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# More participants, fewer trials: A silver lining of moving eye-tracking experiments online

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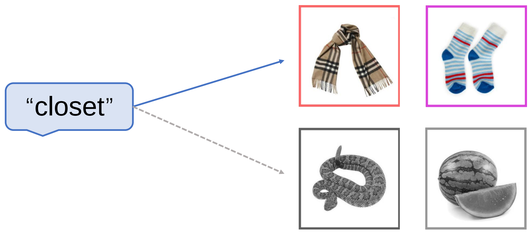
## 1. Goals

- To replicate prior in-lab results [1] with web-based eye-tracking.
- To test whether behavior changes across an experiment.

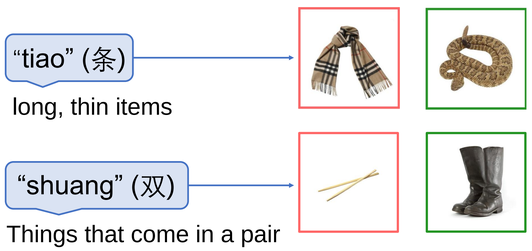
## 2. Phenomenon

**Using semantic cues to facilitate predictions**

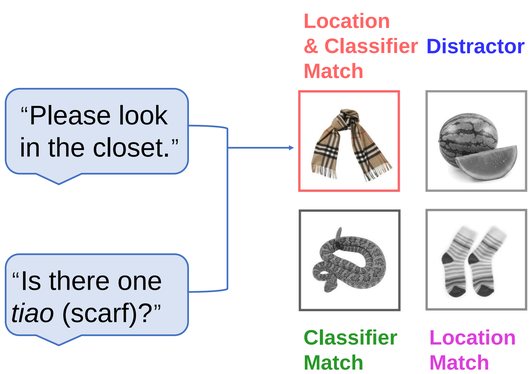
- **Location-specific cues:**




- **(Chinese) Classifier-specific cues:**




- **Integrating two cues:**



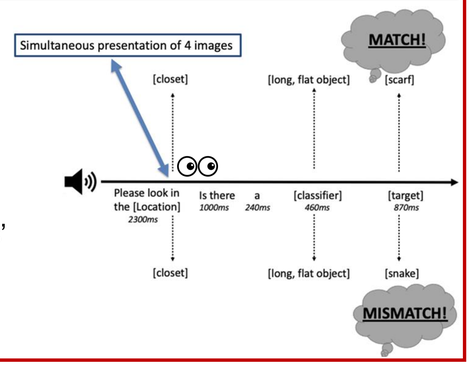

## 3. Method

**Norming task**

- $N_{L1\ English\ Monolinguals}$=37; $N_{L1\ Mandarin\ L2\ English}$ = 31
- E.g., "How likely it is to find a [snake] in [the closet]?"

**Web-based visual world experiment**

- $N_{L1\ Mandarin\ (L2\ English)}$= 47; $N_{L2\ Mandarin\ (L1\ English)}$ = 46
- 14 match trials, 14 mismatch trials, 20 fillers
- **Time-course analysis** captures real-time changes of participants' looks
- **Location Advantage analysis** measures the extent to which participants use location information (see note 1)




