Insights :

1. Trader Performance and Sentiment

- During **"Greed"** and **"Extreme Greed"** periods, average **Closed PnL** tends to be **higher**, indicating traders often earn more when sentiment is optimistic.
- However, **volatility also increases** in these periods, leading to a wider range of outcomes — profits and losses are both amplified.

2. Trade Volume and Sentiment

- **Trade volumes (USD)** are **significantly higher** during **Greed** and **Extreme Greed** phases, showing increased trader participation and risk appetite.
- **ANOVA tests** confirmed statistically significant differences in trade volumes across sentiment categories.

3. Fear Periods = Cautious Trading

- In **"Fear"** and **"Extreme Fear"** periods, traders generally reduced exposure:
  - Lower average trade sizes
  - Lower number of trades
- Traders tend to **wait or hedge** during negative sentiment.

4. Sentiment as a Leading Indicator

- Market sentiment often **precedes shifts** in trader behavior:
  - Sentiment improves → Volume & PnL tend to increase shortly after.
  - Sentiment worsens → Traders start reducing positions.

Strategy Recommendations:

1. Sentiment-Aware Trading Strategy

- **Incorporate sentiment signals (Fear/Greed)** as input features in automated trading strategies.
- Adjust leverage, position size, and stop-loss dynamically based on current sentiment.

2. Risk Management Tuning

- Use **stricter risk controls** (e.g., tighter stop losses or reduced position size) during **Extreme Greed** phases to avoid sharp reversals.
- During **Extreme Fear**, consider **buy-the-dip** strategies for select assets (if supported by fundamentals).

3. Volume-based Triggers

- High sentiment scores with surging trade volume may be **momentum confirmation** signals for short-term entry.

4. Machine Learning Potential

- Sentiment data can help predict **PnL performance categories**, making it useful for building **predictive models** or **agent-based simulations**.