

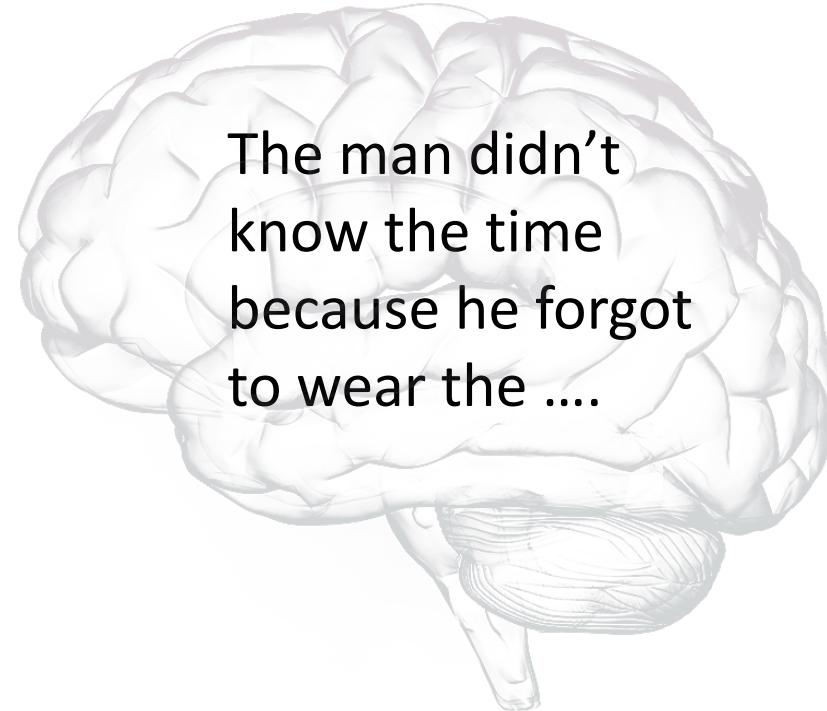


Controllability of Prediction in Language Comprehension: Effects of Task Demands on Predictive Eye Gaze

Chen Hui Ching, Aine Ito

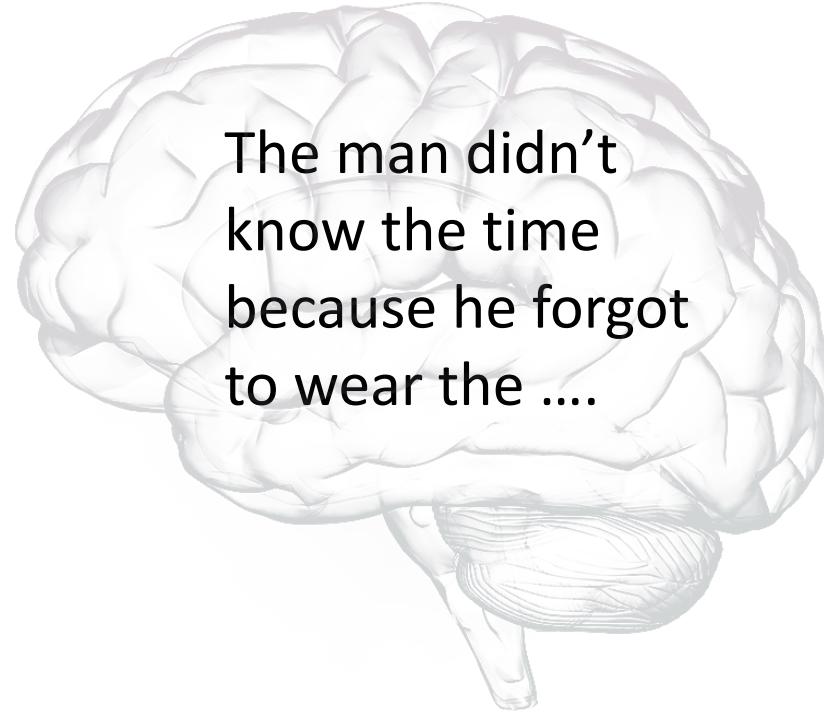
Singapore Summer Meeting 2024

What is prediction?



