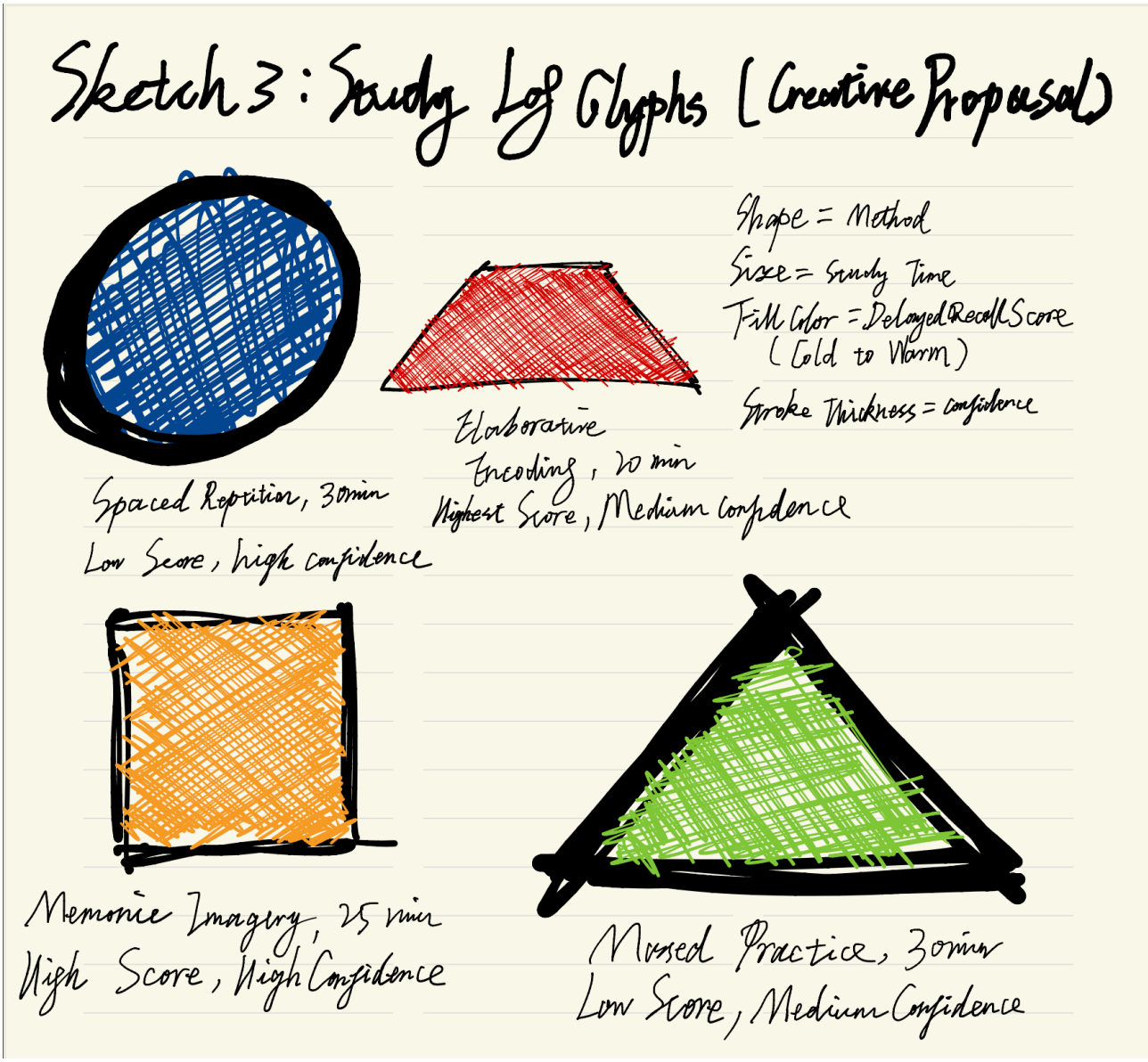
1. Raw Data for Memorizing Vocabs

Hypothesis (updated): there will be a positive correlation between study time and delayed recall score. However, I also predict that active study methods (like Mnemonic Imagery) will get higher retention rates than passive methods (like Massed Practice), regardless of the time spent.

