Chinese learners of Japanese read relative clauses faster when subject-extracted in L2 (and object-extracted in L1)

Kousei TSUJINO (Hasuda City Hall), Edson T. MIYAMOTO (University of Tsukuba)

Abstract

Non-native readers can differ from natives in grammatical knowledge. But more controversially, they may differ in the way they use such knowledge when processing sentences. We report data suggesting that native Chinese speakers learners of Japanese can display biases similar to those of native Japanese speakers by favoring subject-extracted relative clauses in Japanese, while maintaining a different preference in their native language by reading object-extracted relatives faster in Chinese. This is compatible with the assumption that there is a single universal mechanisms underlying sentence comprehension. As soon as enough grammatical knowledge is acquired, non-native readers display the same propensities as native readers.

1 Introduction

Research in second language (L2) has often investigated how L2 knowledge is acquired. But more recent work has investigated how such knowledge is used, in particular, whether the manner L2 readers process sentences is similar to that of native speakers’. Some differences have been ascribed to learners’ inability to build detailed syntactic representations as they read sentences (Clahsen & Felser, 2006). Here we provide evidence that native Chinese advanced learners of Japanese are able to process relative clauses (RCs) in L2 in a manner similar to what has been reported for native Japanese speakers, while maintaining a different preference in their native (L1) language.

2 Relative clauses in L1 and L2

Previous L1 results indicate that, in Japanese, subject relative clauses (SRCs; e.g., “the girl that loves Sato”) are easier to process than object relative clauses (ORCs; “the girl that Sato loves”; Miyamoto & Nakamura, 2003; Ueno & Garnsey, 2008; inter alia), whereas ORCs are easier in Chinese (Gibson & Wu, 2013, and references therein).

Chinese and Japanese are similar in that RCs precede the noun they modify. However, word order is subject-verb-object (SVO) in Chinese, and SOV in Japanese. Thus, as shown in (1), the surface order of the content words (“subject verb N”, where N is the modified noun) is identical for ORCs, but they differ for SRCs (“verb object” in Chinese, “object verb” in Japanese).

(1)  

<table>
<thead>
<tr>
<th></th>
<th>ORCs</th>
<th>SRCs</th>
<th>L1 results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese:</td>
<td>subject verb △ N</td>
<td>△ verb object N</td>
<td>ORC easier</td>
</tr>
<tr>
<td>Japanese:</td>
<td>subject △ verb N</td>
<td>△ object verb N</td>
<td>SRC easier</td>
</tr>
</tbody>
</table>

2.1 L2 strategies

If Chinese speakers transfer word-order preferences from Chinese to Japanese, they should find ORCs easier to understand since the surface order for ORCs (but not for SRCs) is similar between the two languages. A similar ORC advantage is predicted if frequency of exposure to the base word order in simple clauses in Chinese (SVO) is transferred to the comprehension of Japanese (see MacDonald & Christiansen, 2002, for relevant discussion on L1 English, where the SVO order in simple clauses is claimed to facilitate SRCs). We report reading-time results for native Chinese advanced learners of Japanese, who read SRCs faster than ORCs in Japanese, but read ORCs faster than SRCs in Chinese.
3 Context

RCs in Japanese are ambiguous and alternative interpretations can interfere with their interpretation. Therefore, we used a dialogue context to lead readers to favor RCs over other interpretations. Two people X and Y are talking about photographs they are looking at. X asks “who is this?” and the RC is included in Y’s reply (see in this volume: Miyamoto & Tsujino, 2016, for further discussion).

3.1 Normings 1 and 2 with L1 Japanese speakers

Norming 1. To ensure the effectiveness of the context, a questionnaire was conducted with 28 native Japanese speakers who completed fragments such as those in (2) as answers to the question “who is this?” (kono hito-wa daredesuka?).

