

L2 processing of world knowledge and classifier information: Evidence from visual world eye-tracking

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Native speakers efficiently integrate linguistic and non-linguistic information in real-time language processing (Altmann & Mirković, 2009). Studies on L2 processing, however, revealed contradictory evidence on how L2 speakers integrate these two types of information: A reaction time study (Ahn, 2021) shows that L2 speakers tended to over-rely on world knowledge at the expense of linguistic information. Lin et al.'s (2021) eye-tracking results suggest a similar pattern between L1 and L2 listeners in integrating the two types of information. It is noteworthy that the world knowledge effect discussed in these previous studies can hardly be differentiated from word association effects—anticipating one particular object, among many, according to a contextual word can be attributed to word association effects instead of world knowledge per se.

The present study explores the influence of world knowledge and linguistic information by utilizing Mandarin shape classifiers. In a visual-world paradigm eye-tracking experiment, participants listened to a spoken sentence (examples in Table 1) as they viewed two objects (Figure 1). The spoken sentence contained (1) world-knowledge information that either biased listeners' expectations towards the interest-area object or not, and (2) a classifier that either matched or mismatched the shape of this object. Importantly, the two displayed objects share the same word form. Thus, differences between the two world-knowledge conditions in eye fixations cannot be due to word association between contextual words and target nouns.

Twenty-eight L1-Mandarin speakers and 16 advanced L2-Mandarin learners participated in Experiment 1. Before hearing the classifier (henceforth "WK region"), L1 speakers looked more to the object predicted by world knowledge (upper panel in Figure 2a). In the classifier region and the noun region, such world-knowledge effect remained significant, but the main effect of classifiers was also observed. By contrast, L2 learners were not stably affected by world knowledge in the WK region (lower panel in Figure 2a). The classifier effect only appeared in the noun region and interacted with world knowledge.

Experiment 2 (34 L1 speakers and 30 L2 learners) replicated Experiment 1 by aligning the onset of classifiers in auditory stimuli and recruiting more L2 learners. Similar to Experiment 1, L1 speakers (upper panel in Figure 2b) were significantly influenced by world knowledge in all three temporal regions. Classifier effects were significant in the classifier and the noun regions. For the L2 group (lower panel in Figure 2b), the world knowledge effect was absent in the WK region but surfaced in the classifier region. The influence of classifiers only appeared in the noun region with no interaction with world knowledge.

In sum, we find that L2 learners do not reliably use world knowledge to anticipate the shape of the objects as L1 speakers do. While L1 speakers apply the classifier semantics immediately to revise world-knowledge-based expectations, L2 learners are delayed in integrating classifier information and world-knowledge.

Examples and Results



Figure 1. Example visual display

Table 1. Example auditory stimuli

(1) WK predicts the shape of IA object (WK expected); CL matches the shape of IA object (CL expected): jiaoshi de chouti-li you yi zhang baizhi classroom MOD drawer-in exist one CL _{zhāng} white paper
(2) WK predicts the shape of IA object (WK expected); CL mismatches the shape of IA object (CL unexpected): jiaoshi de chouti-li you yi tuan baizhi classroom MOD drawer-in exist one CL _{tuán} white paper
(3) WK does not predict the shape of IA object (WK unexpected); CL matches the shape of IA object (CL expected): bangongshi de lajitong-li you yi zhang baizhi office MOD dustbin-in exist one CL _{zhāng} white paper
(4) WK does not predict the shape of IA object (WK unexpected); CL mismatches the shape of IA object (CL unexpected): bangongshi de lajitong-li you yi tuan baizhi office MOD dustbin-in exist one CL _{tuán} white paper
<i>"In the classroom/office drawer/dustbin, there is a piece of white paper."</i>

Note: For the four conditions above, the critical interest area (IA) for analysis was the left object in Figure 1.

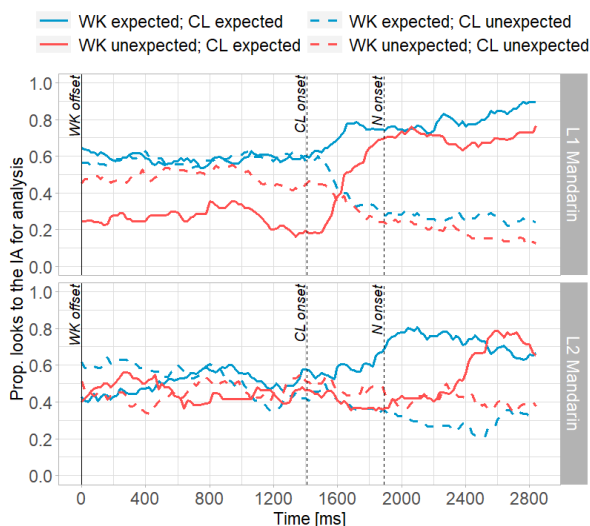


Figure 2a

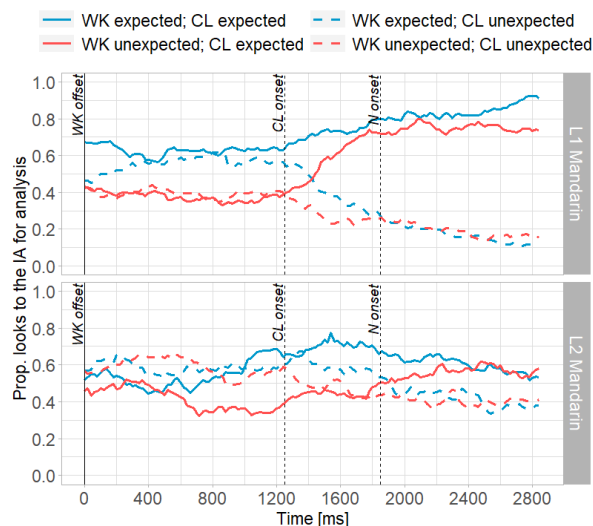


Figure 2b

Figure 2. Proportion of looks to the critical interest area time-locked to the offset of world knowledge part ($t=0$ ms) in **Experiment 1 (left)** and **Experiment 2 (right)**. Dotted lines represent the onset (200ms added) of the classifier and noun.

References

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