The Acquisition of Mandarin Relative Clauses and Binding by Heritage Speakers and Second Language Learners

Chung-yu Chen

1. Introduction

Prior studies have shown that heritage speakers (HSs) have an advantage over adult second language learners (L2ers) in phonology and core aspects of syntax (e.g., grammar that develops before age three), but resemble L2ers in lexicon, syntax-discourse, semantics and inflectional morphology (see Montrul, 2008, 2016). However, little is known about heritage Mandarin (compared to e.g., heritage Spanish, Montrul, 2002). This study examines whether, when both Mandarin proficiency and the dominant language (English) are held constant, early age of acquisition (AoA) confers an advantage to HSs relative to L2ers, and whether this depends on the linguistic domain. In this study, Mandarin relative clauses (RCs) and long-distance (LD) binding were tested. These two phenomena are chosen because (i) they represent different linguistic domains (RCs represent narrow syntax while LD binding represents syntax-semantics/discourse interface), and (ii) they differ with regard to the AoA in monolingual children.

Few studies have compared HSs and L2ers across domains (Spanish: Au, Knightly, Jun, & Oh, 2002; Au, Oh, Knightly, Jun, & Romo, 2008; Knightly, Jun, Oh, & Au, 2003; Korean: Lee-Ellis, 2012), and only one on Mandarin (Mai & Deng, 2019). The present study adds to the existing literature on HS/L2 comparisons by examining whether the selective advantages found for HSs in other languages also hold for Mandarin, while controlling for proficiency. The cross-linguistic differences between Mandarin and English on RCs and LD binding also allow for an investigation of dominant language transfer.

2. Literature Review

2.1. Selective advantages

Unlike typically-developing monolingual children who ultimately reach native-like competence in their first language (L1), HSs often do not reach native-like competence in their L1/heritage language as adults. Yet HSs often outperform...
adult L2ers, who acquire the target language after puberty, typically in a classroom setting (see Montrul, 2008). Comparing HSs and L2ers is crucial for refining current language acquisition theories because different contributing factors can be re-evaluated, such as the effects of AoA, input, and dominant language transfer (Montrul, 2008, 2016). Proponents of the Critical Period Hypothesis (see Mayberry & Kluender, 2017, for an overview) have argued that AoA contributes to the different outcomes of L1 and L2 acquisition. If AoA is the most important factor, HSs are predicted to outperform L2ers because they acquire the language early in life, even though the input is later reduced. In contrast, if the amount and quality of the input are important, HSs may perform similarly to L2ers given that both groups have reduced input in the target language. Furthermore, both HSs and L2ers are subject to dominant language transfer, which may lead to non-target outcomes (for L1-transfer in L2-acquisition: see Schwartz & Sprouse, 1996; White, 2003; for dominant language transfer in HSs, see Montrul, 2014; Montrul & Ionin, 2012).

The relative importance of AoA may differ across linguistic domains. While HSs are found to outperform L2ers on phonology (e.g., Korean: Oh, Jun, Knightly, & Au, 2003; Mandarin: C. Chang & Yao, 2016; Spanish: J. Y. Kim, 2016), findings on morphosyntax are more mixed. Most studies have found HSs to have an advantage over L2ers in core aspects of syntax which develop before age three, but not in the domains of the lexicon, syntax-discourse interface, semantics and inflectional morphology (see Montrul, 2016, for an review). However, some of these conclusions are based on comparisons across multiple studies, without proficiency-matched groups. Studies that directly compared HSs and L2ers across domains have found HSs to have a selective advantage over L2ers on phonology but not on morphosyntax (Spanish: Au et al., 2002, 2008; Knightly et al., 2003; Korean: Lee-Ellis, 2012). This finding is in line with the general finding from L2-acquisition that phonology presents a greater challenge than morphosyntax for adult L2ers (e.g., Abrahamsson & Hyltenstam, 2009). Within morphosyntax, Mai and Deng (2019) examined the \( \text{shì...de} \) cleft construction in Mandarin and found selective vulnerability in the heritage grammar: HSs perform better on the word order and the temporal feature than the telicity and discourse features.