(2) a. Sato-kun-o aisiteita... (“Sato-acc loved”)
   b. Sato-kun-ga aisiteita... (“Sato-nom loved”)

Norming 2. In a plausibility questionnaire, participants rated simple sentences on a 5-point scale (1: meaning natural; 5: meaning strange) so as to determine whether the intended interpretations (e.g., “Sato loved the girl” and “the girl loved Sato”) were equally natural.

4 Experiment 1: Self-paced reading in L2 Japanese

4.1 Method

4.1.1 Participants
Sixteen native Chinese speakers participated, but results for 15 are reported since one was found to be a bilingual Malay speaker (inclusion of all participants’ revealed similar trends; in the crucial SRC advantage in particular, p < .05). They were recruited from the topmost advanced-Japanese classes offered at the University of Tsukuba.

4.1.2 Stimuli
The following is an example of dialogue used.

(3) a. X-san: Kono hito-wa daredesuka? (X: “Who is this?”)
   b. (SRC) Y-san: Sato-kun-o aisiteita onnanoko desu. (Y: “It is the girl who loved Sato.”)
      (ORC) Y-san: Sato-kun-ga aisiteita onnanoko desu. (Y: “It is the girl who Sato loved.”)

The crucial RC was included in Y’s answer, therefore there were two versions for each dialogue (one containing an SRC, and one containing an ORC). A total of 24 pairs of dialogues were created but results for 15 pairs are reported based on the results from Norming 1 (similar reading-time trends were observed when all items were included). These 15 items did not differ according to native Japanese speakers’ data from Norming 1 (98.33% SRC completions for “object verb” fragments such as (2a); 98.67% ORCs for “subject verb” fragments as in (2b)) and from Norming 2 (plausibility did not differ; SRC: 1.54; ORC: 1.65; cumulative link model: p = .384).

Twenty-four filler dialogues were created following the general format of the test trials. The RC was replaced by constructions such as genitives (e.g., Yamada-san-no kouhai-no Yuuta-kun desu. “it is Yamada’s junior, Yuuta.”) and multiple sentences (Kasyu-no Ooki-san desu. Endo-san-no siriai-desu. “It is the singer, Ooki. It is Endo’s acquaintance.”). The 24 test items were distributed into two Latin Square lists so that each list contained only one version of each pair of items. Each participant saw one list shown together with the 24 filler items interspersed in pseudo-random order so that two test items did not follow in succession.
4.1.3 Procedure and Analyses

A non-cumulative sentence-by-sentence self-paced reading experiment was conducted in Japanese (using Doug Rohde’s linger program). A sentence-by-sentence presentation was adopted because it has been claimed that L2 readers use situation-specific strategies to read sentences and are only able to build detailed representations when allowed to backtrack repeatedly relying on processes dissimilar to those used by L1 readers (Clahsen & Felser, 2006). If correct, this should predict that reading times to whole sentences would not reveal the SRC preference observed with native Japanese readers.

Reading times were \((-1/\sqrt{RT})\)-transformed following Box-Cox analyses (similar trends were observed with the raw data as well as with a simple inverse transformation).

4.2 Results and Discussion

Backward selection was used to choose the mixed-linear models reported. Difficulty ratings (on a 5-point scale: SRC 1.34, ORC 1.35, cumulative link model: \(p= .39\)) and comprehension-question accuracy did not differ (SRC 96.67%, ORC 98.89%, mixed logit model: \(p= .11\)).

There were no spurious RC-related differences in the reading times to (3a) \((p= .4)\).

Mixed-linear models revealed that the crucial sentence in (3b) was read faster when it included an SRC rather than an ORC \((p= .013)\) replicating similar trends for L1 Japanese. This difference held even though other factors contributed reliably in the model (plausibility ratings from norming 2: \(p= .049\); number of characters in the sentence: \(p= .04\); number of trials: \(p< .003\)).

