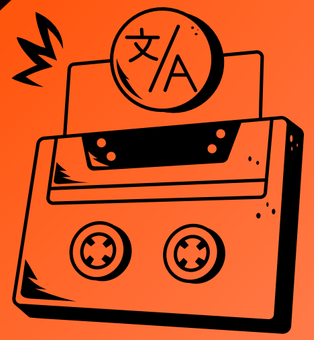
LISTENING TO RECOVERY

Where Tone meets Transformation.

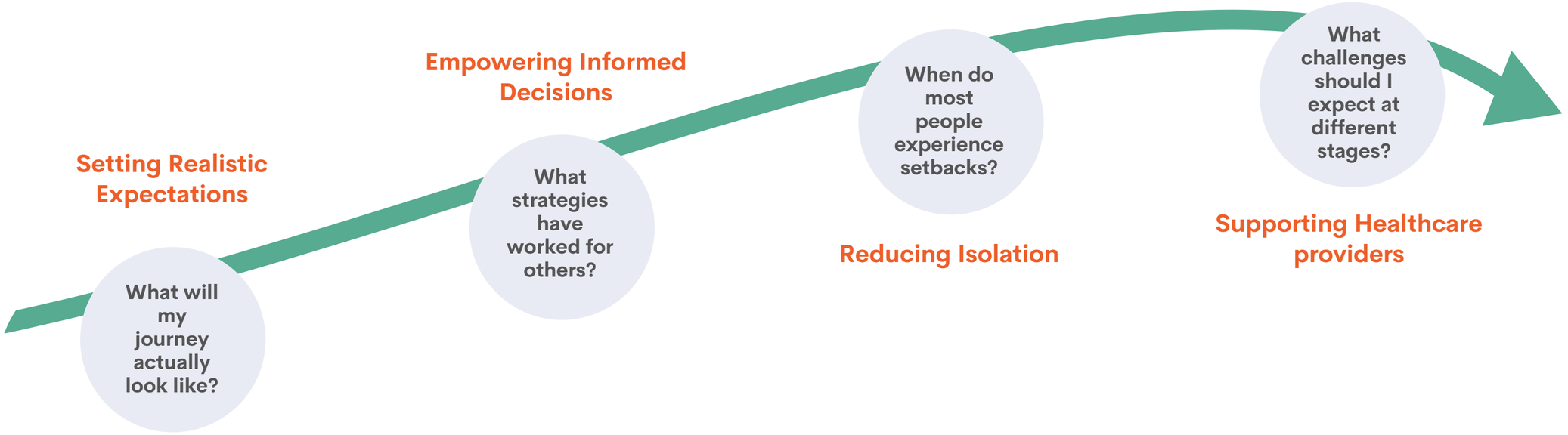


ABHIROOP K | ALINA H | KEERTI R |
MANORANJITH A | ROHAN D | SIMONI D

Navigating the uncertain path to addiction recovery

Current Problems

- Scattered Information
- Limited Accessibility
- Scale of the Crisis
- No data-driven way to understand recovery journey



Our Approach

- Collect real audio narratives of addiction recovery stories*
- Analyze key recovery stages and emotional patterns
- Map each individual's journey from beginning to end
- Transform human stories into data-driven insights on recovery trends

**Scraped transcripts of 51 videos from 'Texas Picture Documentaries' (YouTube)*

From unstructured stories to structured insight

Mapping emotional and behavioral recovery patterns using AI

1. 9 Journey stages identified
2. GPT-4o-mini for Stage Detection
3. Validated with direct quotes
4. Pattern Recognition across stories

1. Background
2. First Use
3. Escalation
4. Rock Bottom
5. Turning Point
6. Treatment
7. Early Recovery
8. Relapse
9. Maintenance

