


Plot and Tension



VISUAL TOOLS FOR WRITERS

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Project Goals

The goal of this project was to create a visual interactive tool for writers. Specifically one writer collaborating with us — [Jill Bodach](#), an Iowa Writers' Workshop grad currently teaching literature and writing in Connecticut — who needs help revising her current draft of her novel. The novel contains several main characters with shifts in narrator, POV, and varies from present day to back-story. With so many characters and changes, Jill was concerned about how to revise her novel and ensure that the story arcs and were in balance so that no single character or plot dominated the overall story. The aim of the tool was to give a visual summary of Jill's novel that will allow her to make informed revision decisions. We were concerned with three main areas—shifts in narrator and character, progression of dramatic tension, and organization of chapters and sections. We created three interactive visuals that were aimed at informing Jill rather than advising and instructing, and allowing her to reorganize chapters and sections to see how the changes would affect dramatic tension and character/narrator shifts.

Related Work

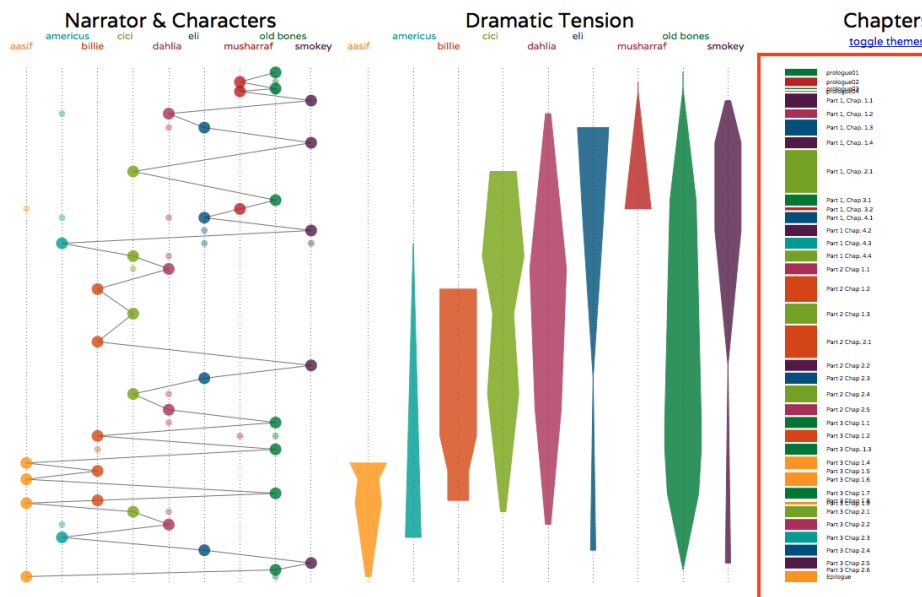
The initial inspiration of this project came from [Mike Bostock's Sankey diagram](#) and [Comic Book Narrative Charts created by Nancy Iskander et al.](#) These visuals were essentially nodes-and-links diagrams and horizontal timelines. We felt that this was a start but ultimately too complex and not interactive enough to achieve what we wanted. Paul looked at research in story representation but found nothing that really addressed the issues of shifting POV. Though a common visual seen in these research articles was the use of nodes-and-links to represent plot, which further affirmed the choice of nodes-and-links.

To understand the progression and change in plot tension, Ian drew inspiration from novelist Kurt Vonnegut Jr's [popular lecture on the shapes of stories](#), in which he [used simple line graphs](#) to depict familiar plot archetypes (e.g., the “boy meets girl” story, the “man in a hole” story, the “cinderella” story, etc.). We coupled this with research in audience

perception of dramatic structure ([Lazier et al](#)). While there is no generally accepted or commonly used technique for quantifying the somewhat intangible quality of dramatic tension in a story, this study found that audience members—whether reading or watching a movie—tended to quantify dramatic tension similarly to one another even when given an arbitrary rating scale. The researchers used a 1-7 scoring range, so we decided to do the same to quantify dramatic tension in Jill’s story.