2.2. Mandarin phenomena under investigation

This study investigates two phenomena in Mandarin; the particular properties are chosen in light of English/Mandarin differences and prior literature. Since HSs are exposed to their heritage language since birth, it is informative to discuss L1 acquisition as well. I discuss L1, L2 and heritage language studies, in that order.

2.2.1. Properties and acquisition of Mandarin RCs

While English has head-initial RCs (the head noun precedes the RC), Mandarin has head-final RCs (the head noun follows the RC); Table 1 exemplifies subject-extracted RCs (SRCs) and object-extracted RCs (ORCs) in both languages. Typologically rare in having head-final RCs and a canonical SVO
order, Mandarin RCs receive much attention in psycholinguistics to help tease apart different theories (such as expectation-based theories, supported by Jäger et al., 2015, and memory-based theories, supported by Gibson & Wu, 2013; Hsiao & Gibson, 2003).

<table>
<thead>
<tr>
<th>Table 1. RCs in English and Mandarin (de is the Mandarin RC marker)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>English</strong></td>
</tr>
<tr>
<td>SRC</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>ORC</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

L1-acquisition of Mandarin RCs starts at age three or four and stabilizes by age five (Hsu, 2014). In L2-Mandarin studies, L1-English L2ers have outperformed L1-Korean L2ers in judging the well-formedness of Mandarin RCs, even though Korean RCs are also head-final (Hu & Liu, 2007). Similarly, C. Chen (2017) found that L1-English L2ers outperformed L1-Korean L2ers, especially on ORCs. However, because Mandarin ORCs have SVO order (see Table 1), it is likely that L1-English L2ers utilize an SVO word order strategy that allows them to succeed on ORCs (answering who is the agent or patient), without fully acquiring Mandarin RCs. The present study controls for this possibility.

Cross-linguistically, SRCs have been found to be easier than ORCs, e.g., in the L1 and L2 acquisition of English (Doughty, 1991; C. Kim & O’Grady, 2016), in line with the Noun Phrase Accessibility Hierarchy (Keenan & Comrie, 1977), according to which subjects are easier to relativize cross-linguistically than objects. However, results from Mandarin are mixed. In L1-acquisition, there is more evidence for an SRC advantage (e.g., Hsu, Hermon, & Zukowski, 2009; Hsu, 2014; Hu, Gavarró, Vernice, & Guasti, 2016) than an ORC advantage (e.g., J. Chen & Shirai, 2015; He, Xu, & Ji, 2017). In L2-acquisition, the findings still do not converge (e.g., Xu, 2014 vs. Wang & Feng, 2014).

To my knowledge, there is no study on Mandarin RCs by adult HSs, but there are a few studies on child HSs, which have found English transfer of head direction (‘head error’: Jia & Paradis, 2018; Tsoi, Yang, Chan, & Kidd, 2019). Tsoi et al. also found an SRC advantage. In Korean, O’Grady, Lee, and Choo (2001) found transfer of head direction by Korean HSs and L1-English L2-Korean learners, without HS advantage. The present study contributes to the debate concerning SRC/ORC advantage with new data from both heritage and L2-Mandarin.

2.2.2. Properties and acquisition of Mandarin LD binding

Since properties of reflexives differ across languages, reflexives have received much attention in L2 acquisition (mostly with a focus on parameter resetting). According to Chomsky’s (1981) Binding Principle A, a reflexive must be bound in its binding domain, roughly a clause. In (1), an English reflexive must
refer to the local antecedent, and not a LD antecedent. Unlike English, Mandarin has two types of reflexives, the complex reflexive *taziji* (himself/herself) and the simplex reflexive *ziji* (‘self’). In (2), *taziji* requires a local antecedent, just like English ‘himself/herself’. In contrast, *ziji* can take either a LD or a local antecedent, as in (3) (see Cole, Hermon, & Sung, 1990; Huang & Liu, 2001). Huang and Liu’s (2001) non-uniform approach argues that there are two kinds of *ziji*: a syntactic anaphor (which is locally bound) and a pragmatic logophor (which typically has the LD reading). The former is subject to syntactic constraints while the logophor is subject to pragmatic constraints at the syntax-discourse interface.

