Data Science Report: Trader Behavior & Market Sentiment

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1. Executive Summary

This analysis explored the relationship between trader performance (from 209,763 trades) and market sentiment (Bitcoin Fear/Greed Index). The objective was to find "hidden patterns" to inform smarter trading strategies.

The analysis of 32 unique traders revealed a clear and dominant pattern: **a trader's performance is defined by their behavior during "Fear."**

Key Findings:

1. **"Fear" Drives Profitability:** The market as a whole is most active and most profitable during "Fear." Overall trading volume on "Fear" days ($343M) was **4.5x higher** than on "Greed" days ($74M), resulting in **2.1x more profit** ($6.6M vs. $3.1M).
2. **The "Bottom 10%" Lose Money in Fear:** The key difference between top and bottom traders is risk management. The "Bottom 10%" of traders are **net-negative** during "Fear," losing -$43k. They are only profitable during "Greed."
3. **The "Top 10%" Thrive in Fear:** In contrast, the "Top 10%" of traders generate the majority of their profit during "Fear" ($3.5M), demonstrating a successful strategy for high-volatility periods.
4. **"Mid 80%" are the Market Whales:** Surprisingly, the "Mid 80%" segment—not the "Top 10%"—are the market's biggest movers. This group had the highest trading volume ($241M in Fear) and the largest average trade size ($7,420) during Fear.

2. Methodology

1. **Data Cleaning:** Both datasets were loaded. The sentiment data was simplified from 5 categories (e.g., "Extreme Fear") to 3 ("Fear", "Neutral", "Greed"). The trader data was cleaned, timestamps were converted, and a proper datetime key was created for merging.
2. **Feature Engineering:** A is_win column was created (1 for Closed PnL > 0, 0 otherwise). The analysis focused on 90,204 trades that had non-zero PnL and corresponding sentiment data.
3. **Segmentation:** The 32 unique traders (with >5 trades) were segmented by their total PnL into "Top 10%" (4 traders), "Mid 80%" (24 traders), and "Bottom 10%" (4 traders).
4. **Analysis:** Data was aggregated by (1) Sentiment only, and (2) Sentiment + Trader Segment to compare behavior.

3. Overall Market vs. Sentiment

The first analysis shows that high market volatility (Fear) is the primary driver of market activity, not high market optimism (Greed). Traders are more active, trade larger, and are slightly more successful during Fear.

- **Average Win Rate:** 86% (Fear) vs. 83% (Greed)
- **Average Trade Size:** $5,368 (Fear) vs. $3,204 (Greed)

4. Segmented Behavior vs. Sentiment

Total PnL (Sum) by Segment & Sentiment

Segment	Fear	Neutral	Greed
Top 10%	**3,548,678.91**	62,586.18	1,781,227.35
Mid 80%	**3,096,367.97**	95,940.44	1,271,045.17
Bottom 10%	**-43,390.88**	215.75	66,467.75

Average Win Rate by Segment & Sentiment

Segment	Fear	Neutral	Greed
Top 10%	0.85	0.92	0.75

Mid 80%	0.88	0.79	0.90
Bottom 10%	0.71	0.38	0.90

5. Conclusion & Actionable Strategy

The key difference between profitable and unprofitable traders is not their overall win rate, but their **risk management during "Fear."**

"Bottom 10%" traders have a respectable 71% win rate in "Fear" but *still lose money*. This indicates their 29% of losing trades are so catastrophically large (due to high-risk, oversized bets) that they wipe out all 71% of their wins.

Actionable Insight for Smarter Trading:
A trader struggling with performance should drastically reduce their trade size and risk exposure during "Fear" periods. The data shows this is when they are most vulnerable to catastrophic losses that define their "Bottom 10%" status. Profitability is dictated not by how much you make, but by how much you don't lose during high-volume "Fear" markets.