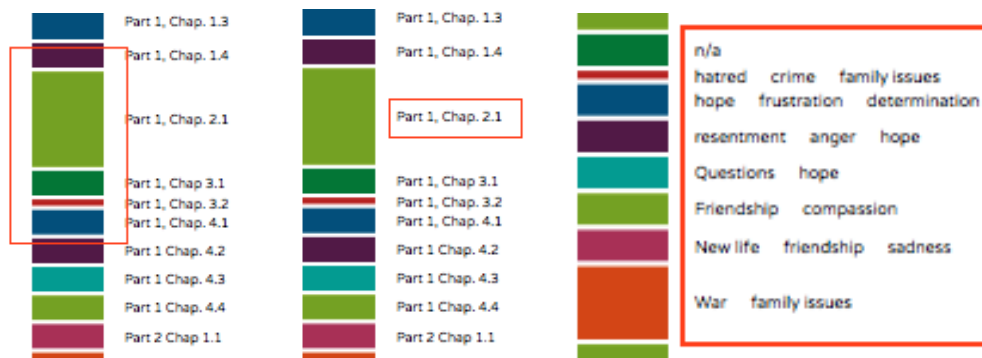
To create the timeline visual to represent the number of words per chapter section, we decided to go with a stacked bar chart. Bar charts are great for representing quantitative data so choosing a visual for word count was simple. Since our purpose was to depict the chapters as parts of a whole (the complete manuscript), the chart has just a single bar; each stacked segment represents a chapter or sub-chapter devoted to a single character or narrator, which also served as a row that corresponded to points in the plot link-node graph and plot tension graph, providing a unifying vertical scale for the dashboard.

Description of the Visualization



The visual tool is a dashboard with three visualizations, one of which is the timeline of the story represented by the single stacked bar.

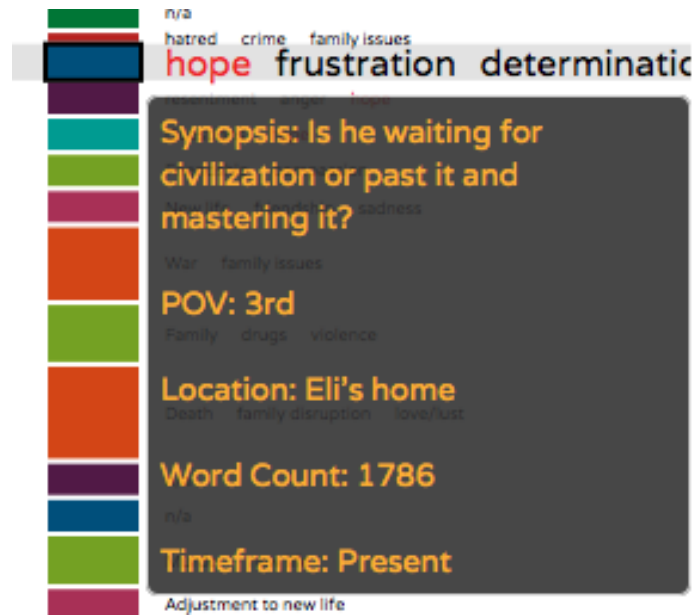
The stacked bar has many segments; each represents a section of a chapter devoted to a single character's story. The height of each segment box represents the word count for that section, and each segment's color corresponds to the section's narrator or main character. To the right of each segment box is the chapter and section number. Beneath the graph's heading is a toggle link that replaces the chapter and section headings with theme tags for each section.



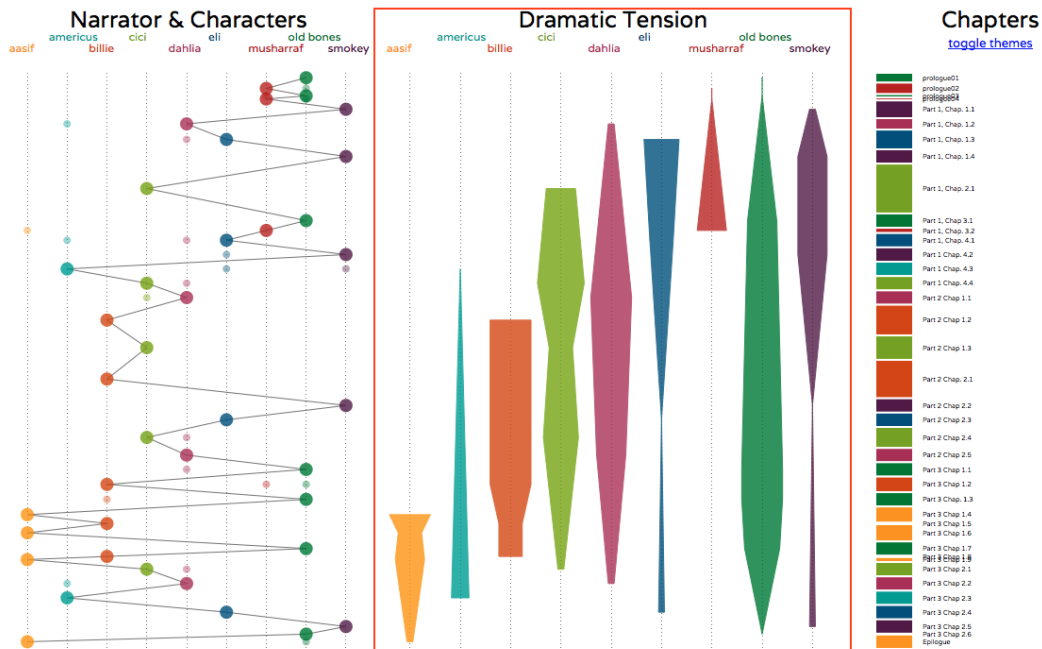
Hovering over the themes words or chapter section headings or the segment box increases the font-size of the text. Clicking on any one of the theme words will highlight all other occurrences of that theme throughout the book.



