



The Combination of Learning strategy on Enhancing Remembrance

Athena Lee
Emma Geller, Ph.D

Introduction

Much research on effective learning has highlighted two strategies to improve learning: spacing and testing. Spacing your study involves repeatedly studying information with breaks in between sessions, and research consistently finds that this leads to more learning than studying for the same amount of time in one unbroken chunk. Further, there is evidence that expanding the length of the breaks over time leads to even more learning.¹ The testing effect shows that participants typically learn more after testing themselves than they do from simply restudying the information.²

However, few studies have examined how these study strategies could be combined and what impact that might have on learning.³ The motivation for this study is to understand how combining these strategies might improve learning more than using just one alone.

Research Question

- Does the benefit of expanding vs. uniform spacing differ depending on whether you are rereading or testing yourself on the material?
 - Does Testing with Feedback enhance recallability than Rereading and Testing?

Methods

Study 1

- 2x2 Factorial ANOVA design
- Immune System Passage (Survey 1), Exam (Survey 2)
- Convenience snowball sampling

Study Method

	Testing	Restudy
Uniform	57	53
Expanding	49	44

Total: 203

Study 2

- Between-Subject Design
- Convenience snowball sampling via the UCSD SONA system

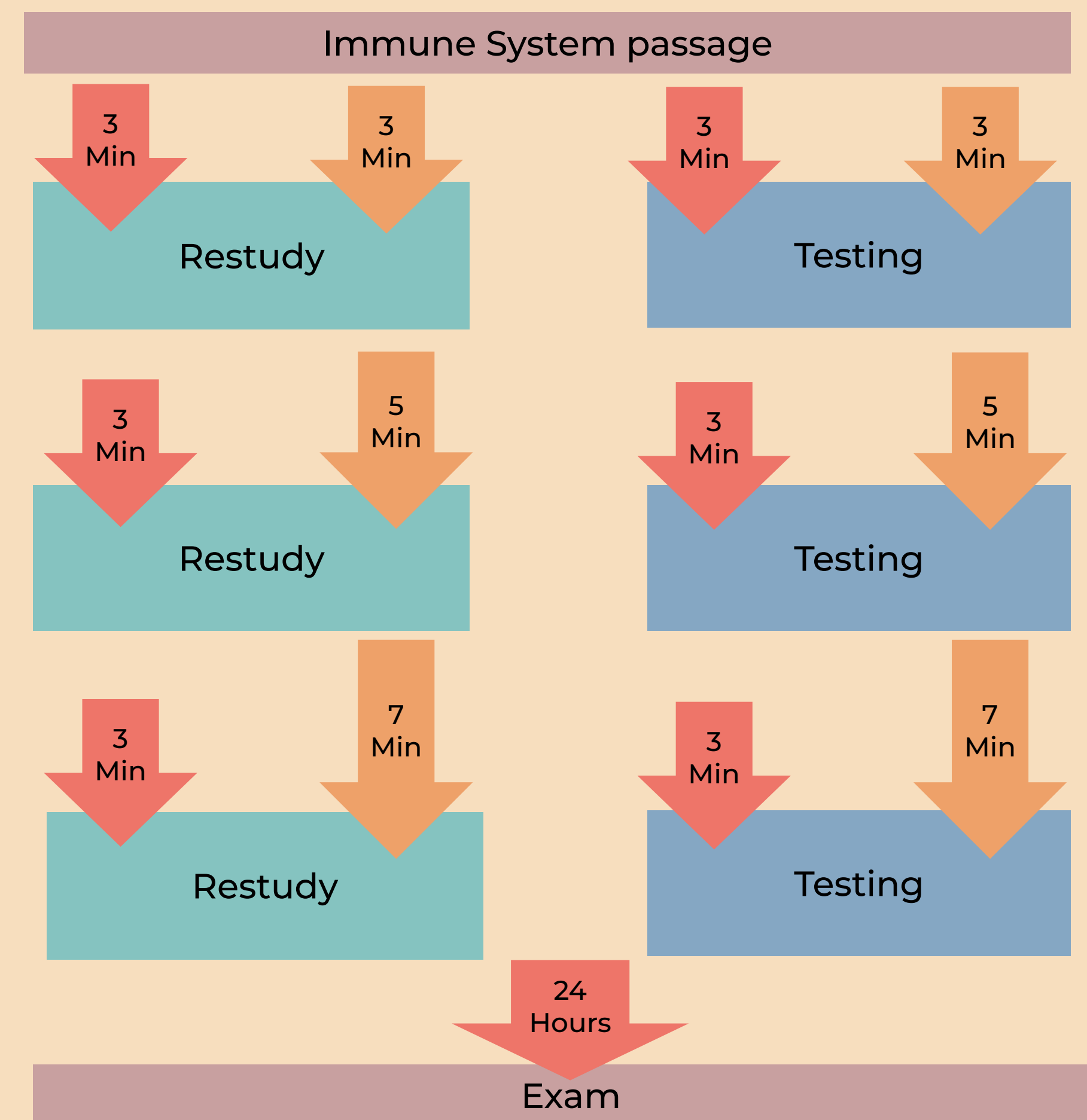
Study Method

	Restudy	Testing	Testing with Feedback
Uniform	49	54	51

Total: 154

Procedure 1

Study 1 (IVs)



