Introduction
Sentences provide valuable contextual clues that allow us to generate a prediction about the meaning of a new word → generating predictions about word meanings can guide word learning [1]

Factors influencing successful word learning:

1. Sentence constraint
   - Better retention of words studied in strongly constraining contexts that are highly informative (e.g., “the pupil peeled an old impet (banana)”) [1]

2. Accuracy of predictions
   - Predictive Interactive Multiple Memory Systems (PIMMS) framework: greater disparity between expected and encountered information → stronger memory traces [2]
   - Incorrect and disqualified predictions → better memory compared to correct and confirmed predictions for known words [3], benefit of disconfirmed predictions on novel word learning is unclear [4, 5]

Eye movements were aggregated into 10ms time bins, proportion of fixations to four interest images: Strong constraint (i.e., confirmatory feedback given) and incorrect (i.e., disconfirmatory feedback received) vs. Strong constraint (i.e., confirmatory feedback given) and correct (i.e., confirmatory feedback received). Fixation times were shorter for correct predictions than for incorrect predictions [2, 3, 5].

Method
Participants: 32 L1 English speakers

1. Study phase: 2 x 2 design:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Experience</th>
<th>Close</th>
<th>Sentence</th>
<th>Target</th>
<th>Competitor</th>
<th>Feedback</th>
<th>Guess accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong</td>
<td>Expected</td>
<td>0.74</td>
<td>The pupil peeled an old impet</td>
<td>cheetah</td>
<td>guitar</td>
<td>mug, shirt</td>
<td>74%</td>
</tr>
<tr>
<td>Strong</td>
<td>Unexpected</td>
<td>0.27</td>
<td>The pupil peeled an old impet</td>
<td>cheetah</td>
<td>banana</td>
<td>mug, shirt</td>
<td>14%</td>
</tr>
<tr>
<td>Weak</td>
<td>Expected</td>
<td>0.15</td>
<td>The pupil held an old impet</td>
<td>cheetah</td>
<td>guitar</td>
<td>mug, shirt</td>
<td>25%</td>
</tr>
<tr>
<td>Weak</td>
<td>Unexpected</td>
<td>0.18</td>
<td>The pupil held an old impet</td>
<td>cheetah</td>
<td>banana</td>
<td>mug, shirt</td>
<td>20%</td>
</tr>
</tbody>
</table>

Fixations to target images more often

Expected condition (one target object that fits the context well):
- Click on the object you think the new word refers to
- The current answer is non-highlighted (e.g., click on the highlighted object to continue)

Expected condition studied: Displays comprised target and competitor objects from target item and another item (dependent on condition studied)

Results
1. Fixations at study:
   - When novel word meanings are expected, learners fixate target images more often
   - When novel word meanings are unexpected, learners fixate competitor images more often

2. Memory performance at test:
   - Better memory for novel words when sentences are strongly constraining and word meanings are expected, but the effect of sentence constraint on memory performance is dependent on whether word meanings are expected or not (GLMM, 2x2 interaction: z = 2.79).

3. Linking prediction at study and memory at test:
   - When sentences are strongly constraining and target meanings are expected, an increase in the amount of time spent fixating target at study is associated with an increase in memory accuracy at test

Conclusions
1. Prediction during study: Evidence of an effect of sentence constraint on eye movements and guesses (more looks to/clicks on objects that fit the context well in strongly constraining contexts, consistent with [6, 7])
2. Memory performance: Novel words are learned better in strongly constraining contexts and when word meanings are expected, compared to when word meanings are unexpected (i.e., when learners’ predictions are confirmed rather than disconfirmed).
3. Role of feedback: Receiving confirmatory or disconfirmatory feedback at study does not influence memory for novel words at test.
4. No evidence of error-driven vocabulary learning: learning is more successful when predictions are correct and confirmatory feedback is received (consistent with [5]).
   - Disconfirmatory feedback may be beneficial after initial anchoring opportunity to familiarise learners with novel words [8].
   - Rehearsal of correct word meanings after receiving feedback diminishes effects of confirmatory or disconfirmatory feedback?

References:
[1] Borovsky et al. (2010), Cognition
[3] Haeuser & Kray (2021), Language, Cognition and Neuroscience