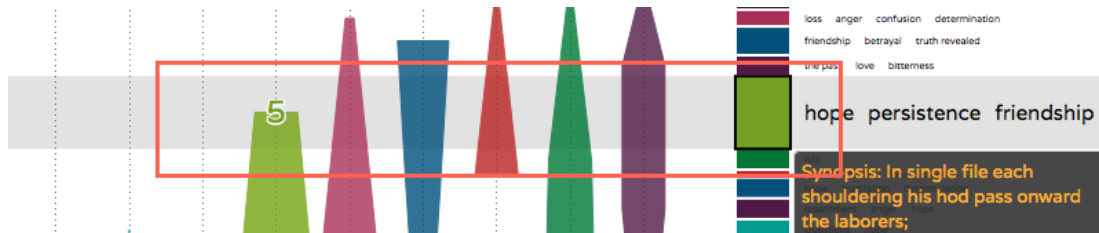
Clicking on any of the segment boxes highlights the row (which you'll see in other screen shots) and activates a pop-up with additional relevant information about the section.



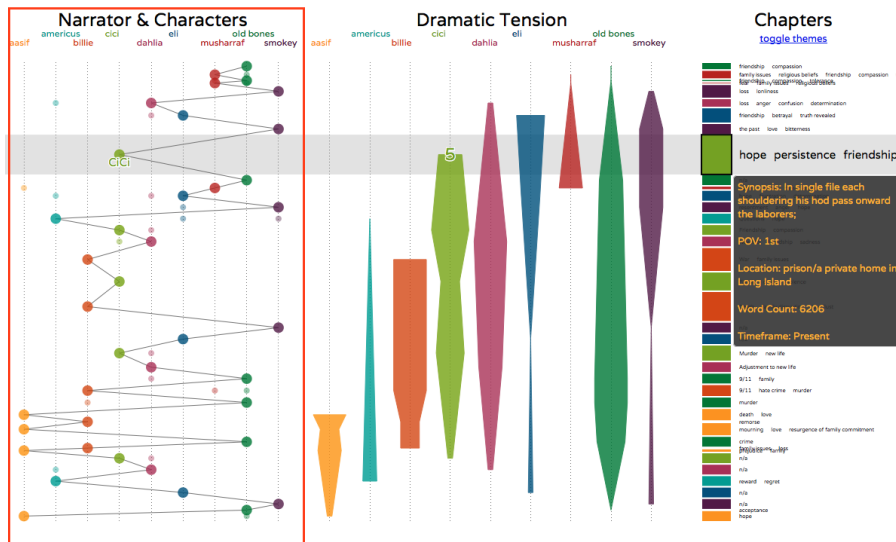
To the left of the timeline bar are the tension lines. Because line graphs would be confusing in a vertical orientation, we conceived of these shapes as line graphs that were mirrored across a vertical axis, forming a polygon that would grow thicker as the tension scores increased. Each character has their own tension timeline, representing the progression and decline of dramatic tension in the character's story throughout the novel.



Tension also corresponded to the timeline bar as the start of each character's tension line does not occur until the character's first appearance as a narrator in the story. The row highlighting activates when the user clicks on the segment box or a large node in the links-and-nodes graph.