The man didn't
know the time
because he forgot
to wear the

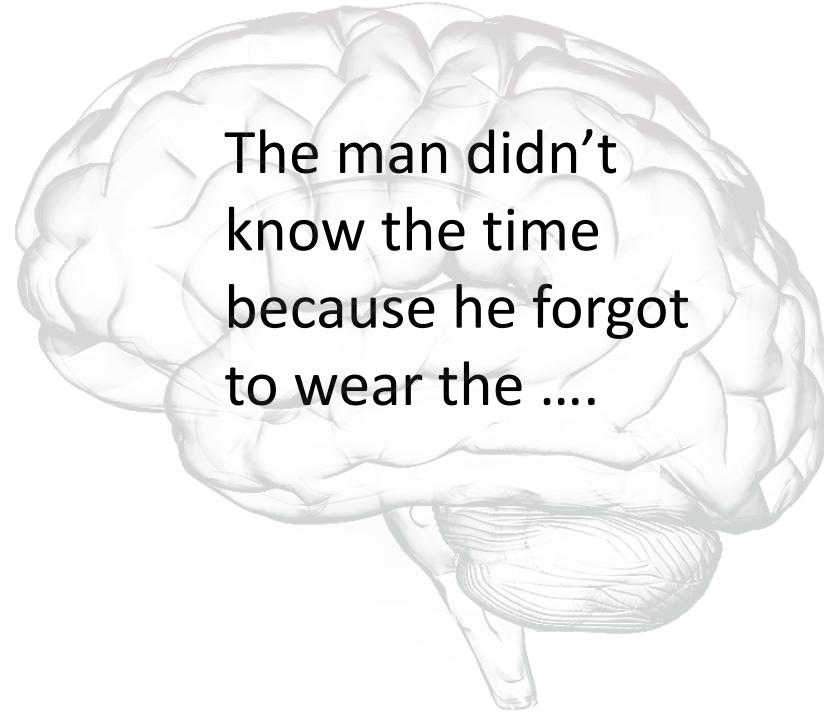




The man didn't
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- Prediction by
Production
mechanism
- Non-automatic



The man didn't
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Prediction by
Production
mechanism
• Non-automatic

Prediction by
Association
mechanism
• Automatic

Introduction

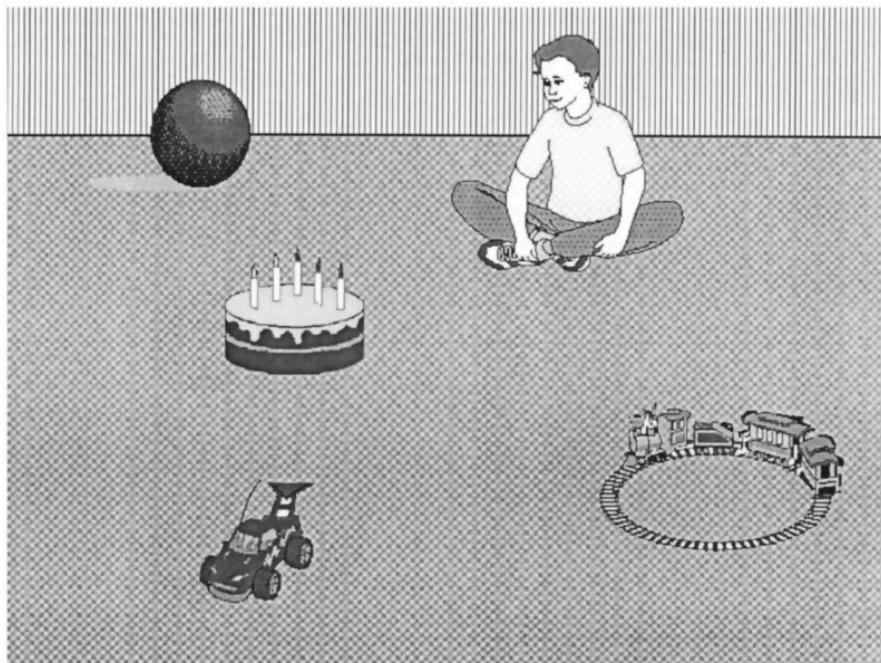
Introduction

- Several studies have investigated the role of prediction in language processing (Huettig 2015; Pickering and Gambi 2018; Ryskin and Nieuwland 2023)

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- It is not clear to what extent prediction process is automatic

- The visual world paradigm has been used to explore language processing (Altmann and Kamide, 1999; Tanenhaus et al., 1995)



‘The boy will eat the cake’

‘The boy will move the cake’

(Altmann and Kamide, 1999)

Research Question

Is prediction controllable?

Experiment 1:

If prediction is controllable, then participants would predict more in the prediction task vs comprehension task

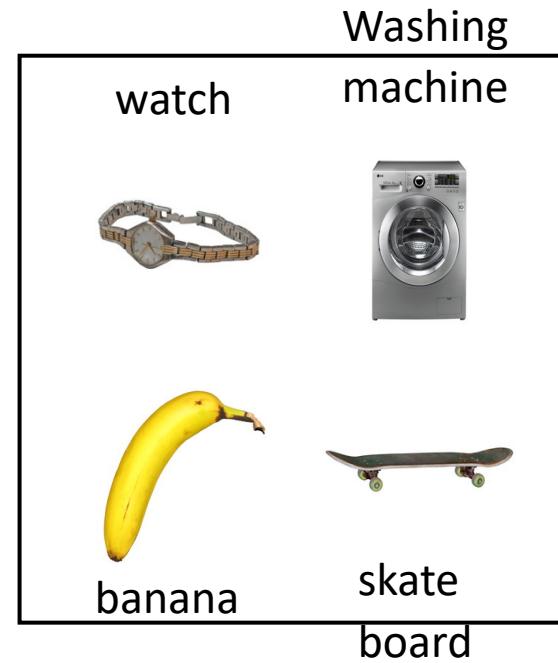
Experiment 2:

If prediction is controllable, then participants would predict less in the inhibition prediction task vs comprehension task

Method

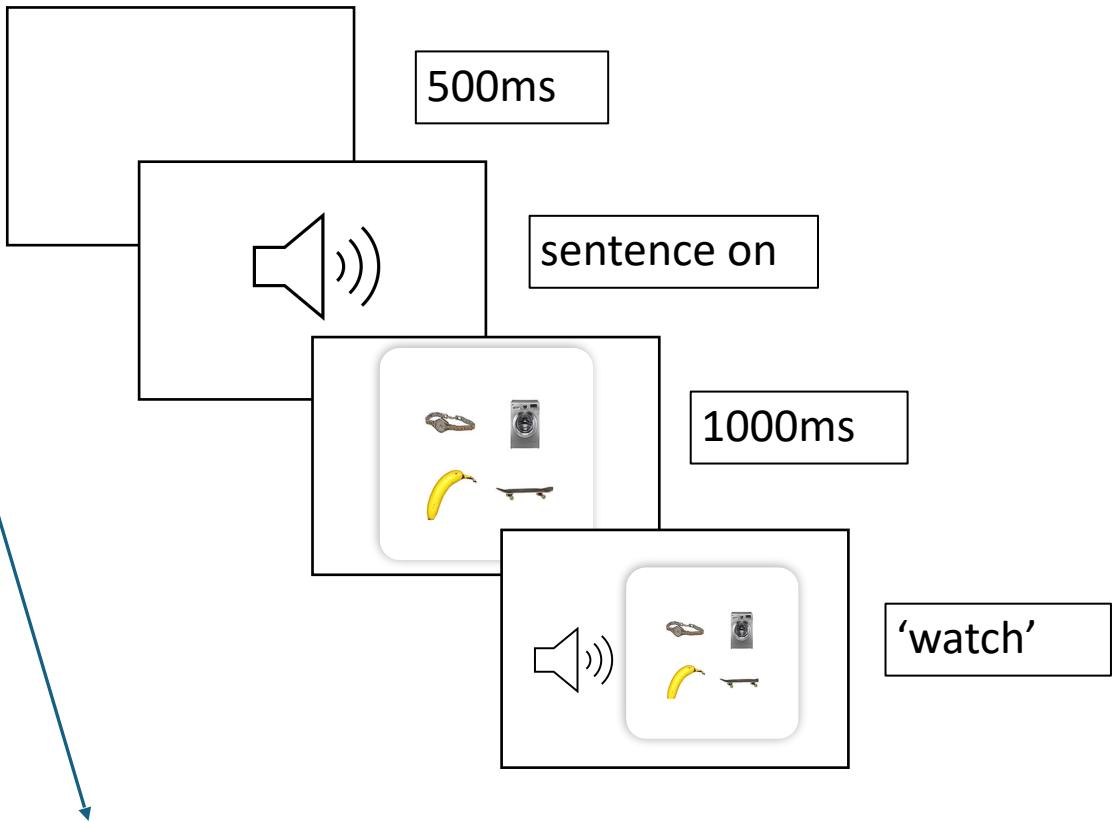
Experiment 1: Enhancing prediction

- **Participants:** 24 L1 English speakers
- **Items:** 22 target items
(highly predictable sentence)
- The man didn't know the time because he forgot to wear the **watch** that he usually wears.