Study 1 (DVs):

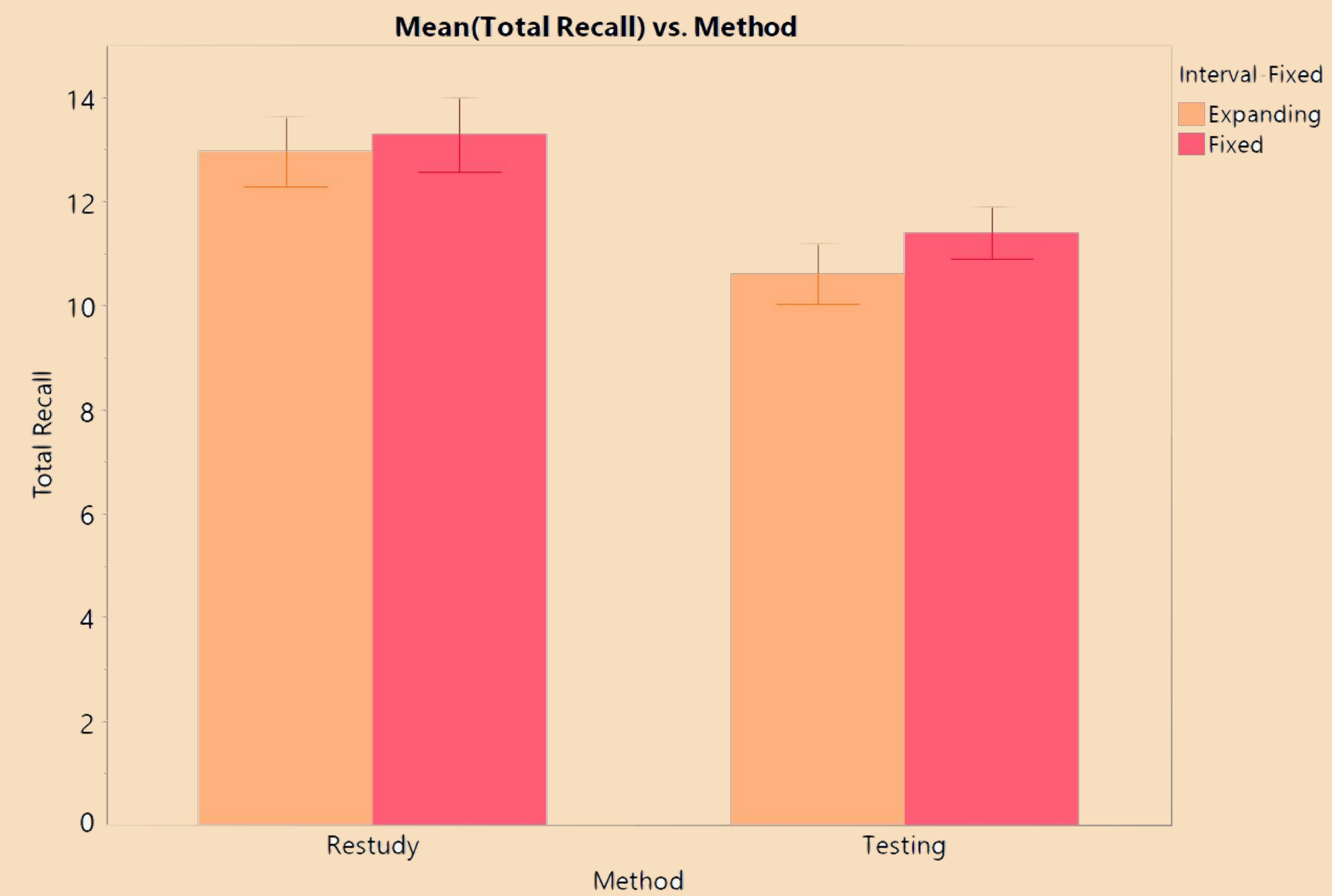
Multiple Choice (Total of 10)

- Which of the following is not an essential characteristic of Neutrophils?
 - Generate barriers that trap and kill the bacteria
 - A type of white blood cells
 - Kills infected cells only
 - Commit suicide after five days
- What does the B cell produce?
 - Antibodies
 - Dendritic cell
 - Neutrophils
 - Plasma cells

Free Response (Total of 4)

- What is herd immunity? How does it limit the spread of disease?
- Explain how hand washing and social distancing both protect you from infection.