NOT ALL JOURNEYS ARE LINEAR

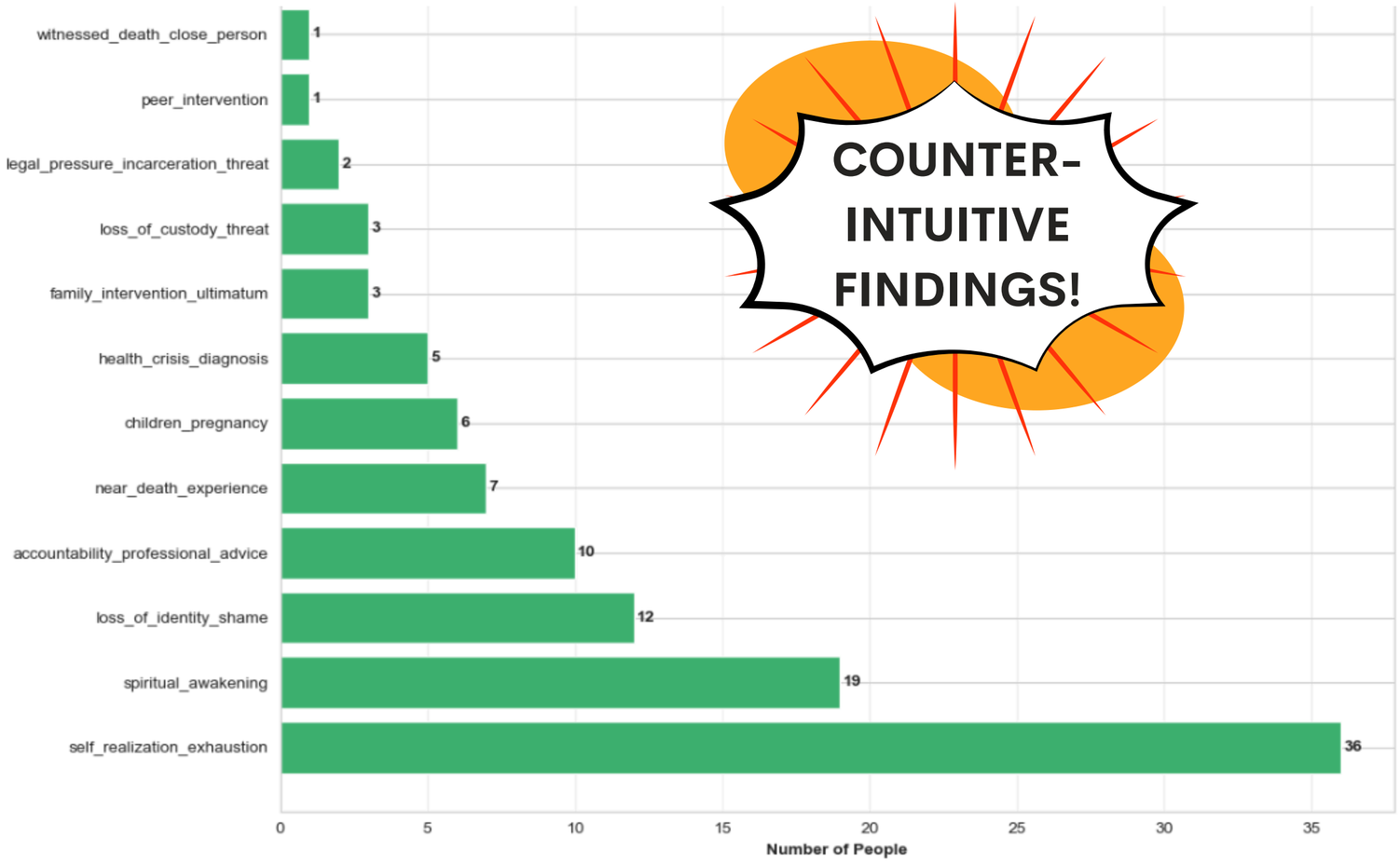
Understanding patterns help predict challenges

AI UNCOVERS HIDDEN PARALLELS

AI can uncover common triggers and recovery patterns shared across individual journeys

Self-realization is the strongest?!

What really drives recovery?



COUNTER-INTUITIVE FINDINGS!