(1) John_{ij} thinks Peter_{ij} trusts himself_{ij}.
(2) Zhāngsān_{ij} rènwéi Lǐsì_{ij} xiāngxin tāzìjì_{ij}
   ‘Zhangsan thinks that Lisi trusts himself.’
(3) Zhāngsān_{ij} rènwéi Lǐsì_{ij} xiāngxin zìjì_{ij}
   ‘Zhangsan thinks that Lisi trusts himself/him.’

Studies have shown that, while adult NSs allow both LD and local readings, children under age eight predominantly choose local readings for *ziji* even in contexts biasing towards LD readings (Chien & Lust, 2006; Chien, Wexler & H. Chang, 1993; Su, 2004). This has been traced to children’s lack of pragmatic knowledge (on the account that LD reflexives are logophors and LD readings involve the syntax-discourse interface, Huang & Liu, 2001) or to a default parameter setting (local readings are unmarked, Manzini & Wexler, 1987). L2ers also have difficulties acquiring LD reflexives (e.g., Christie & Lantolf, 1998). L1-transfer is evident in some studies that tested two L2 groups with different L1s (Sperlich, 2016; Yuan, 1998), but not others (D. Chen, 1995; Dugarova, 2007). Lack of L1 transfer is also found in Zeng (2010) where L1-English L2ers did not start out giving local readings of *ziji* and *taziji* consistently.

C. Chen (2019) compared Mandarin HSs and L1-English L2ers on their interpretations of *ziji* and *taziji*, using a picture-based Truth-Value Judgment Task (TVJT) adapted from the Korean version in J. Kim, Montrul & Yoon (2009). Unlike NSs, who accepted both LD and local readings of *ziji*, HSs and L2ers predominantly allowed only local readings, with no advantage for HSs. This finding is different from J. Kim et al. (2009, 2010) who showed that English-dominant Korean HSs and L1-English L2-Korean learners acquired some knowledge of LD readings in Korean. There are many explanations for C. Chen’s finding, including transfer from English, local binding as the default parameter setting (Manzini & Wexler, 1987), input frequency (Lu, submitted), and (on the view that LD reflexives are discourse logophors) difficulties with the syntax/discourse interface (cf. the Interface Hypothesis of Sorace, 2011).

With regard to *taziji*, C. Chen (2019) found that HSs patterned with NSs in correctly accepting only local readings, yet L2ers over-accepted LD readings and under-accepted local readings of *taziji*, possibly due to misanalysis of *taziji* as the
pronoun *ta* ‘he/she/him/her’, which, like any pronoun, requires the LD reading.\(^1\) Since L2ers and HSs were not proficiency-matched, it is unclear whether the differences between these two groups was due to L2/HS status or proficiency. The present study compares performance on *ziji*, *taziji* and *ta* with proficiency-matched groups. By comparing *ta*, *ziji*, and *taziji*, the present study also examines whether L2ers indeed misinterpret *taziji* as a pronoun rather than a reflexive.

3. Research questions and hypotheses

Based on previous studies, I asked three research questions in this study. First, can HSs and L2ers acquire the properties of Mandarin RCs? Second, can HSs and L2ers acquire the properties of Mandarin LD binding? Third, do HSs have selective advantages over L2ers in these two different linguistic structures?

For the first question, I hypothesize that both HSs and L2ers can acquire RCs. Recall that RCs are stabilized in L1 acquisition by age five (Hsu, 2014). While some HSs might already be in English-medium schools by age five, their family input is expected to be enough for them to acquire RCs, even if protracted acquisition happens (Jia & Paradis, 2018). L2ers are expected to also acquire RCs since narrow syntax is not particularly difficult for L2ers. Following the Noun Phrase Accessibility Hierarchy, an SRC advantage is expected from both groups. Note that such SRC advantage would not be seen if participants score at ceiling.