Result 1



- The analysis showed a statistically significant main effect of the Study Method ($F(1,200)=11.8778, p<0.0007$), where recall was higher for restudy ($M=13.1415$) than for testing ($M=10.9958$).
- No statistically significant main effect on the Study Schedule and no interaction.

Discussion

Study 1

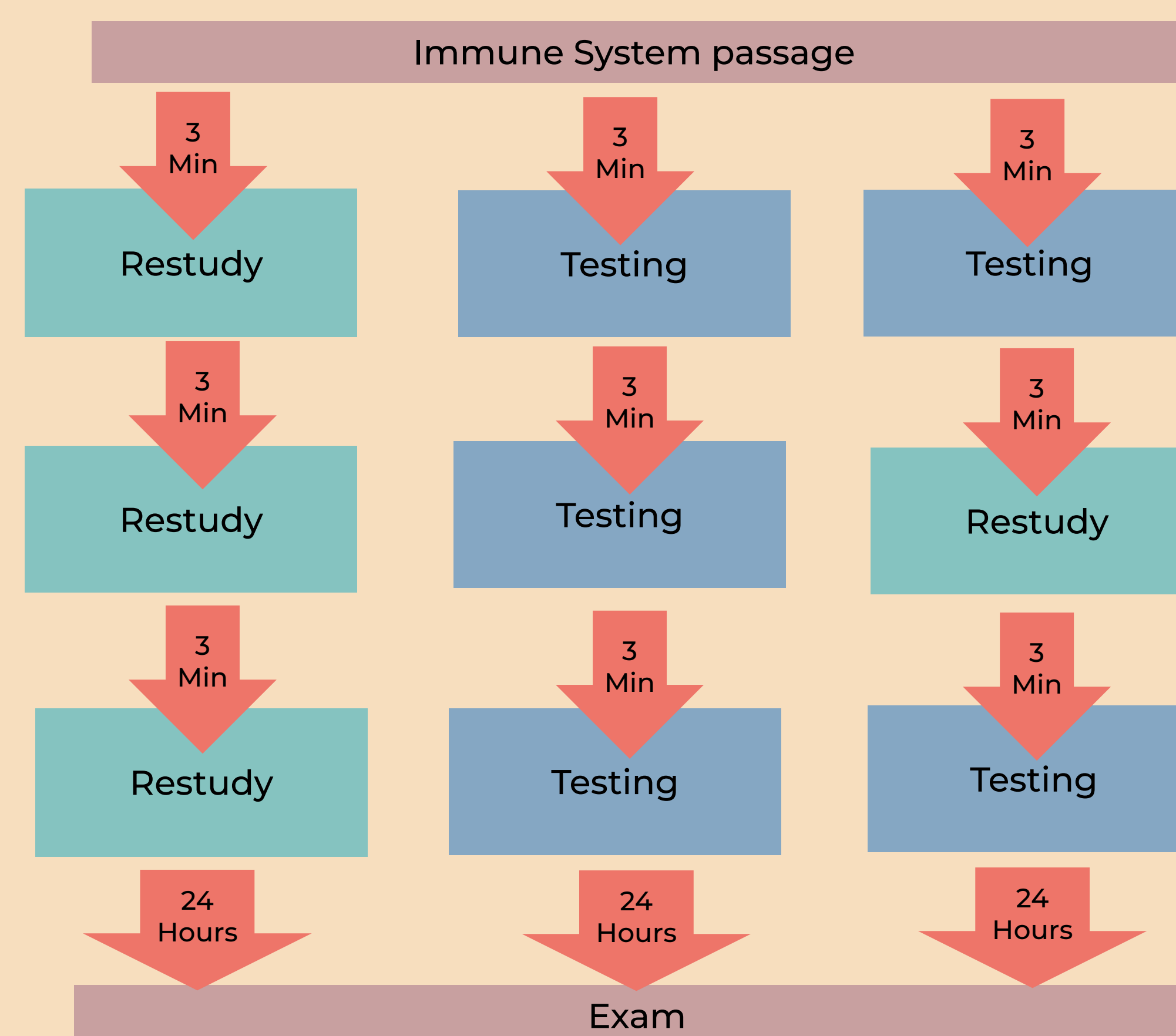
Contrary to our predictions, participants recalled more of text in the rereading condition than in the self-testing condition, and there was no effect of expanding intervals. This could be because the text was particularly challenging and because no feedback was provided to the self-testing responses. We explore the feedback idea in Study 2.