Comprehension task

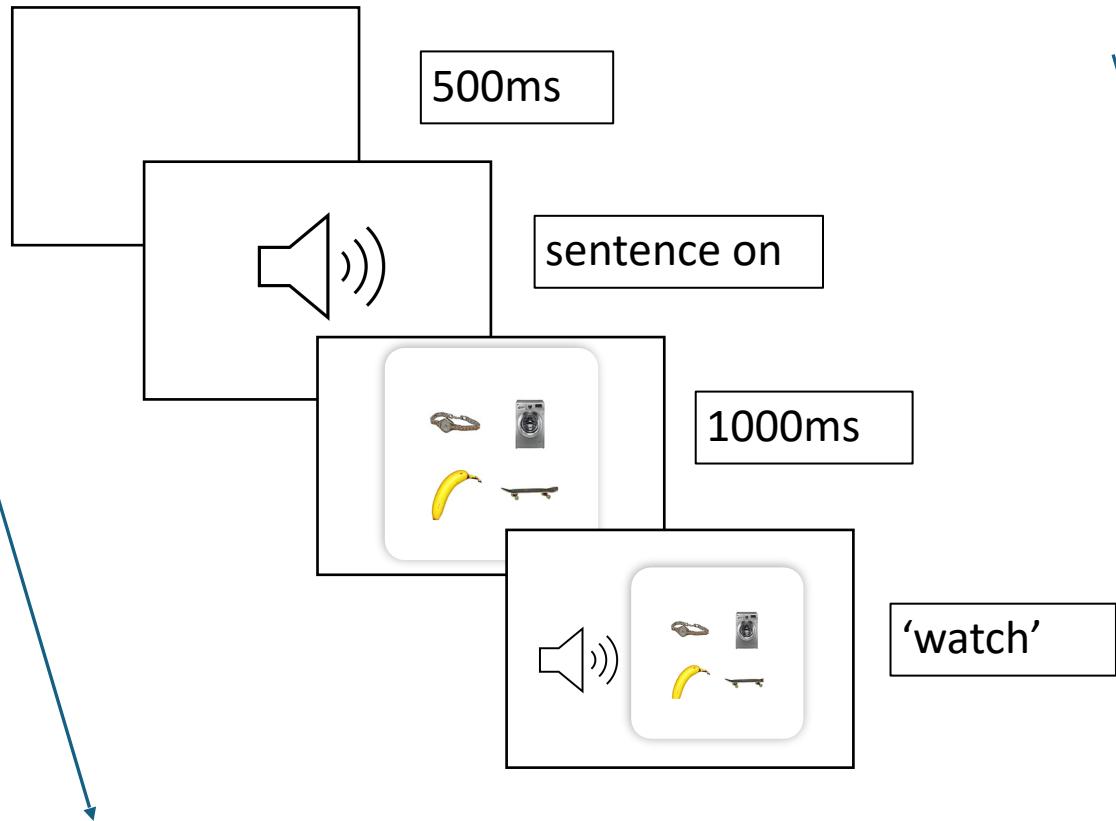
In this session, please listen to the sentence and click on the object that was mentioned in the sentences as quickly as possible and as accurately as possible.



Action: Click on the mentioned item

Comprehension task

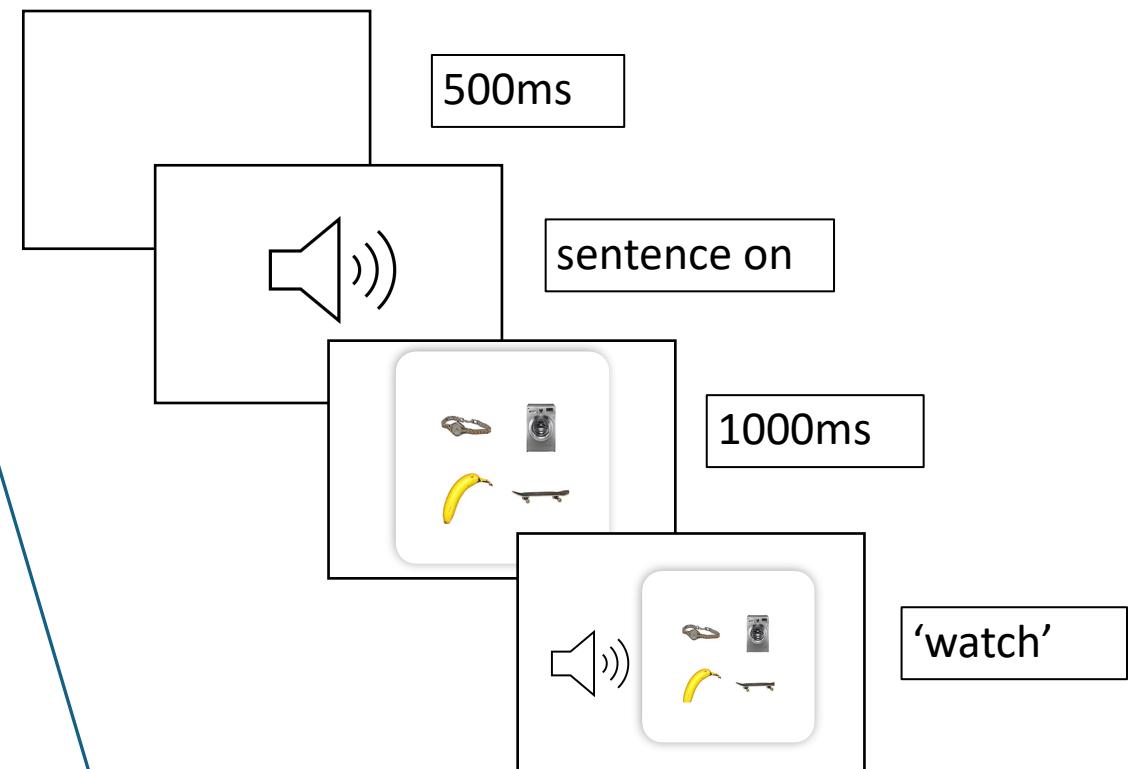
In this session, please listen to the sentence and click on the object that was mentioned in the sentences as quickly as possible and as accurately as possible.



