

Repetition Priming Preferentially Benefits Infrequent Targets

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Background

In visual search, performance is worse for infrequent targets (e.g., searching for your friend's car in the parking lot compared to your own car) ^{1, 2}

- Frequency refers to the probability for an individual target to occur in a search display

Professionals, such as airport baggage screeners, search for many illegal objects

- Some illegal items are more frequent: 
- Some illegal items are less frequent: 

Search performance improves with sequential, repeated exposure, known as repetition priming ³

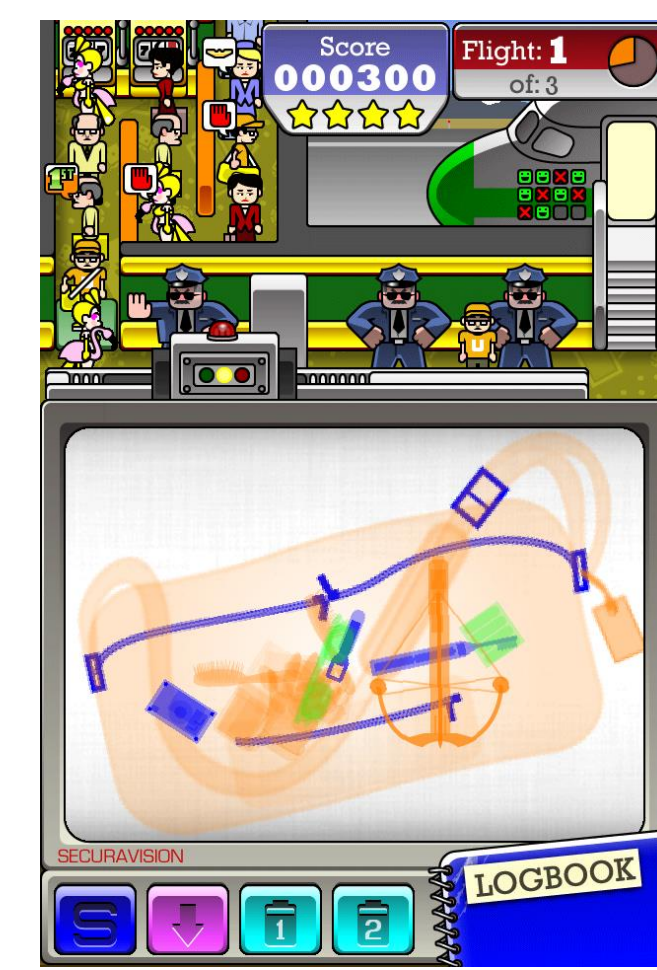
Question

Does repetition improve detection of infrequent targets?

Airport Scanner

Airport Scanner, a visual search mobile game for iOS & Android ⁴

- 93,064 players in dataset used
- Each person played anywhere from hundreds to thousands of trials
- Each target has a specific frequency of occurrence, ranging from 0.4% to 5.4% of all bags

