


CROSS-CODAL BRIDGING

INFORMATION PROCESSING:

DIFFERENCES ACROSS LANGUAGES

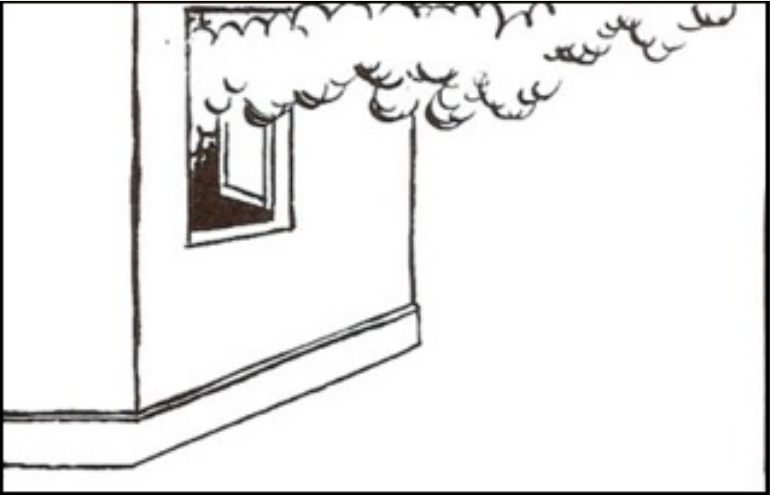
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Cross-codal* bridging information in stories in English and Chinese:

a) From picture to text

Context Panel





Bridging Event Panel

The son passes by the house and sees the smoke.

儿子从房子边经过, 看到了浓烟。

Critical Panel






b) From text to picture

Context Panel

Smoke billows out of the windows of the house.

滚滚浓烟从一户人家的窗户中飘出来。

Bridging Event Panel



Critical Panel

The son pours water into the window.

儿子从窗户把水泼进屋里。

End-state Panel

The father comes out of the window all wet, pointing to his pipe.

爸爸湿漉漉地从窗户里探出身子, 指着手里的烟斗。

In this study, we compared comprehension of stories with cross-codal bridging event with uni-codal stories.

* Codality refers to the specific information coding systems (e.g. pictorial vs. textual).