Action: Click on the mentioned item

Prediction task

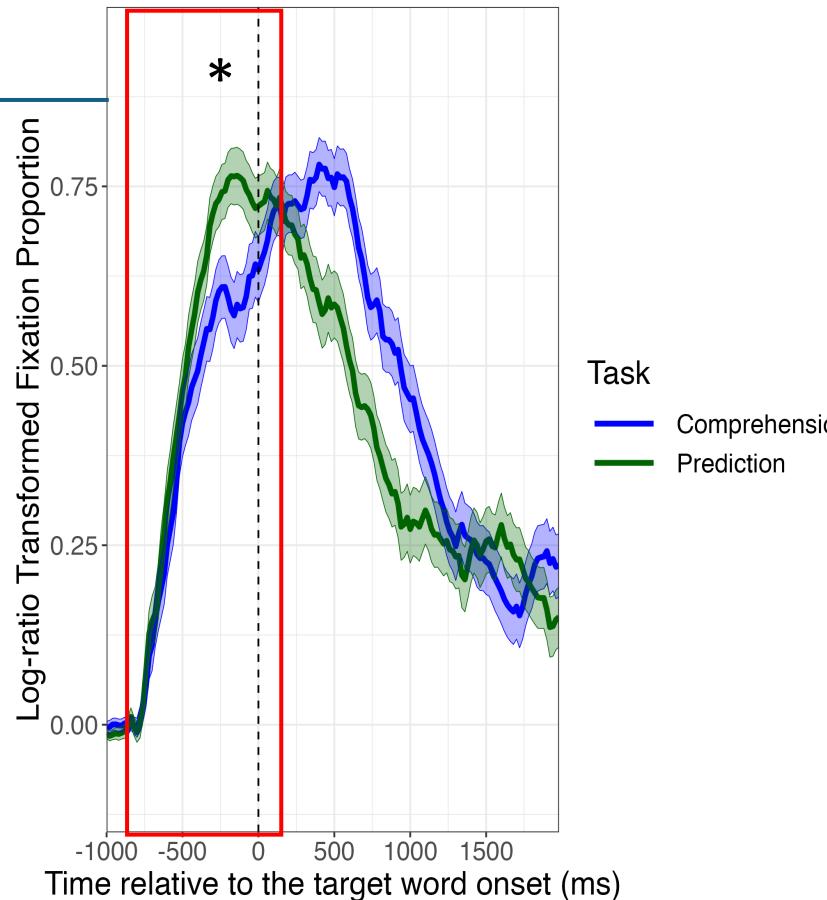
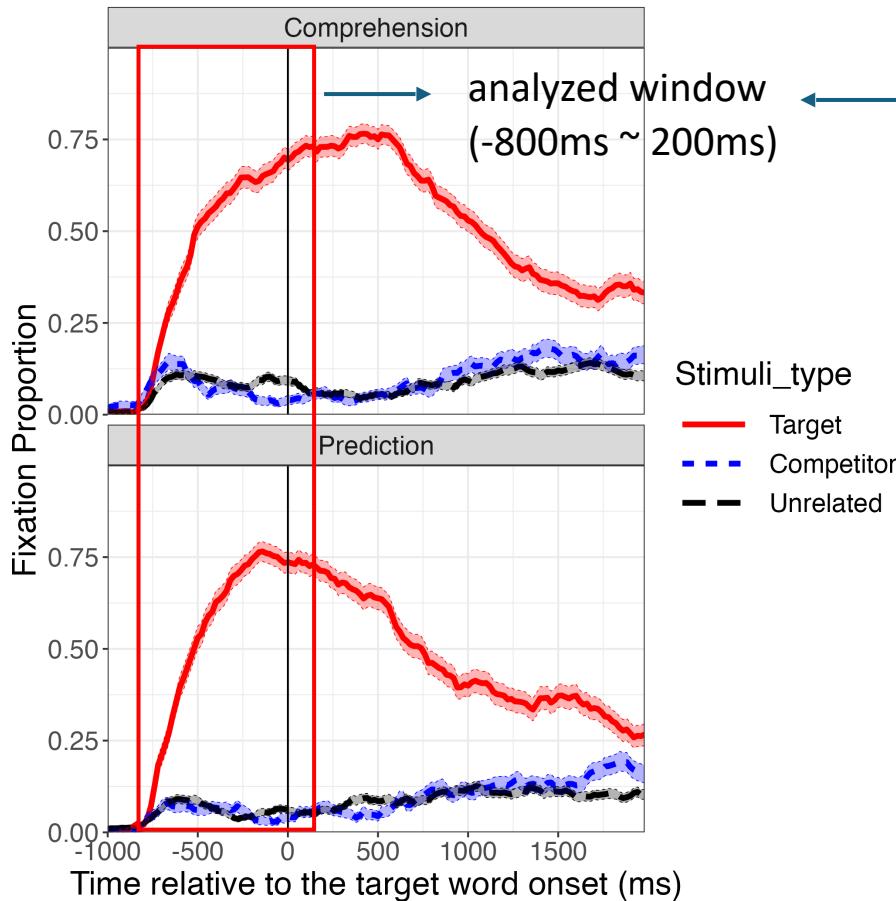
In this session, please try to **predict** how the sentence is likely to continue while listening and click on the object that was mentioned in the sentences as quickly as possible and as accurately as possible.