For the second question, I hypothesize that both HSs and L2ers would only allow local readings of *ziji* due to multiple reasons, such as transfer from English, local binding as the default option, input frequency, and difficulties with the interface phenomenon, as discussed in C. Chen (2019). For *ta* and *taziji*, they are expected to perform like NSs, as there are no cross-linguistic differences between Mandarin and English. However, L2ers might over-accept the LD reading of *taziji*, as in C. Chen’s study.

I now turn to the third question. Given that HSs have early exposure to Mandarin, and that RCs are acquired earlier in L1 acquisition than LD binding, it is hypothesized that HSs might have an advantage over L2ers on RCs, but not necessarily on LD binding. While many HSs might already be in English-medium schools by age five, it is expected that they have acquired RCs by then, even if slightly later than monolingual children. In contrast, LD binding is less likely to be acquired by HSs because it is acquired after age eight in L1 acquisition: by age eight, most HSs have been in school for several years and are likely English-dominant, with reduced Mandarin input. Indeed, C. Chen (2019) found no HS advantage for LD binding of *ziji*, even though HSs in that study were more proficient than L2ers. Additionally, while Mandarin RCs represent narrow syntax (word order), LD binding of *ziji* represents the interface between syntax and

---

1 *Taziji* can be grammatically interpreted as *ta* plus an intensifying *ziji* (‘emphatic reading’ or ‘focus reading’) in some cases. However, the NSs and HSs in the study did not choose the LD reading, suggesting that the emphatic reading of *taziji* was not available in the context.
semantics/discourse, where HS advantages are usually not found (see Montrul, 2016).

4. Methodology
4.1. Tasks and procedure

Participants completed a language background questionnaire, a picture-based TVJT, and several other tasks investigating other linguistic phenomena, not discussed here. HSs and L2ers also completed a multiple-choice proficiency test, consisting of 16 vocabulary items and 24 cloze items. To minimize literacy issue, the Chinese characters were presented along with Pinyin romanization in the TVJT. The experiment was untimed.

4.2. TVJT materials

Each TVJT item consists of a picture and a sentence; participants indicate whether the picture and sentence match by selecting either TRUE or FALSE. Since all sentences are grammatical, the TVJT tests whether participants know the correct interpretation. The TVJT includes four conditions testing RCs (two TRUE, two FALSE) and six conditions testing binding (four TRUE, two FALSE). There are six tokens per condition, resulting in (6*10=)60 target sentences. Another 24 filler sentences were added to balance the number of TRUE and FALSE responses. Two lists were created. Items were blocked and pseudorandomized within each block so that trials from a single condition never occurred consecutively.

For RCs, to examine whether participants have an SRC or an ORC advantage, four target conditions were created in a 2 (RC type: SRC vs. ORC) x 2 (picture type: match vs. mismatch) design; see Table 2 for a sample token set. Note that the action is reversible, and there are no animacy cues. Crucially, relying on linear word order or some other extra-syntactic strategy (e.g., animacy cues) would not yield the correct answer across all four conditions.

Table 2. A sample token set testing RCs (4 conditions) (de is the RC marker)

| SRC: [kànjiàn nǚrén de] nánrén názhe bēizi [see woman de] man hold-ASP cup ‘The man [who sees a woman] holds a cup.’ | TRUE | FALSE |
| ORC: [nǚrén kànjiàn de] nánrén názhe bēizi [woman see de] man hold-ASP cup ‘The man [who a woman sees] holds a cup.’ | FALSE | TRUE |
For binding, to examine whether participants can differentiate different anaphors, six target conditions were created in a 3 (anaphor type: ta, ziji, and taziji) x 2 (picture type: LD vs. local readings of the anaphors) design; see Table 3 for a token set. The anaphors are embedded objects. This design is adapted from C. Chen (2019), which in turn was adapted from J. Kim et al. (2009).