## 4. Results

**Time-course analysis:**

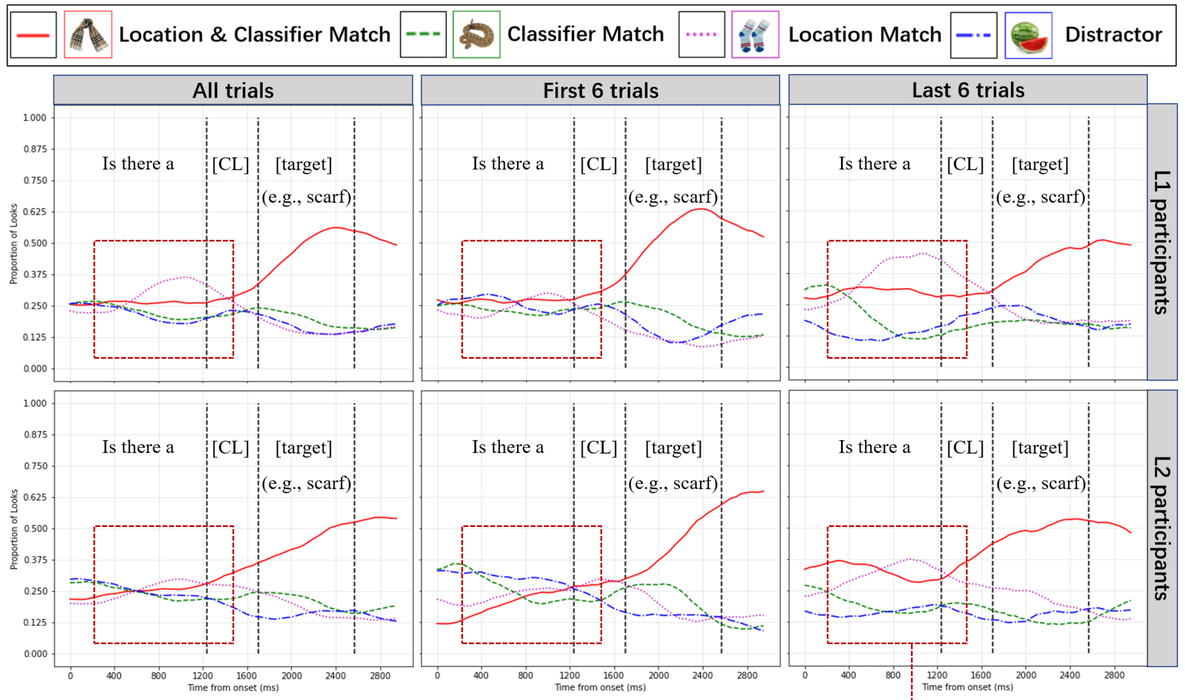



Figure 1. Time-Course Analysis of Looks to Four AOIs in Match Trials

**Location Advantage analysis:**

Table 1. Fixed Effects of Location Advantage from the Linear Mixed-Effect Regression

| | All trials | First 6 trials | Last 6 trials |
|---|---|---|---|
| GroupL2 | –0.11 (.14) | **–0.23 (.06)** | –0.03 (.79) |
| ConditionMismatch | 0.01 (.97) | 0.15 (.19) | –0.25 (.15) |
| GroupL2:ConditionMismatch | 0.02 (.87) | 0.17 (.31) | –0.14 (.38) |

*Note:* Formula: LocAdv ~ Group * Condition + (1 | Participant) + (1 | Trial)

L2 listeners showed less (if any) sensitivity to location information in early trials but similarly high sensitivity in late trials, suggesting task-specific adjustments over the course of the experiment.

## 5. Conclusions

- As in [1], both L1 and L2 listeners can integrate location and classifier information to make predictions.
- Repeated exposure to experimental manipulations risks changing participants' responses over the course of an experiment.
- Web-based eye-tracking provides a good opportunity to test many more participants on fewer items, which may better capture language processing patterns.

## Note

(1) Location Advantage = ($Count_{LocationMatch}$ + $Count_{Location\&ClassifierMatch}$ – $Count_{ClassifierMatch}$ – $Count_{Distractor}$) / ($Count_{Total}$)

*Note:* Considering that a 200-ms delay is expected between hearing the acoustic stimuli and executing eye movements accordingly, Location Advantage was calculated within 200 ms after the onset of the [location] till 200 ms after the onset of the [classifier], covering a time window of 1250 ms (25*50-ms time bins).

## Reference

[1] Wiener, S., & Rohde, H. (2018). *Immediate integration of real-world knowledge and classifier cues during Mandarin sentence processing*. Talk at the 30th North American Conference on Chinese Linguistics (NACCL). Columbus, OH.