Action: Click on the mentioned item

Eye-tracking results

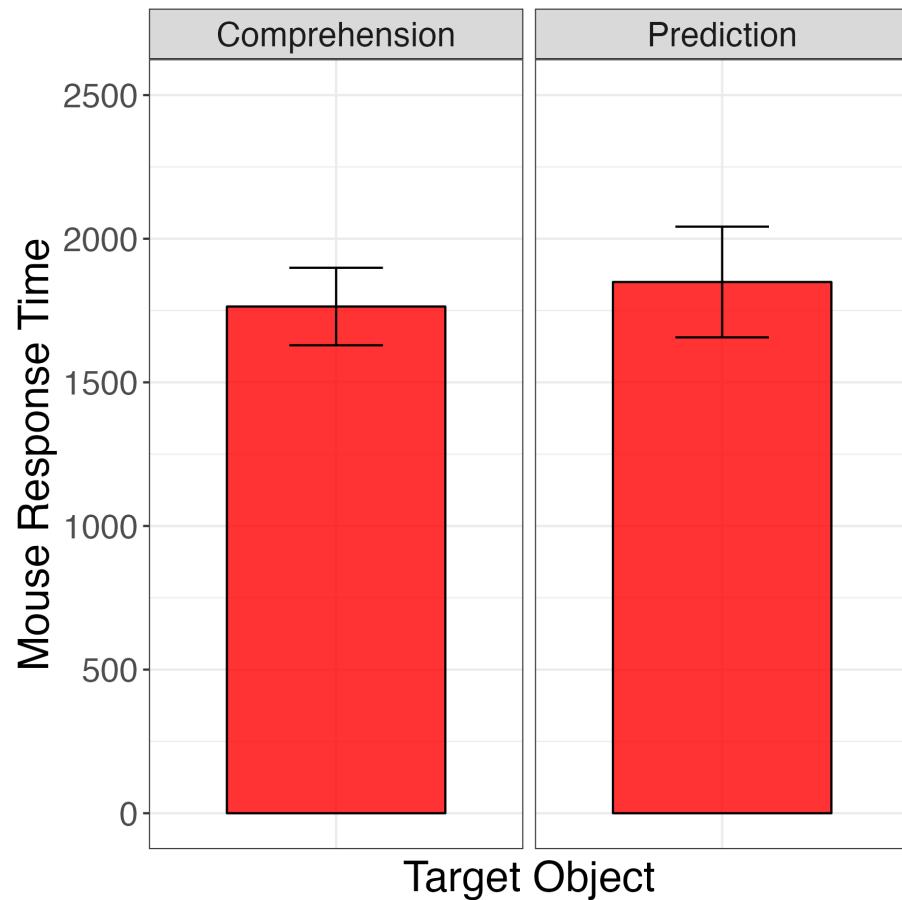
Experiment 1



- More look to the target object in the prediction task comparing to the comprehension task
- The same performance toward the phonological competitor picture for the prediction task as well as for the listening task

Mouse reaction results

Experiment 1



- No difference between the comprehension task and the prediction task

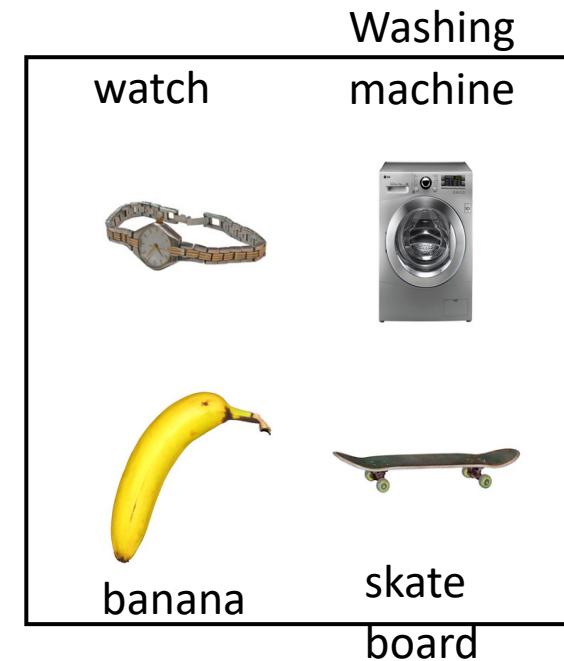
Experiment 2: Inhibiting prediction

- Participants: 24 L1 English speakers
- Materials: same as in Experiment 1
- Instructions:

Inhibition prediction task:

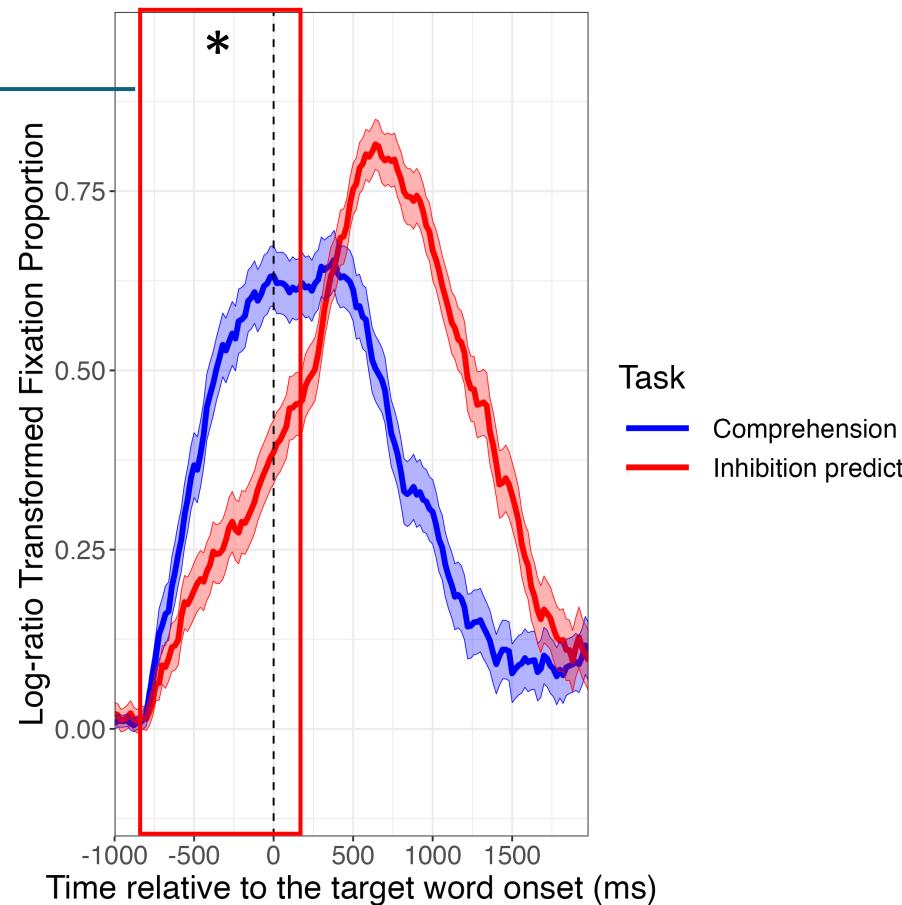
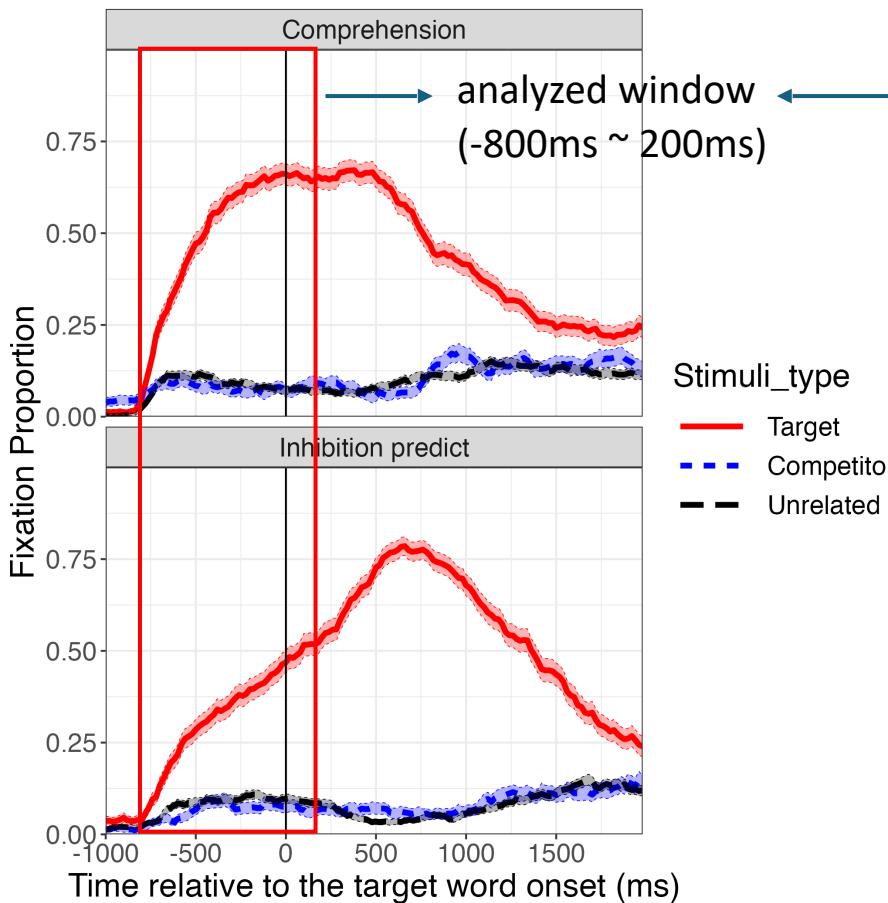
In this session, please **not to predict** how the sentence is likely to continue while listening and click on the object that was mentioned in the sentences as quickly as possible and as accurately as possible.