date	method	studyTime	immediateRecall	delayedRecallScore	errorCount	confidence	retention
2025-10-01	spaced repetition	26	11	10	1	7.0	91%
2025-10-02	massed practice	18	14	8	3	7.5	57%
2025-10-03	elaborative encoding	32	12	10	1	8.0	83%
2025-10-04	mnemonic imagery	27	13	11	1	8.0	85%
2025-10-05	spaced repetition	24	10	9	1	7.0	90%
2025-10-06	massed practice	22	13	7	1	7.0	54%
2025-10-07	elaborative encoding	30	11	10	2	7.5	91%
2025-10-08	mnemonic imagery	28	12	11	1	8.0	92%
2025-10-09	spaced repetition	25	11	10	0	7.0	91%
2025-10-10	massed practice	19	14	9	1	8.0	64%
2025-10-11	elaborative encoding	33	13	11	2	8.0	85%
2025-10-12	mnemonic imagery	27	12	10	1	8.0	83%
2025-10-13	spaced repetition	23	10	9	0	7.5	90%
2025-10-14	massed practice	21	13	8	3	7.5	62%
2025-10-15	elaborative encoding	29	12	10	1	8.5	83%
2025-10-16	mnemonic imagery	30	13	12	0	7.2	92%
2025-10-17	spaced repetition	26	11	10	1	7.5	91%
2025-10-18	massed practice	19	14	8	2	7.0	57%
2025-10-19	elaborative encoding	31	11	9	1	7.5	82%
2025-10-20	mnemonic imagery	29	12	11	0	8.0	92%
2025-10-21	spaced repetition	24	10	9	1	7.0	90%
2025-10-22	massed practice	20	13	7	2	7.0	54%
2025-10-23	elaborative encoding	32	12	10	1	7.5	83%
2025-10-24	mnemonic imagery	28	13	12	1	8.0	92%
2025-10-25	spaced repetition	24	11	10	1	7.0	91%
2025-10-26	massed practice	20	14	8	2	7.5	57%
2025-10-27	elaborative encoding	31	12	10	1	7.5	83%
2025-10-28	mnemonic imagery	25	11	9	1	8.0	82%
2025-10-29	spaced repetition	28	10	9	1	7.2	90%
2025-10-30	massed practice	24	15	6	4	7.7	40%
2025-10-31	elaborative encoding	32	11	11	2	7.5	100%
2025-11-01	mnemonic imagery	26	12	12	0	8.5	100%
2025-11-02	spaced repetition	28	12	11	1	7.2	91%
2025-11-03	massed practice	27	14	6	2	7.7	42%
2025-11-04	elaborative encoding	30	12	9	1	8.5	75%
2025-11-05	mnemonic imagery	28	12	11	1	7.9	91%
2025-11-06	spaced repetition	25	12	10	0	7.7	83%