Internal motivation beats external pressure

- Top 4 triggers are ALL internal/personal
- 70% cite self-realization as their turning point

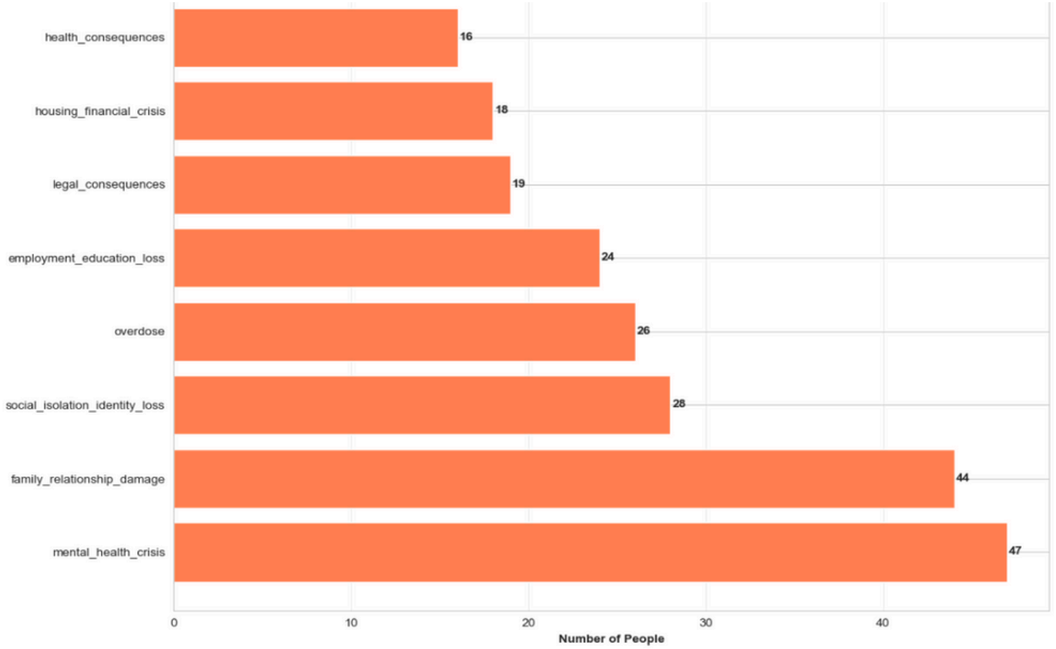
Family pressure triggers recovery in only 6%

Internal motivation outpaces external pressure 12×

- **For treatment programs:** Design interventions that facilitate self-reflection
- **For families:** Support the person's journey toward self-awareness rather than trying to force change

Most frequent rock bottom events

The triad of destruction: Mental Health (47) + Family Damage (44) + Social Isolation (28) = The Core Crisis



Key Insights

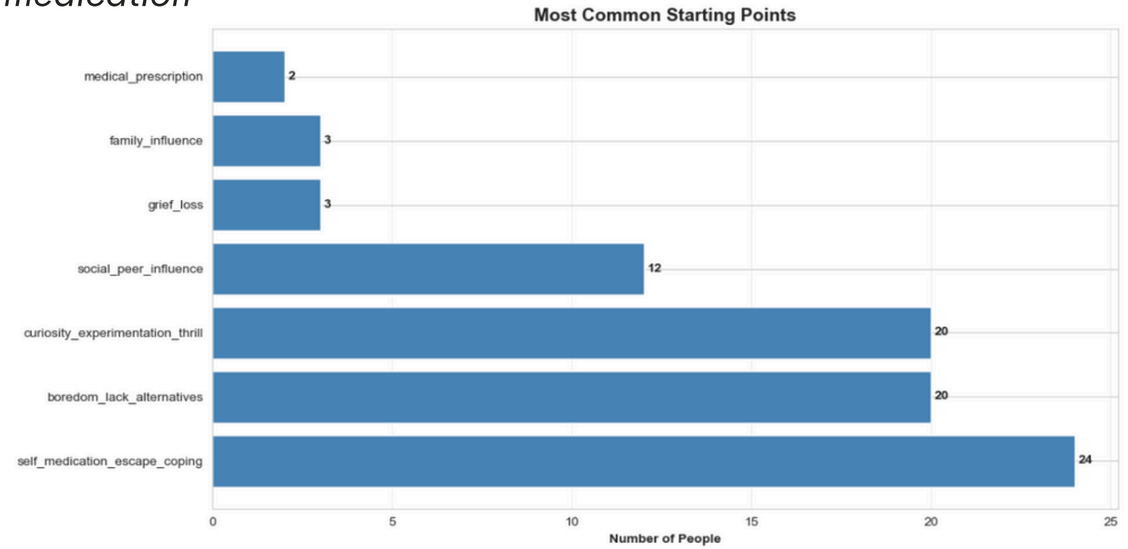
- Mental health crisis in 92% → Addiction is a **mental health condition**
- Family relationships fail in 86% → **Social pain** > physical pain
- Physical health consequences rank **LAST!** → not the root cause