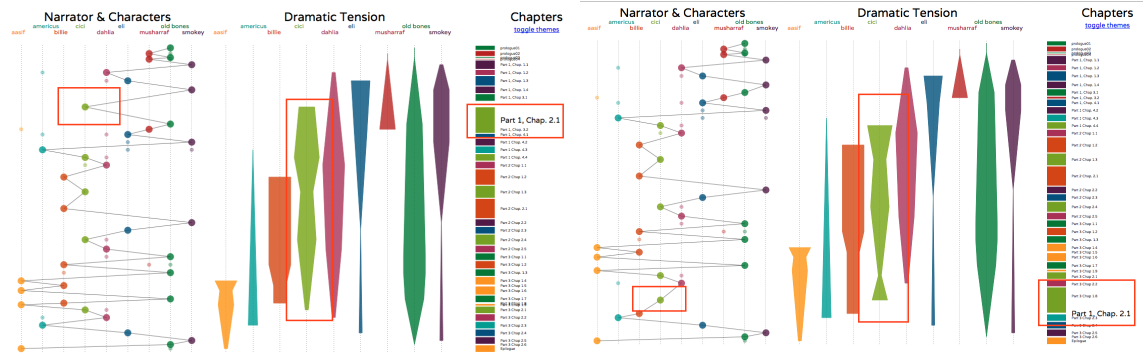
To the left of the tension graph is the narrator and character links-and-nodes graph that shows shifts in narrator and character.



The larger nodes represent the main character of the current story line. Smaller nodes represent other main characters that appear in that chapter segment, if any. Each row of the nodes corresponds to a segment box of the time line and tension points on the tension graph. Also, each highlighted row also activates a pop-up with relevant information.



The main interactive element of this visual tool is the timeline bar. Users are not only able to highlight and activate pop-ups but also rearrange the story, which updates the two other graphs.



Data, Tools, and Steps

The data used to accomplish this was metadata about the book created by Jill, our writer. We decided what metadata was needed based on our initial interview with her and provided a structured data table in spreadsheet form for her to populate. We used Python to convert that spreadsheet into a JSON file for use in our dashboard. The dashboard itself was built entirely in D3. The steps required to achieve the interaction goals were complicated but we created three visuals and bound the data to them so that the appropriate data would display with each interaction. We used GitHub to create a repository for our code but kept the JSON file private, as we did not want the contents of it open to the Internet. This was because we wanted the details of Jill's novel controlled and kept away from the public.

Results

In addition to conferring with Jill at various steps of the design process, we received feedback on our initial sketches for the dashboard from the novelist [Dorothy Hearst](#) and performed user tests on our final dashboard with Jill, a friend of Paul's who is an aspiring writer, and a writer friend of Ian's who holds an MFA from the University of Michigan and has had stories published in several literary journals. We gave all three a list a tasks to

complete using the visual tool with little instruction or help, to evaluate whether the dashboard was conveying information effectively, and also solicited general feedback and suggestions based on their needs as writers. All three felt that the visual tool was useful but varied in how they understood the visuals. The meaning of the tension score was not clear to all three and two of the users said that the tension graph distracted them or caused their eyes to only focus on it. In one test, the user always went to the tension graph for information even though she knew it didn't have the information she was looking for. Another problem was how time was presented. One user didn't understand that time was presented vertically rather than horizontally and was thrown off a few times.

Many issues with the visual tool were related to labeling and presentation norms. Two of the test users didn't even think to click on the link to toggle the theme words next to the timeline bar. This doesn't mean that they didn't see it but they just didn't think to click it. This might have been because it was a link rather than a button. As a result these users didn't include the theme words as part of the answers to the task list. One user didn't understand the narrator and character link-node graph because we had previously labeled it "POV Path." This confused the user, who interpreted as changes between first- and third-person POV rather than changes in narrator. Users misunderstood or missed certain features because they weren't clearly labeled or the visuals diverted from visual norms—line graphs and horizontal timeline—which led them to improperly interpret the visual. After the test and the visuals and interaction were explained, two of the users understood the visuals and interactions better and responded positively about it. For the most part, the users were able to find the information we asked for in the list of tasks, but again just varied in granularity due to the issues just stated. Based on this feedback, we added more explicit labels to the highlighting feature of the dashboard – adding narrator and character names to the node-and-link graph and displaying the numerical tension score.

Our main concern in user testing was with Jill, as the visual tool was meant to aid in her revision decisions. Jill commented that the visual tool was very informative and helped her to understand where she could improve

character and plot development. What was interesting was that even though Jill had gone through the process of creating and giving us this information, many of the imbalances in tension or word count were not apparent to her until she saw our visualizations. She reported that the information was much easier to recognize with our tool than it was from looking at a spreadsheet or reading over her drafts repeatedly, which affirmed the role and purpose of information visualization.

Project Links

[Online prototype](#)

(note: plot summaries have been redacted with dummy text)

[Github](#)

Division of Work

Task	Ian	Paul
Project Management	20%	80%
Design and Research	60%	40%
Programming	80%	20%
User Testing	45%	55%
Project Reports	50%	50%

Note: The reason for the lack of balance in the coding workload was not because Paul's lack of participation, but simply because it took him longer to code than Ian. The percentages reflect both time spent and amount of code that made it into the final product.