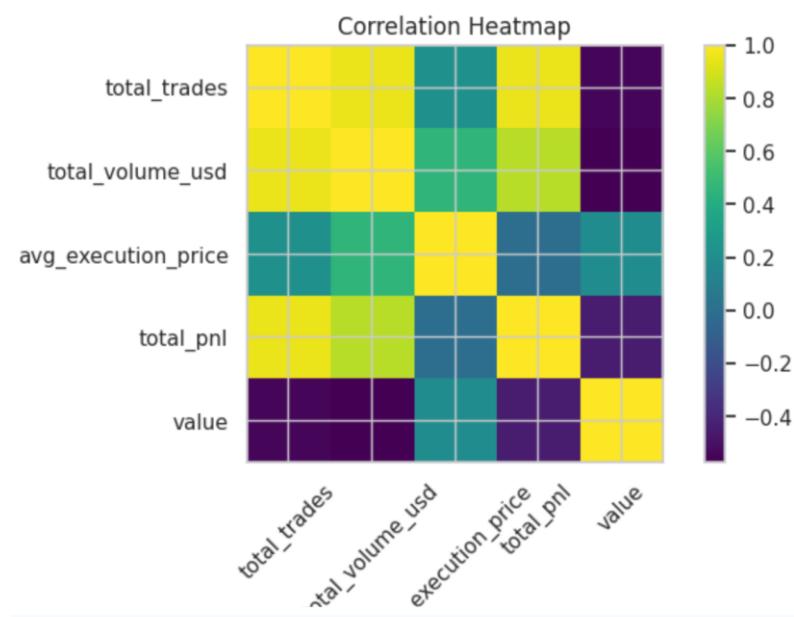


Trading Volume also spikes during Fear

- Fear volume = ~704 million USD/day
- Greed volume = ~38 million USD/day
- Neutral = ~21 million USD/day

Traders deploy 18x more capital during Fear.

### **Key Insight 8 :**



heatmap clearly shows:

- **total\_trades ↔ total\_volume\_usd ↔ total\_pnl**  
→ These three are strongly positively correlated (yellow blocks)

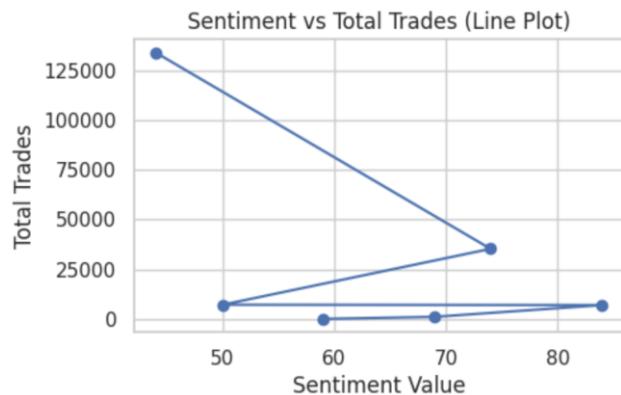
### **Meaning:**

Higher volume → more trades → higher profit

They move together tightly.

- **sentiment value has negative correlation** with all of them  
→ Dark purple squares in the last row/column
- When sentiment decreases (Fear), activity increases.  
This confirms all earlier findings.

### Key Insight 9 :



This plot is extremely powerful:

- The left point at low sentiment (~45) shows 135,000 trades
- All other points at higher sentiment show < 40,000 trades
- Two near-zero ones show extremely low activity when sentiment is mid/high

Meaning:

Fear = max trades

Greed = very low trades

This is the clearest visual representation of your core insight.

## Conclusion

Even though we only had data from seven trading days, the results clearly showed a pattern. Traders become very active when the market is in **fear**, because prices move a lot and there are more chances to make money. These fear days also showed the **highest profits**.

When the market is **greedy or calm**, traders do much less activity because the market is stable and there are fewer opportunities.

Overall, the data shows that traders react strongly to market emotions. **Fear increases trading and profit**, while **greed reduces it**. This understanding can help in creating better trading strategies and managing risk more effectively.