2025-11-07	massed practice	27	13	9	2	7.6	69%
2025-11-08	elaborative encoding	34	13	11	2	8.1	84%
2025-11-09	mnemonic imagery	31	12	11	0	8.7	91%
2025-11-10	spaced repetition	23	10	9	1	7.3	90%
2025-11-11	massed practice	28	14	7	3	7.4	50%
2025-11-12	elaborative encoding	33	12	11	1	8.1	91%
2025-11-13	mnemonic imagery	27	14	12	0	8.4	85%
2025-11-14	spaced repetition	25	12	11	0	7.7	91%
2025-11-15	massed practice	23	13	6	3	7.4	46%
2025-11-16	elaborative encoding	28	11	11	2	7.7	100%
2025-11-17	mnemonic imagery	29	13	14	0	8.1	107%
2025-11-18	spaced repetition	24	12	11	1	7.7	91%
2025-11-19	massed practice	26	15	9	3	7.2	60%
2025-11-20	elaborative encoding	29	13	10	1	8.3	76%
2025-11-21	mnemonic imagery	26	12	12	1	8.5	100%
2025-11-22	spaced repetition	26	11	11	1	7.5	100%
2025-11-23	massed practice	27	13	6	4	7.9	46%
2025-11-24	elaborative encoding	34	12	11	2	7.6	91%
2025-11-25	mnemonic imagery	29	12	14	0	8.9	116%
2025-11-26	spaced repetition	28	11	11	0	7.5	100%
2025-11-27	massed practice	23	15	8	4	7.5	53%
2025-11-28	elaborative encoding	29	11	10	1	8.0	90%
2025-11-29	mnemonic imagery	30	12	13	1	7.8	108%
2025-11-30	spaced repetition	25	11	9	0	7.2	81%
2025-12-01	massed practice	27	13	6	4	7.5	46%
2025-12-02	elaborative encoding	28	13	9	1	8.2	69%
2025-12-03	mnemonic imagery	30	12	13	1	9.0	108%
2025-12-04	spaced repetition	27	12	11	0	7.7	91%
2025-12-05	massed practice	26	15	8	3	7.9	53%
2025-12-06	elaborative encoding	31	11	9	1	7.6	81%
2025-12-07	mnemonic imagery	26	14	12	0	7.8	85%
2025-12-08	spaced repetition	28	12	9	0	7.1	75%
2025-12-09	massed practice	23	14	6	4	7.2	42%
2025-12-10	elaborative encoding	33	12	9	1	8.2	75%

2. Sketch(es) of Alternative Ideas



Alternative Idea: Study Log Glyphs

Description: My third sketch explored a "Glyph" visualization approach. Instead of a standard chart, each study session would be represented by a unique shape (glyph) containing multiple dimensions of data:

- Shape: Represented the Study Method (e.g., Square for Spaced Repetition, Star for Mnemonic Imagery).
- Size: Represented the Study Time (larger shapes = longer time).
- Fill Color: Represented the Delayed Recall Score using a diverging color scale (Cold/Blue for low scores to Warm/Red for high scores).
- Stroke Thickness: Represented Self-rated Confidence (thicker border = higher confidence).

Analysis of Benefits and Drawbacks:

- Pros: This visualization is highly creative and allows for multivariate analysis. It would allow a viewer to inspect a single "session" and immediately grasp four different data points at once. It emphasizes the "fingerprint" of individual study sessions.
- Cons: While visually interesting, it is harder to spot overall trends, specifically the correlation between time and score, which was my primary research question. Comparing the exact "size" of different shapes (e.g., the area of a star vs. a square) is cognitively difficult for viewers.
- Decision: I decided to move forward with the Scatterplot instead. The scatterplot makes the correlation (or lack thereof) between the X and Y axes immediately obvious, which directly answers my hypothesis. Implementing complex custom glyphs in D3 was also a higher technical risk given the timeline.

3. Rationale

I chose a scatterplot for my final visualization because my primary question was about the relationship between two quantitative variables: Study Time (X-axis) and Delayed Recall Score (Y-axis).

- Color was used to encode the nominal variable "Study Method", allowing viewers to spot clusters (e.g., Mnemonic Imagery clustering at the top).
- Size was used to encode "Confidence", adding a third dimension to the chart.
- This format aligns with standard data visualization practices for showing correlation and distribution .

4. Self-Analysis

- Conclusions: The data from October to December supported my hypothesis. "Mnemonic Imagery" consistently yielded high recall scores (11-14) even when study time was moderate. Conversely, "Massed Practice" resulted in low retention scores (often below 60%), even when I increased the study time in late November to try and compensate. This surprised me; I thought more time would equal better scores, but the method matters more .
- Future Collection: If I were to continue, I would also record "Time of Day" to see if studying in the morning vs. night affects the score .

5. Works Cited

Taylor-Laird, Jay. "Lab 2: Debugging & DOM Exploration." *DGM 6108: Programming Foundations for Digital Media*, Northeastern University, 25 Sep. 2025.

Taylor-Laird, Jay. "Lab 5: Loops: The Basics." *DGM 6108: Programming Foundations for Digital Media*, Northeastern University, 2 Oct. 2025.

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"d3-scale." *D3.js*, https://d3js.org/d3-scale. Accessed 8 Dec. 2025.

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