Comprehension task: same as in Experiment 1



Eye-tracking results

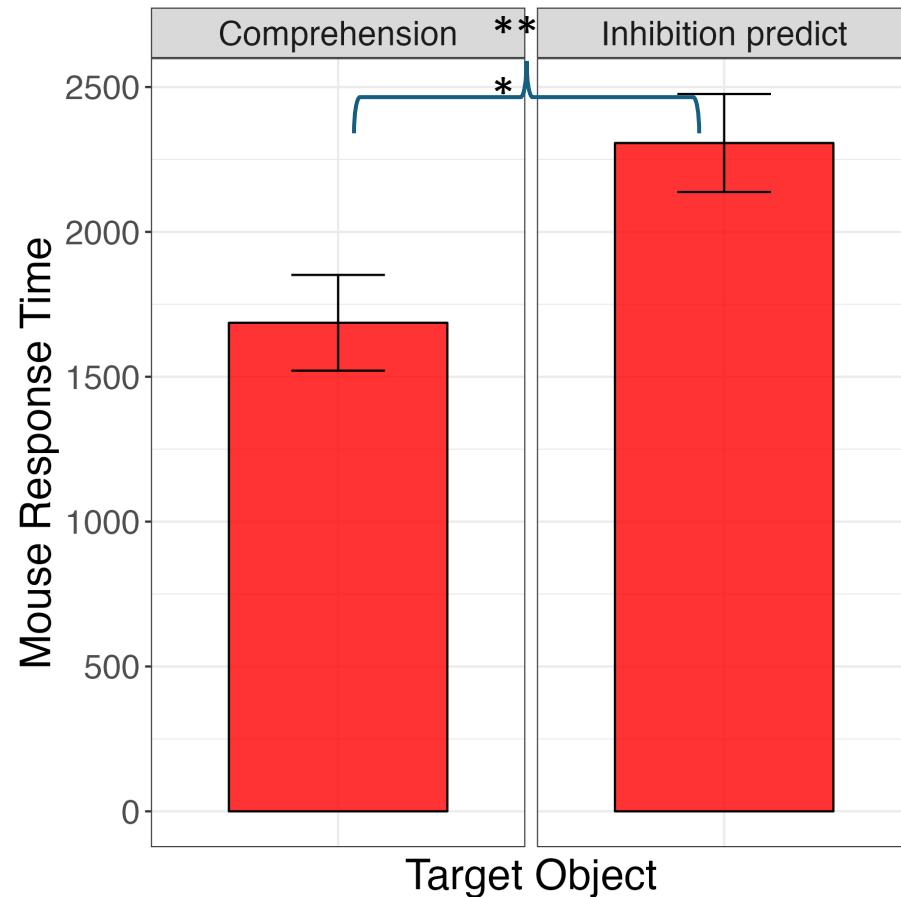
Experiment 2



- Less look to the target object in the inhibition task comparing to the comprehension task
- The same performance toward the phonological competitor picture for the prediction task as well as for the listening task

Mouse reaction results

Experiment 2



- Much slower in the inhibition prediction task than in the comprehension task

Discussion

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- The prediction in language comprehension is controllable because in **Experiment 1**, more look to the target in the prediction task vs comprehension task; in **Experiment 2**, less look to the target in the inhibition prediction task vs comprehension task

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- We didn't find the phonological competition effect

Discussion

- The prediction in language comprehension is controllable because in **Experiment 1**, more look to the target in the prediction task vs comprehension task; in **Experiment 2**, less look to the target in the inhibition prediction task vs comprehension task
- We didn't find the phonological competition effect
- No faster reaction time for the prediction task compared to the comprehension task in **Experiment 1**, while slower reaction time for the inhibition prediction task compared to the comprehension task in **Experiment 2**

Conclusion

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- Prediction is controllable: Enhancing or Inhibiting

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Conclusion

- Prediction is controllable: Enhancing or Inhibiting
- Prediction can't be inhibited fully

Thank YOU!

- You
- Participants
- Lab members
- Natalie
- Beth
- Spencer
- MOE Tier 1 (grant agency)