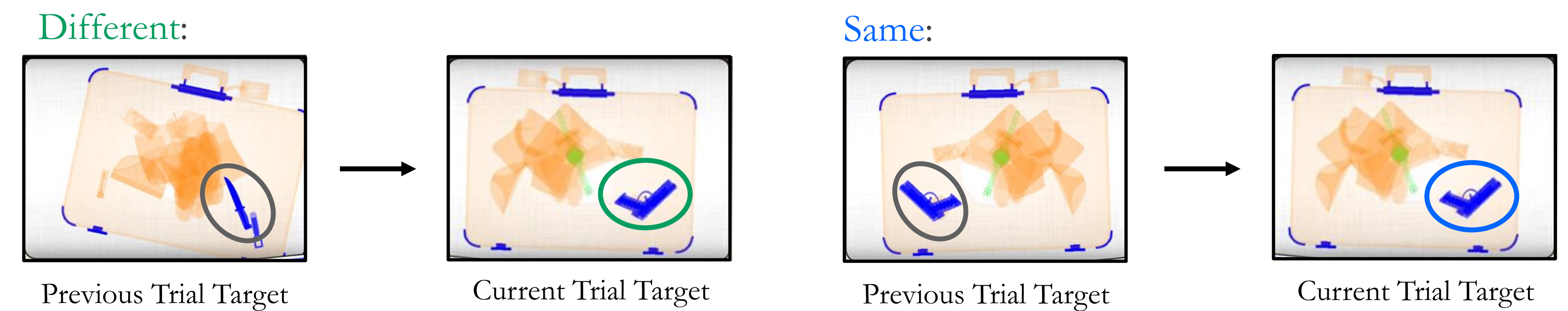
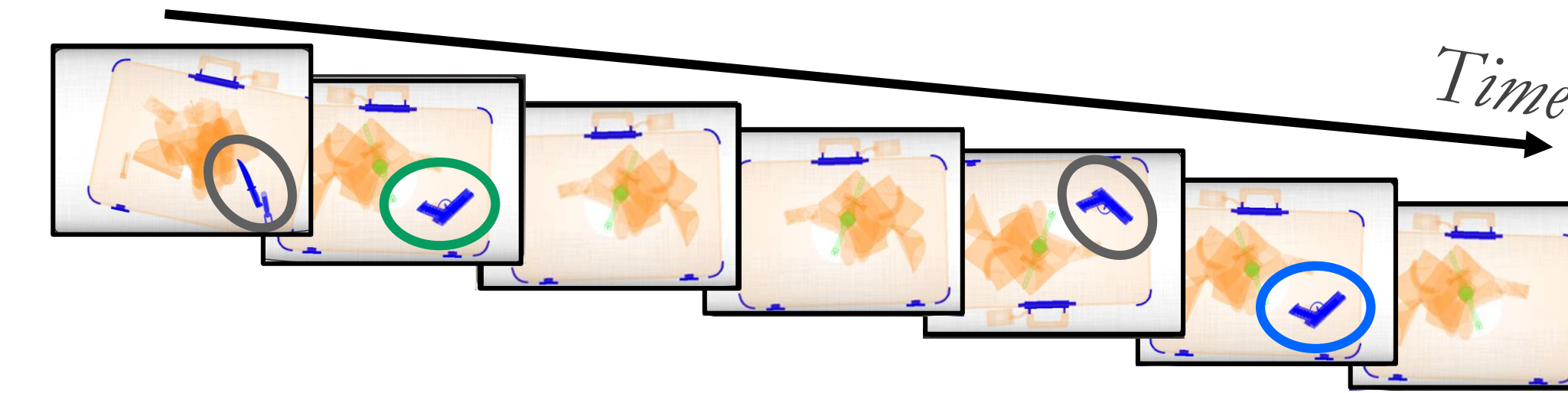