Results and Discussion

Figure 1. The reading times of the English monolinguals

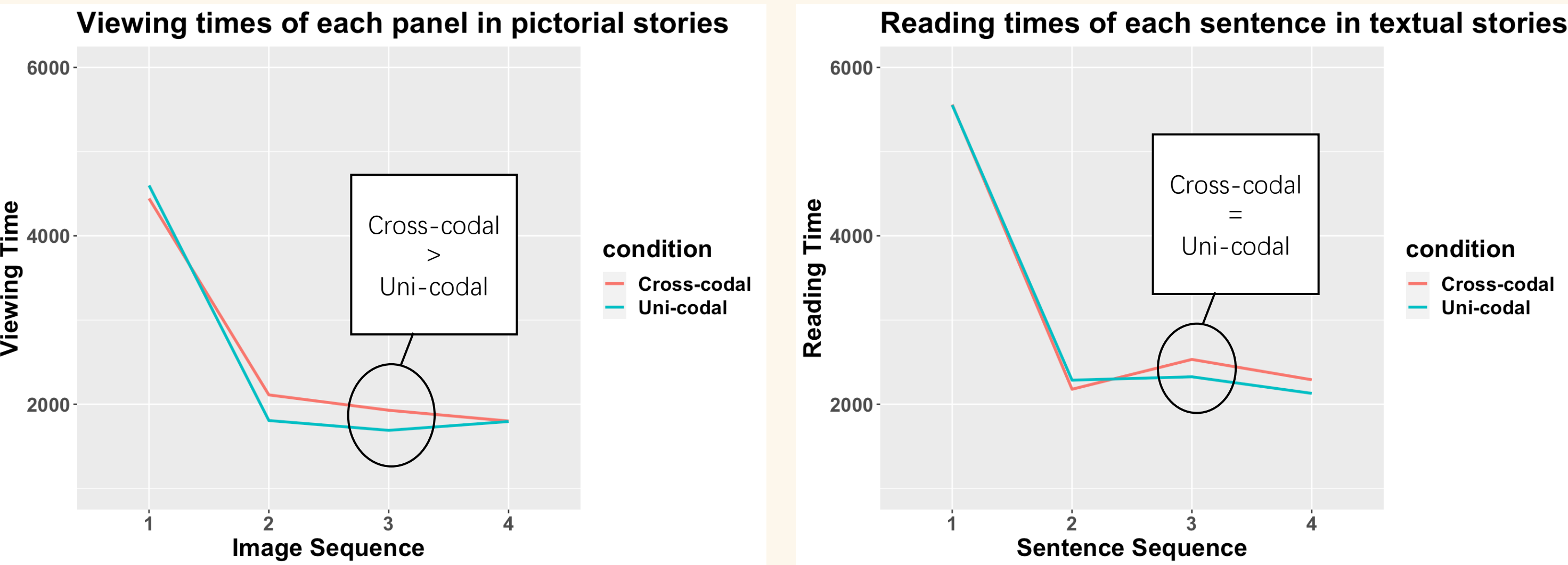
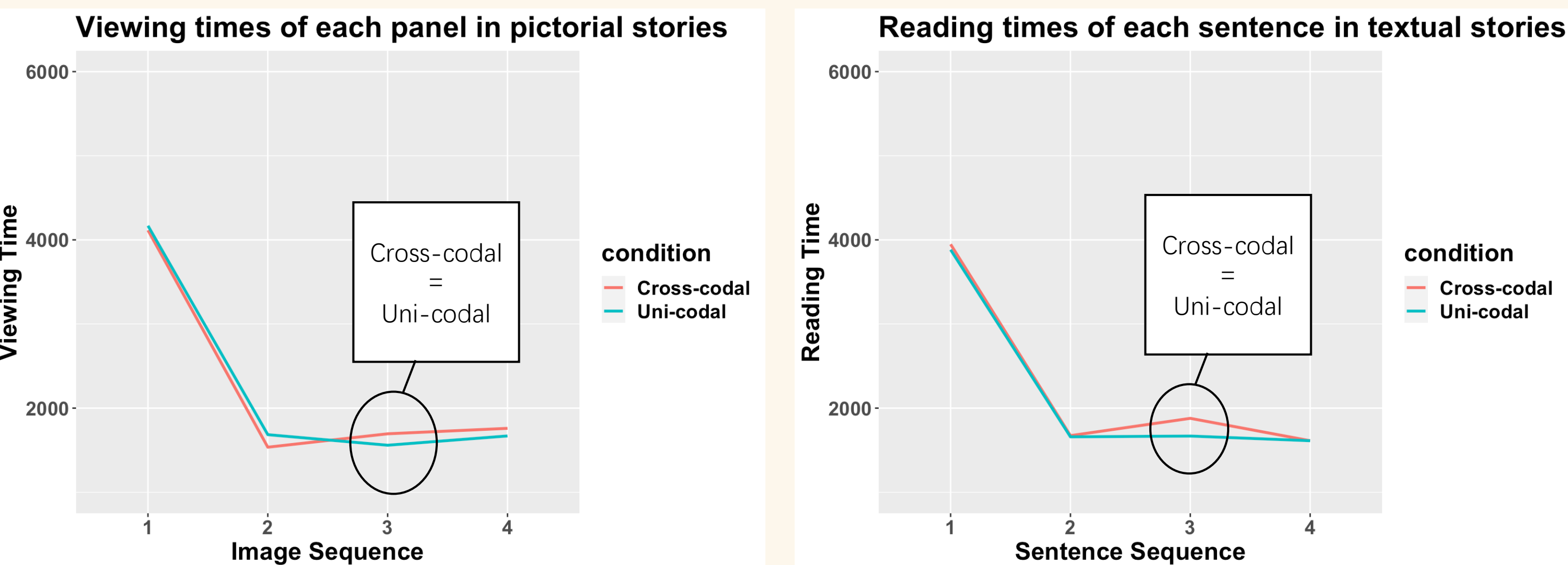