Clinical Implications

- Treat mental health **FIRST**
- **Family therapy** is critical

Common starting points

The self-medication pathway → 47% started with self-medication



Self-medication → **Loss of control** → **Mental health crisis**

Key Insights

- 47% began with **self-medication**, not recreation
- **Boredom** and purposelessness drive 39% of first use
- Medical prescriptions trigger **<5%** - challenges the *"opioid crisis started with doctors"* narrative for this sample

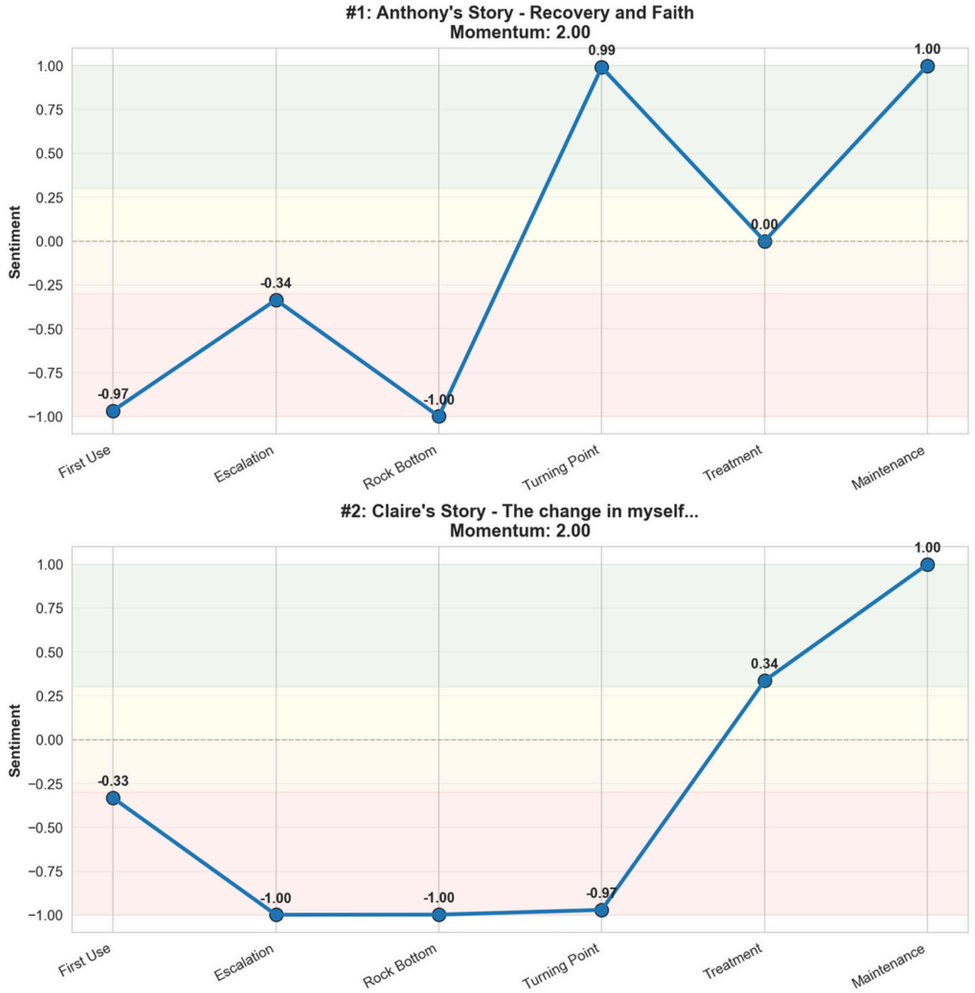
Clinical Implications

- Address **boredom and purpose**, not just drugs
- Build **coping skills** before crisis