Methods

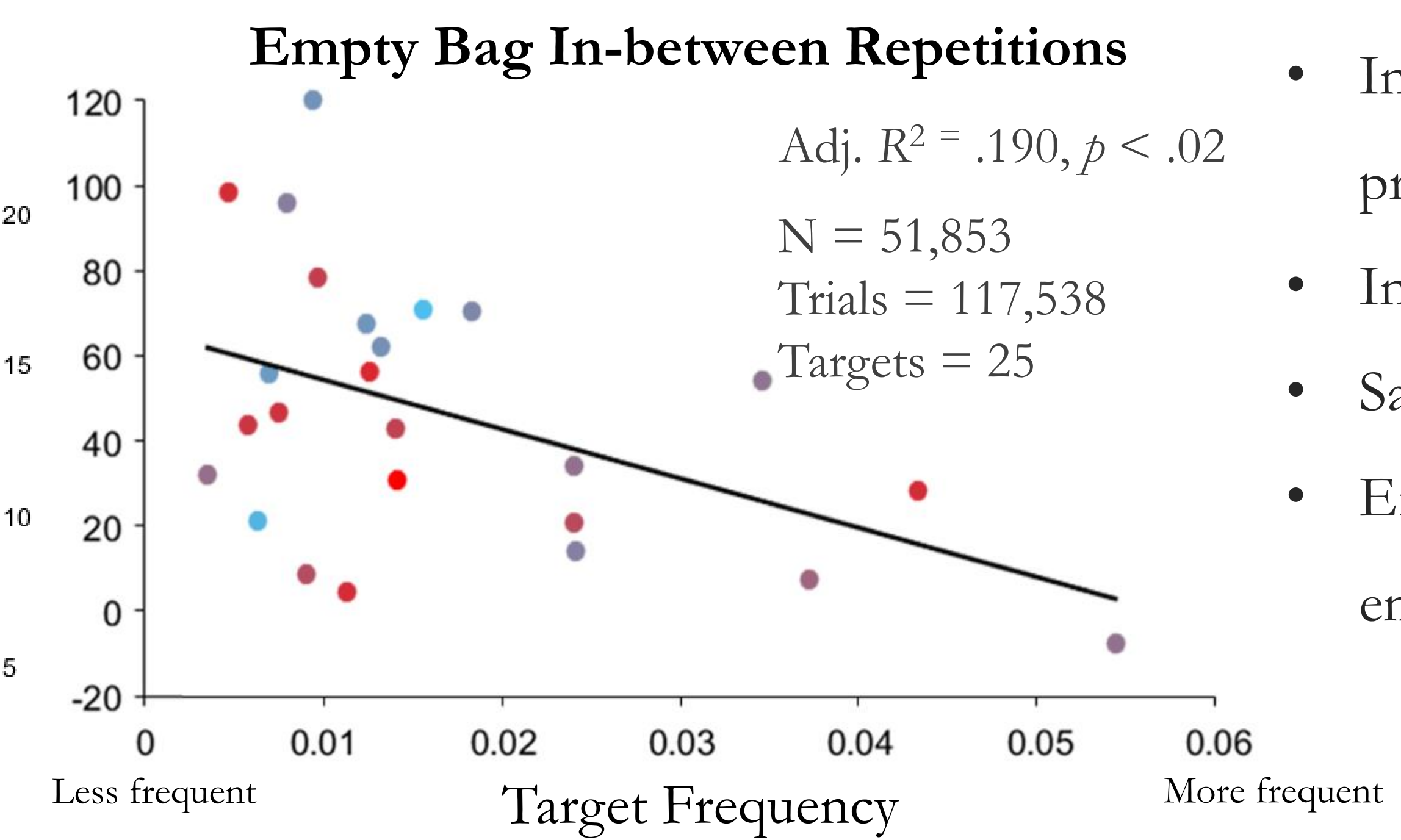
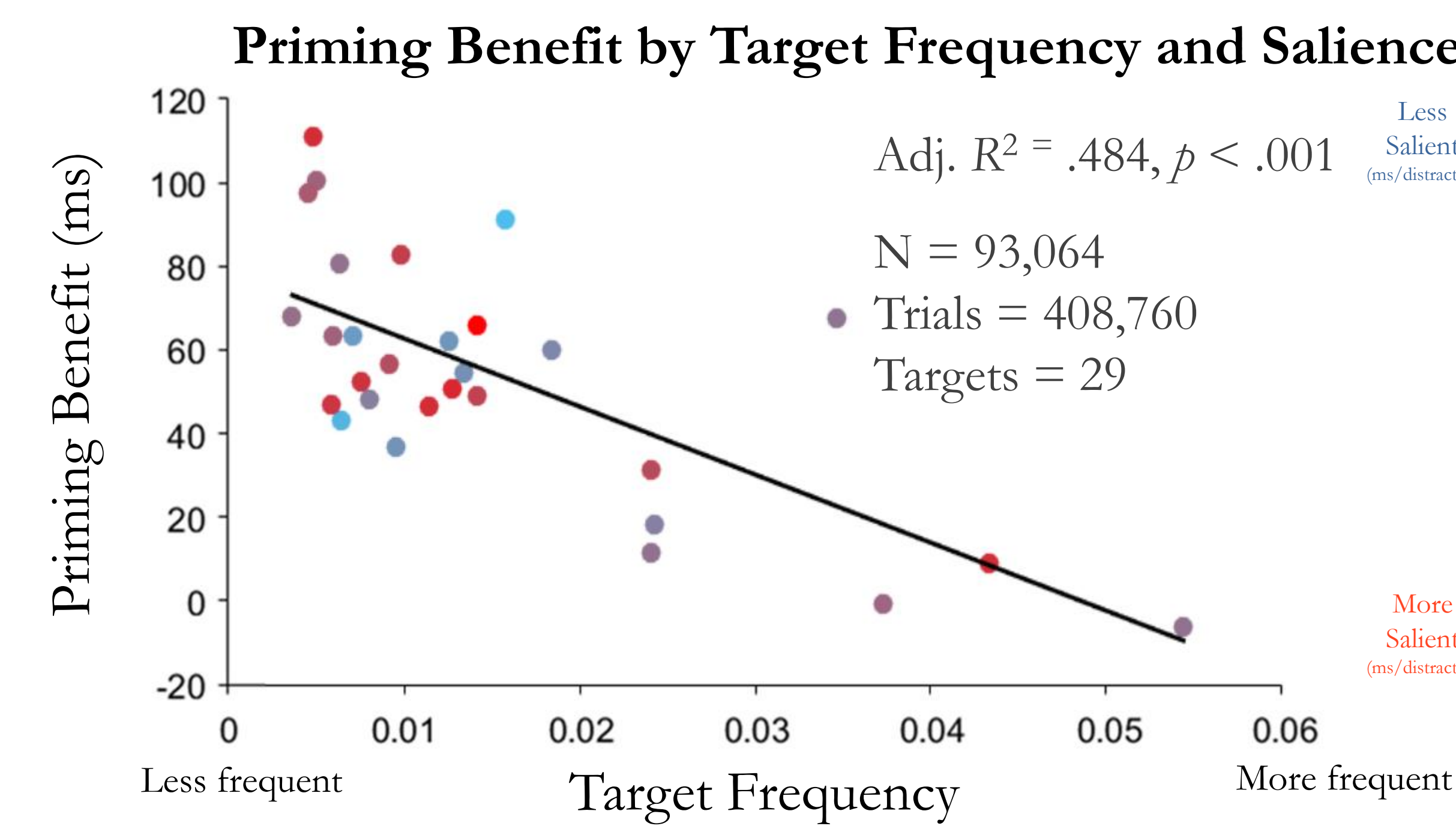
Calculated relative priming benefit for each individual target item

