This project, we aim to tell a visual story using data on aggravated assault across the United States(2010- 2025), sourced from the FBI's Crime Data Explorer. Our goal is to provide insight into how aggravated assault trends have changed over time, what factors influence them, and how these trends vary by state, weapon type, and demographics. We selected aggravated assault due to its rising importance in public safety discussions. Our story will highlight:
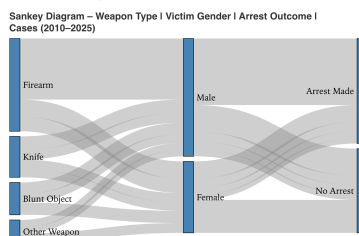*National trends in aggravated assault incidents over time.*
State-level variations in assault rates per 100,000 population.
The relationship between weapon type, victim gender, and arrest outcomes.

1 Advanced Visualization Design

: Our main visualization will be a Sankey diagram showing the flow between weapon type, victim gender, and arrest outcome. This structure helps us intuitively represent the flow of incidents through key categorical variables. **Encoding: Nodes**: Weapon type (e.g., Firearm, Knife, Blunt Object), victim gender (Male, Female), and arrest outcome (Arrest Made, No Arrest). **Links:** The Width of links encodes several incidents flowing between categories. **Color:** Weapon type is represented by node color, while arrest outcome is shaded to indicate severity. The interactive Sankey diagram allows users to select a year (2010–2025) and view how flows change, with hover-

over tooltips displaying counts and percentages.

2 Storytelling Structure: Martini Glass

: We use the **Martini Glass** structure to first guide the audience through a clear narrative, then shift to interactive exploration. It starts broad, narrows into focused analysis, and ends with user-driven discovery.

Narrative Stages: Scene 1: **National Trends:** A line chart will show U.S. aggravated assault trends (2010–2025), with annotations for key shifts like post-pandemic changes. Animations will help illustrate the progression over time. **Scene 2: State Comparison:** A parallel coordinates plot will depict state-level metrics (assault rate, arrest rate, population), allowing outlier detection and comparisons. Annotations and animations will highlight key state-level variations. While not visually included here to conserve space, this visualization would reveal states with notably higher or lower assault and arrest rates relative to their population. **Scene 3:** Victims and Weapons: The Sankey diagram shows flows from weapon type to victim gender to arrest outcome. Tooltips reveal exact values, while animations and color-coding guide user focus and insight discovery. **Explore Mode:** The final stage offers user-led data exploration via interactive filters, enabling personalized trend analysis following the guided narrative.

3 Transitions and Guidance:

To ensure a smooth flow between sections and maintain the audience's attention, we will use the following strategies: **Text Annotations:** Brief, clear text annotations will provide context for each

visualization. For example, when discussing national trends, the text will explain the significance of trends or major shifts (e.g., post-pandemic increases). **Animations:** Animations will be used to transition between different states in the visualizations, such as animating the line chart's data points or the Sankey diagram's flows. These animations will help the audience follow the evolution of the data. **Highlighted Focus Areas:** The interactive visualizations will highlight specific data points as users hover over them, drawing attention to key insights. In the Sankey diagram, for instance, the width of the links will dynamically change based on the selected year, providing immediate visual feedback to users. **Guided Interaction:** As users transition between scenes, brief explanations will guide interaction, helping them follow the narrative and understand the data context.

4 Other Diagrams for Exploration

Line Chart – National Trends Over Time (2010–2025): This line chart will illustrate the total number of aggravated assault cases reported in the U.S. each year from 2010 to 2025. This helps establish the national context for later visualizations.
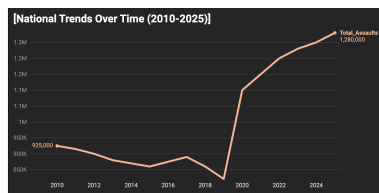
5 Parallel Coordinates Plot – Multivariate State Comparison (2010–2025)

:While not displayed here for brevity, a parallel coordinates plot would show variations across states using multiple axes (assault rate, arrest rate, population), allowing for state-level comparisons and identification of outliers.

6 Storytelling Structure:

Employing the Martini Glass structure, we balance an initial author-driven narrative with subsequent open exploration. This convergent-divergent approach facilitates comprehension for a broad audience before enabling user-centric data discovery.

Narrative Flow and Transitions: **Scene 1:National Trends:** Start with a line chart showing national aggravated assault trends (2010–2025). Use text annotations and arrows to highlight significant trends, guiding the audience's focus.
Scene 2: State Comparison: Shift to state-level assault rates using a parallel coordinates plot. Animated transitions and tooltips will direct attention to key data points.
Scene 3: Weapon Use, Victim Demographics, and Arrest Outcomes: Introduce the interactive Sankey diagram showing relationships between weapon type, victim gender, and arrest outcomes. Transition- Hover-over functionality and arrows will guide attention to significant flows and changes.
Scene 4: Explore Mode: The final phase transitions to user-driven exploration via interactive filters (year, state, etc.). This shift from the guided narrative, supported by annotations, tooltips, and animations, enables personalized data investigation.

7   References

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