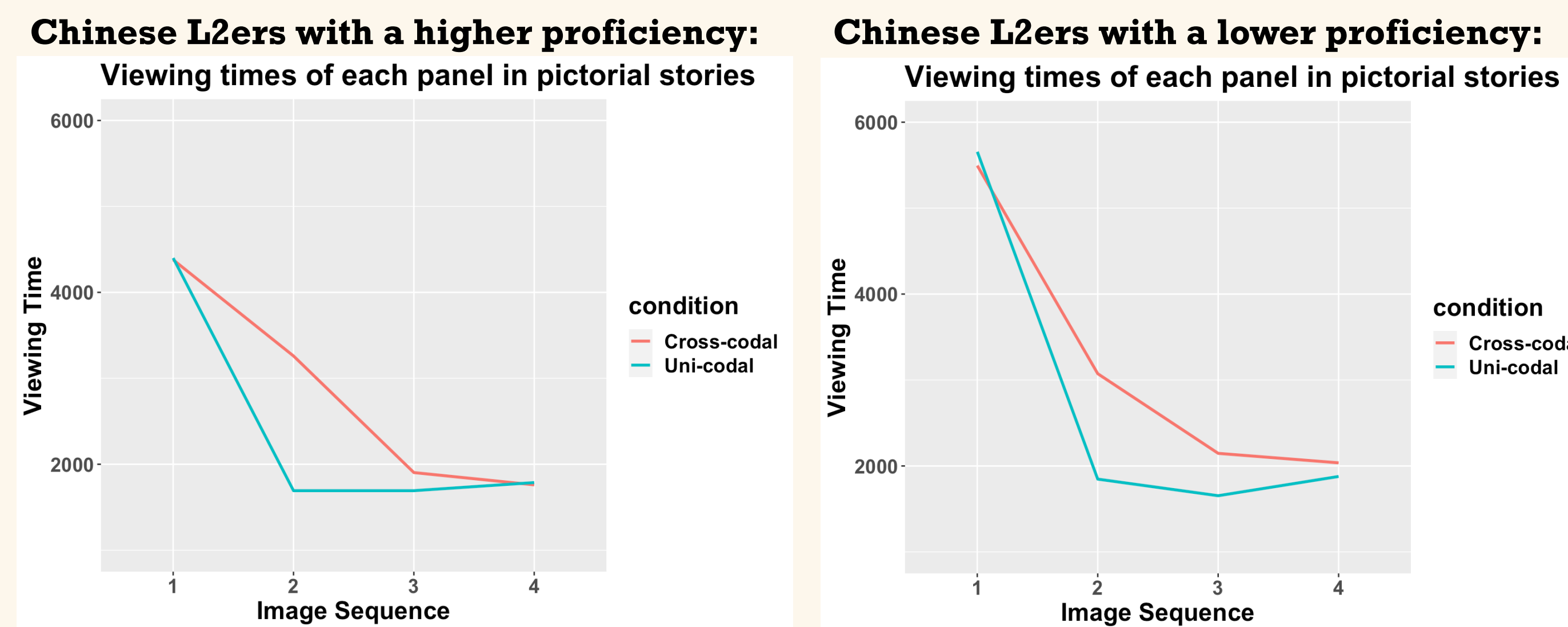
Figure 2. The reading times of the Chinese monolinguals



What about reading in an L2?

- Both English and Chinese L2ers, whose L1 was Chinese and English, respectively, found picture to text cross-codal integration hard, like the English L1ers.
- L2 texts more difficult than pictures to process.
- But proficiency also plays a role in Chinese L2ers...
- The advanced Chinese L2ers performed depictive processing of the Chinese characters like the Chinese L1ers, but for the less proficient Chinese L2ers, the visuo-spatial route is blocked.

Figure 5. The reading times of the Chinese L2ers divided by proficiency



Conclusion

- Cross-codal bridging information integration does NOT require additional cognitive resources.
- Alphabetic text processing is less straightforward than logographic text and picture processing.
- The activation of meaning from logographic patterns is blocked in less proficient L2 Chinese speakers.

Acknowledgement

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Research Questions

- Can the pictorial information be integrated in a textual story?
- Is cross-codal integration from picture to text, and vice versa, universal?
 - Reading logographic scripts relies on visual skills (Mcbride-Chang et al., 2005), and reading alphabetic scripts: depends on phonological awareness (Huang & Hanley, 1995)
- How do verbal and visuo-spatial working memory capacities affect cross-codal processing?
- How do the L2 English and L2 Chinese speakers perform?

Research Design

- Participants:** 69 Chinese monolingual speakers, 58 English monolingual speakers, 63 Chinese learners of English, and 59 English learners of Chinese.
- Materials:** 48 four-panel comics from *Father and Son* (Plauen, 1934-1937) and the transcriptions in English and Chinese. A norming study validated the matchiness between the pictures and texts, and revealed no difference between the informativeness of the stories in the two codalities.
- Procedure:** A standard viewing time paradigm, where the panels or sentences were presented one at a time, and the viewing or reading time of each panel or sentence was recorded.
- Variables:** Reading times of the second segment (i.e. the bridging event panel or sentence) and that of the third segment (the critical panel or sentence).