$$\text{Priming Benefit (ms)} = \text{Different} - \text{Same}$$

Two temporal intervals: immediate repetition and empty bag in-between



Results

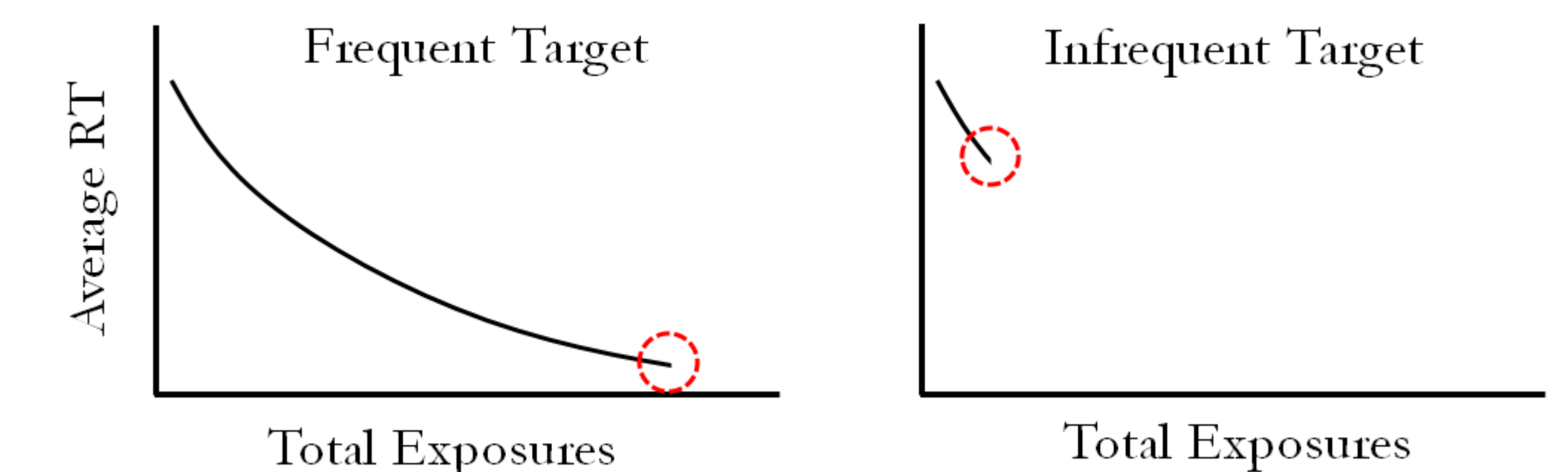


- Inverse relationship between repetition priming and target frequency
- Infrequent targets can improve ~10% in RT
- Salience did not predict repetition priming
- Effects persist provided a correctly identified empty bag in-between repeated target bags



Discussion

- Priming for individual targets can accumulate over long time-scales ^{5, 6}
- Frequent targets are exposed to more often, leading to lasting facilitation across searches ^{7, 8}
- In contrast, infrequent targets strongly benefit from recent exposures



Conclusions

- Infrequent targets benefit more from repetition priming
- Priming effects scale to target frequency, posing implications for literature typically conducted with few, frequent targets
- Findings suggest that airport screening procedures would benefit from practice with interspersed infrequent targets

References

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