The results indicate that the L1 Chinese speakers’ reading times to Japanese RCs revealed trends similar to those reported for L1 Japanese speakers. One possibility is that these Chinese speakers are outliers and prefer SRCs in Chinese as well. Therefore, an experiment was conducted in Chinese to counter this possibility.

5 Experiment 2: Self-paced reading in L1 Chinese

After participating in Experiment 1 and taking a break, the same native Chinese speakers participated in a self-paced reading experiment in Chinese. The following reports the results for the 15 participants whose data were reported for Experiment 1.

The order of the experiments was fixed because the results for Experiment 1 were the focus of interest and we did not want them to be contaminated by conducting the Chinese experiment first.

5.1 Method
5.1.1 Stimuli

Items from a previous study in Chinese were used (Gibson & Wu, 2013; the authors would like to thank Ted Gibson for providing the linger scripts containing all the test items and fillers). The original 16 items were in traditional Chinese characters, and a new version using simplified Chinese characters were created. The items were double checked by two native Chinese speakers (one from Taiwan and one from Mainland China) to guarantee that the two versions were as similar as possible, especially in the segmentation used. One item in the original was found to have a mistake in the context and was corrected. The following is the translation of an example item (from Gibson & Wu, 2013).

(4) On a highway, a motorcycle chased a car through heavy traffic. Another car saw (the situation), and then chased the motorcycle. Xiaoming said: I heard that a high school student was driving one of the cars and a middle-aged woman was driving the other. Which car was the high-school student driving?

a. Subject-extraction
Xiaomei said: The car which chased the motorcycle is the one that the student was driving.

b. Object-extraction
Xiaomei said: The car which the motorcycle chased is the one that the student was driving.
A non-cumulative moving-window self-paced reading experiment was conducted. The context was shown sentence by sentence and the crucial sentence in (4ab) word-by-word using Doug Rohde’s linger software. Before the comprehension question from the original study was presented, participants were asked to rate the difficulty in reading the item on a 5-point scale (1 for very easy; 5 for very difficult). Otherwise, the experiment was conducted as in the original study (see Gibson & Wu, 2013, for details).

5.2 Results

SCRs (by-subject mean: 1.69) and ORCs (1.71) were rated to be equally easy (cumulative link model: $p = .59$). Correct comprehension performance did not differ either (SRC: 83.8%; ORC: 84.9%; mixed logit model: $p > .84$).

For the reading time analyses, RC extraction position, participants’ origin (Mainland China or Taiwan) and their interaction, as well as number of characters in the region were included. Mixed models reported were chosen based on backward selection. The ORC advantage in the original study was replicated (Gibson & Wu, 2013). When regions 3 and 4 (the relativizer $de$ and the modified noun) were analyzed together, SRCS were slower than ORCs ($p = .038$).

Although these items can be criticized for being too complex and for using the same words and constructions repeatedly, the results nevertheless show that these participants’ L1 trends replicated the results reported in previous literature while displaying mastery of the L2 as in Experiment 1.

6 General Discussion

Advanced L2 learners displayed preferences similar to those of native Japanese speakers’. The results are not easily explained by proposals according to which L2 readers only build simplified, shallow representations, or have to re-read the sentence repeatedly in a manner distinct from the way native readers process sentences (Clahsen & Felser, 2006). Neither are the results compatible with L1-transfer accounts, especially those based on past experience, according to which frequency of exposure to a given word order in L1 can facilitate comprehension of a similar word order in L2.

The results are in line with the assumption that a single processing mechanism underlies the processing of all languages (Fodor, 1997), hence similar processing patterns are observed once the learner has acquired enough knowledge of the L2. This null hypothesis has been argued against based on discrepancies between L1 and L2 readers. However, the results were often not sensitive enough (leading to null results) or did not measure grammatical proficiency carefully enough or did not factor out possible individual differences reflected in the reading times (see Wilson & Miyamoto, 2015, and references therein, on L1 Japanese readers processing subject-verb agreement in L2 English).

References