- Cross-codal integration from text to picture did not cause problems for both groups.

→ Cross-codal bridging information can be processed without extra efforts.

- Cross-codal integration from picture to text caused distortion in reading for English monolingual speakers, but not Chinese monolingual speakers.

→ Alphabetic texts are harder to process than pictures, but logographic texts are not.

These patterns were modulated by working memory capacities:

- 2-back task to test the verbal working memory:

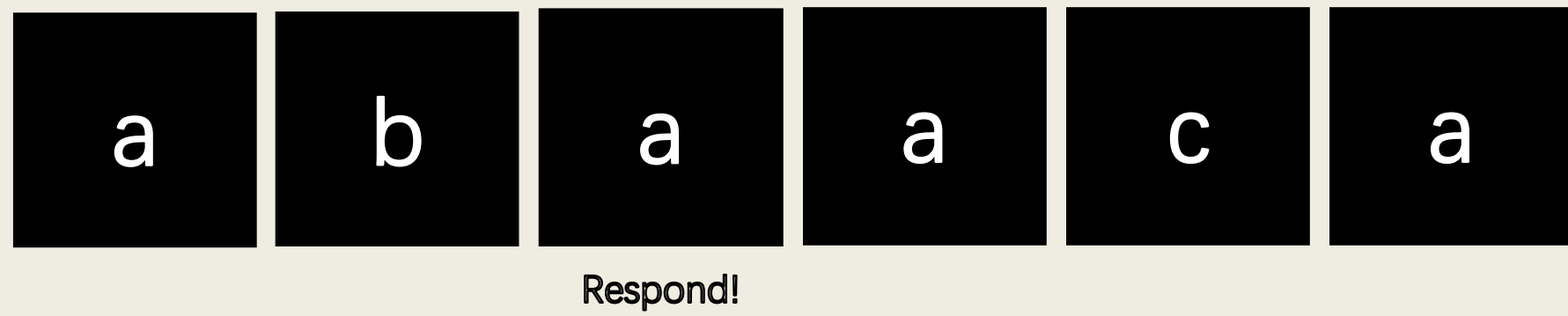


Figure 3. Demonstration of the 2-back task

- Backward Corsi task to test the visuo-spatial working memory:

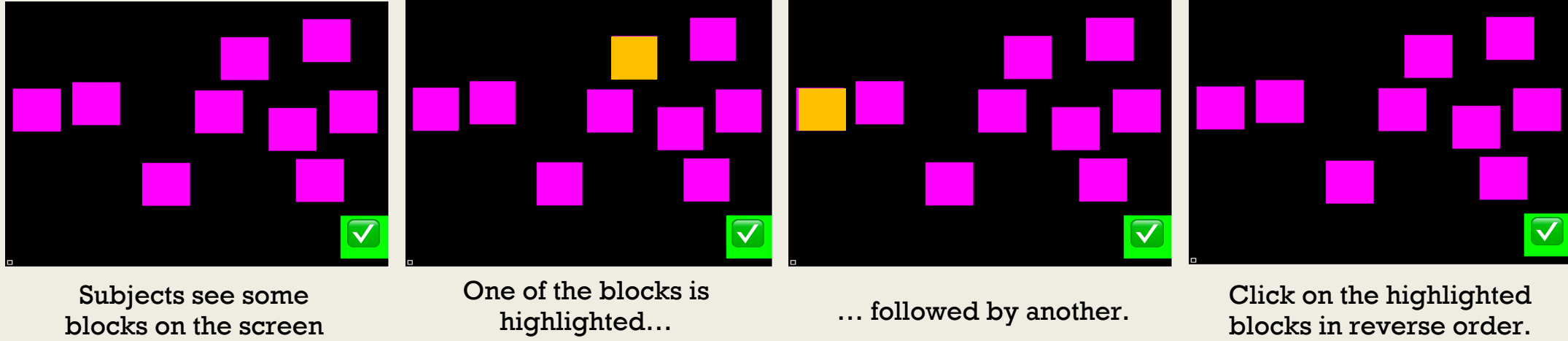


Figure 4. Demonstration of the backward Corsi task

- English L1ers: The higher the verbal working memory capacity, the better they are at cross-codal processing from picture to text.

- Chinese L1ers: The higher the visuo-spatial working memory capacity, the better they are at text processing.

The advanced Chinese L2ers were NOT affected by the codality-switched bridging information, but the beginners WERE!