Study 2

Overall, there was no difference in recall between the three conditions BUT we did find evidence of a testing benefit for participants who *actually tested themselves*. Participants who did not follow the self-testing instructions performed significantly worse than participants in the restudy condition. This suggests that **self-testing improves learning if you actually do it!**

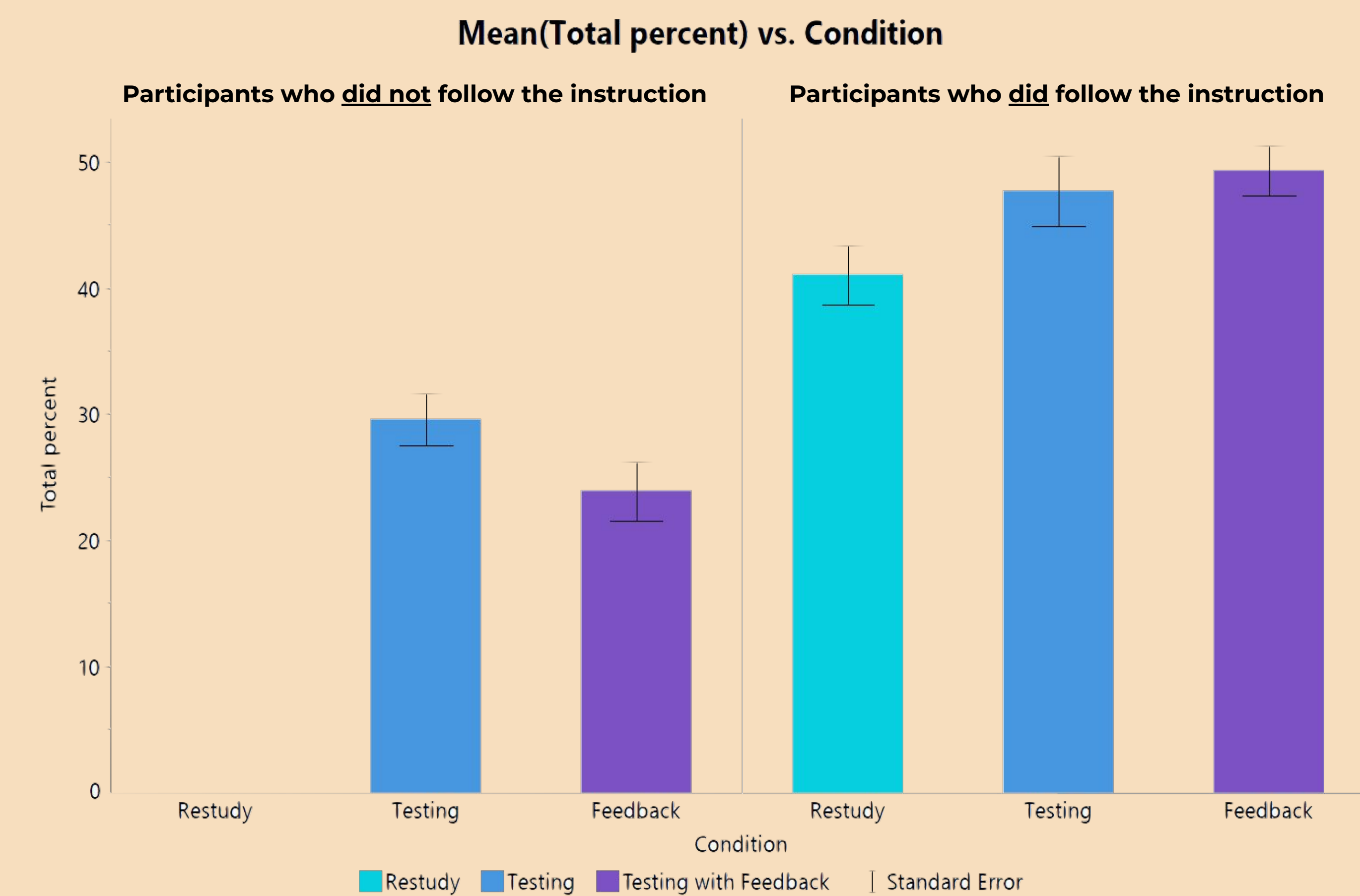
Procedure 2

Study 2 (IVs):



Study 2 (Dvs): Identical to Study 1

Result 2



Main effect of Study Method ($F(2,108)=3.7415, p<0.0268$)

Main effect of Study Method ($F(2,89)=12.0812, p<0.0001$)

Future Direction

- Exploring the benefits of feedback
- Exploring the importance of the retention interval
- Conduct studies in person in the lab
- Evaluate the role of motivation

Acknowledge

- Special thanks to Dr.Geller and all LIME Lab members for the advice, guidiness, and encouragement for this project.
- Special thanks UCSD Psychology Department for the opportunity of Honor project presentation.

References

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