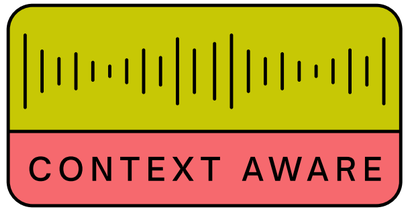
Why sentiment analysis wasn't sufficient!

Sentiment models misread emotional language - optimism can appear early, and crisis can sound calm

We used DistilBERT to analyze sentiment across journey stages, but found it overly sensitive to language nuances rather than actual recovery progress, leading us to develop a more robust rule-based severity metric.



Top 2 stories with highest recovery momentum

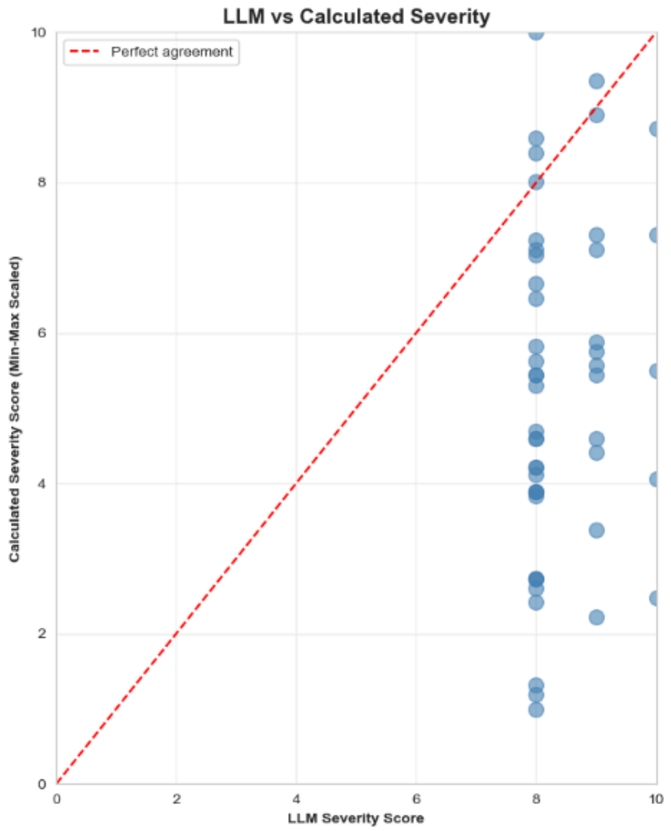


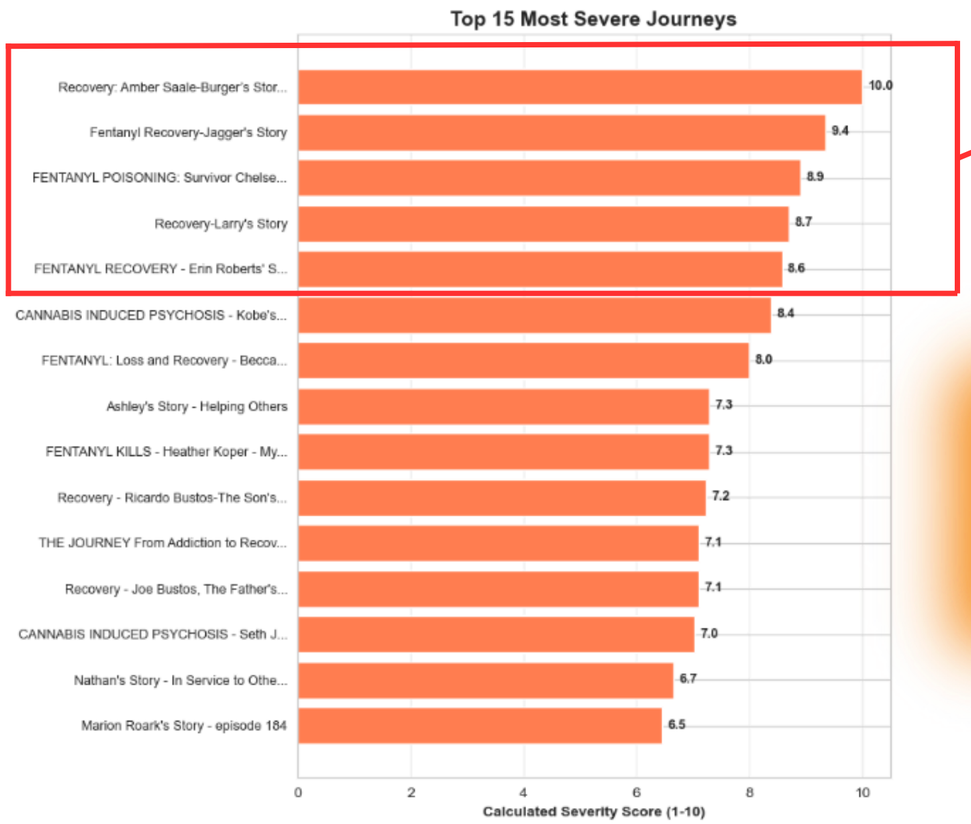
Sentiment captures emotion, but true recovery needs more context-aware metrics.

- Positive language **doesn't equal recovery progress** early stages may still sound hopeful
- Context matters! "I said **ENOUGH**" reads as **positive** to the model, when it's slightly a moment of crisis
- **Recovery is non-linear**. The erratic patterns do capture one truth - recovery isn't a straight line.

SENTIMENT  **RECOVERY**

Beyond Sentiment: An Event Driven Severity Score





Fentanyl crisis pattern

5 / 15 most severe journeys involve **fentanyl**

Worst Rock Bottom!

Amber's Journey

Severity: 10/10

# of Events: 7

Challenge

- LLM scores showed **ceiling effect** - most stories rated 8-10
- Limited ability to **distinguish severity levels**, e.g., moderate vs. extreme crises

Our Approach

Create rule-based scoring using:

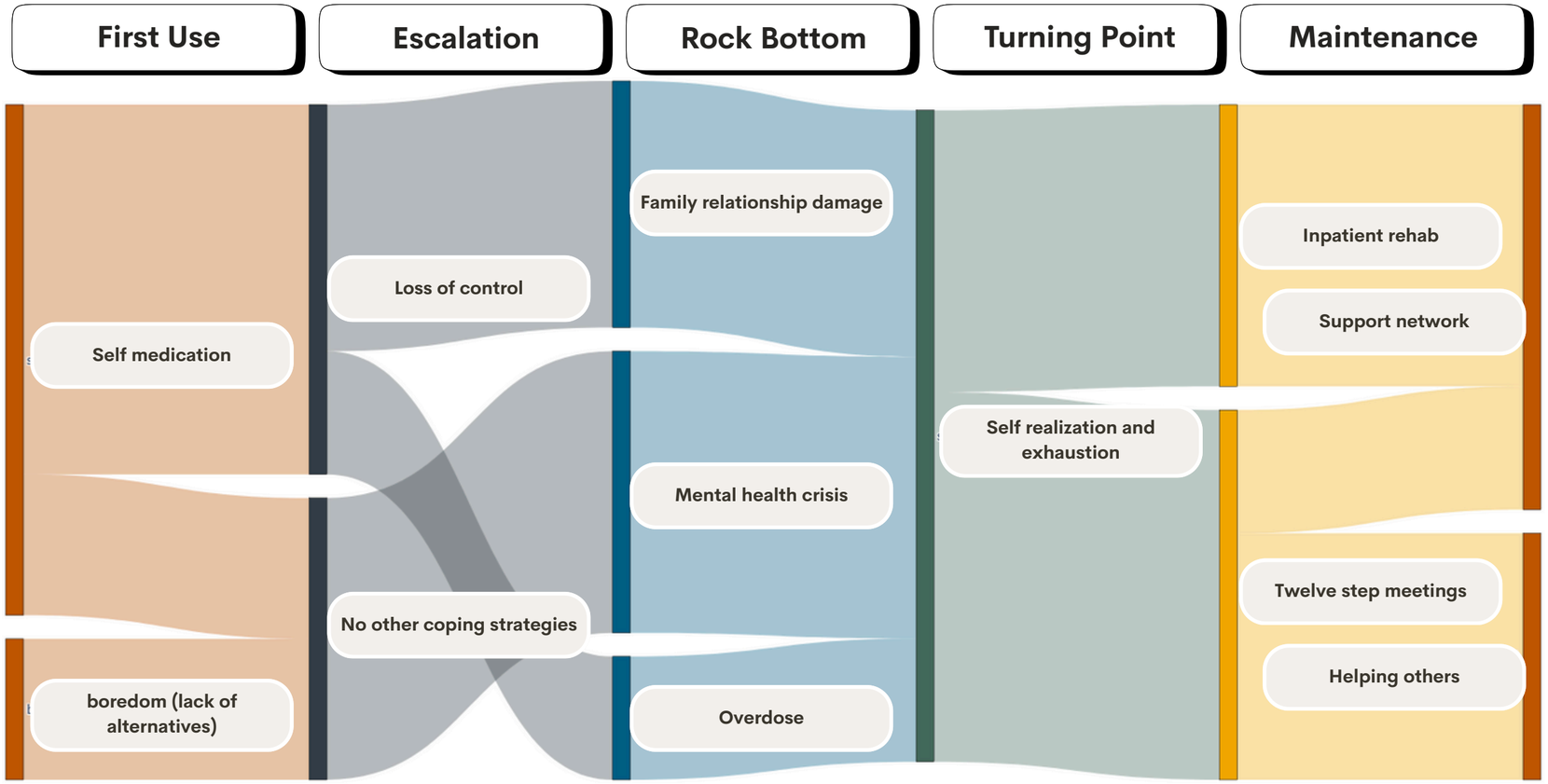
- Weighted events by **clinical severity**
- **# of events** (repeated trauma matters!)
- **Multiple crisis types** (mental health + legal + housing) compound severity

SEVERITY = Weighted Events x Frequency Multiplier + Diversity Bonus

The Path to Recovery: Different Journeys, Shared Patterns

Patterns that repeat across stories reveal the formula behind recovery

We mapped each person's full journey – from **first use to maintenance** – to uncover the most **frequent and successful** pathways. These routes reveal what truly helps people recover, guiding more **effective recovery interventions**.



Sankey Diagram: Top 5 Recovery Pathways

Recovery is personal, but patterns repeat. Recognizing them can save lives.

Recovery patterns discovered:

- **Turning Point:** Self-realization > external help
- **Treatment:** Structured inpatient programs + peer support work best
- **Maintenance:** Community and ongoing meetings keep recovery alive

FUTURE SCOPE & IMPROVEMENTS

Expand Dataset Diversity

Include multilingual and cross-cultural narratives to generalize findings beyond English-speaking recovery communities.

Temporal Modeling

Introduce sequence models (like LSTMs or Transformers) to predict relapse likelihood or next probable stage in the journey.

Integrate Speech & Tone Analysis

Extend from text to audio emotion — analyzing tone, pauses, and stress markers for deeper empathy mapping.

Interactive Recovery Dashboards

Build clinician-facing visual tools that allow dynamic filtering by addiction type, demographics, or treatment success rate.

Context-aware Sentiment Models

Fine-tune emotion detection models on addiction-specific language to avoid false positives/negatives.

Real-Time Tracking & Early Intervention System

Build a system that continuously analyzes new journal or voice inputs to detect early signs of relapse and provide timely intervention.

Thank you!

Any thoughts?