Table 3. A sample token testing binding (6 conditions)

<table>
<thead>
<tr>
<th>Anaphor Type</th>
<th>True/False</th>
</tr>
</thead>
<tbody>
<tr>
<td>John shuō Peter j huà-le tā i*j/k.</td>
<td>TRUE/FALSE</td>
</tr>
<tr>
<td>John say Peter draw-ASP self ‘John says that Peter draw him.’</td>
<td>TRUE/FALSE</td>
</tr>
<tr>
<td>John shuō Peter j huà-le zìjǐ i.j.</td>
<td>TRUE/FALSE</td>
</tr>
<tr>
<td>John say Peter draw-ASP self ‘John says that Peter draw himself/him.’</td>
<td>TRUE/FALSE</td>
</tr>
<tr>
<td>John shuō Peter j huà-le tāzījī*i.j.</td>
<td>FALSE/TRUE</td>
</tr>
<tr>
<td>John say Peter draw-ASP himself ‘John says Peter drew himself.’</td>
<td>FALSE/TRUE</td>
</tr>
</tbody>
</table>

4.3. Participants

Data from 62 Mandarin native speakers (NSs), 44 HSs, and 41 L2ers were included in the analysis, after excluding 13 participants based on language background questionnaire. Participants who were excluded were one L2er from the Philippines who was native in both English and Filipino, one HS of Mandarin and Korean, 11 HSs of non-Mandarin Chinese dialects/languages, such as Cantonese, or HSs of both Mandarin and other non-Mandarin Chinese dialects/languages. HSs tested in Taiwan grew up in the U.S. or Canada but moved to Taiwan as adults or were visiting Taiwan at the time of testing.

2 Since ta can be written with a human radical (‘he/him/she/her’) or with a female radical ‘she/her’, half of the sentences use male names and another half use female names.

3 Participants who were excluded were one L2er from the Philippines who was native in both English and Filipino, one HS of Mandarin and Korean, 11 HSs of non-Mandarin Chinese dialects/languages, such as Cantonese, or HSs of both Mandarin and other non-Mandarin Chinese dialects/languages.

4 HSs tested in Taiwan grew up in the U.S. or Canada but moved to Taiwan as adults or were visiting Taiwan at the time of testing.
Table 4. Information about participants

<table>
<thead>
<tr>
<th></th>
<th>NSs (n= 62)</th>
<th>HSs (n= 44)</th>
<th>L2ers (n= 41)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (range)</td>
<td>22.2 (19-37)</td>
<td>21 (18-33)</td>
<td>25 (18-55)</td>
</tr>
<tr>
<td>Mean AoA of Mandarin (range)</td>
<td>n/a</td>
<td>0.05 (0-1)</td>
<td>19.6 (8-49)</td>
</tr>
<tr>
<td>Proficiency test (max 40) (range)</td>
<td>n/a</td>
<td>27.1 (11-40)</td>
<td>29.5 (10-40)</td>
</tr>
</tbody>
</table>

4.4. Predictions

The predictions for RCs are presented before the predictions for binding. For RCs, first, if learners read the matrix predicates and ignore the RC, they would incorrectly choose TRUE to all four conditions (since there is man holding a cup in all four). Second, if they misread ORC as a head-initial SRC (‘head error’) under English transfer, as in ‘a woman [who sees a man] holds a cup’, they would incorrectly choose FALSE in both ORC conditions (since there is no woman holding a cup). (However, if they misread ORCs as ‘a woman sees a man [who holds a cup]’, they would accidentally give correct responses for ORCs for the wrong reason.) HSs are expected to perform slightly better than proficiency-matched L2ers, since RCs are acquired in monolingual children by age 5.5

For binding, under English transfer (as well as reduced input), both groups are predicted to accept only local readings of Mandarin reflexives (ziji and taziji). If L2ers perform similarly on ta and taziji by choosing only LD readings for both, it is likely that they treat taziji as ta plus intensifier (as speculated in C. Chen, 2019). No HS advantage is expected with regard to LD binding.

5. Results

For RCs, a score of “1” was assigned to an accurate response and a score of “0” to an inaccurate response. For binding, since both response options are correct for ziji, instead of coding for accuracy, a TRUE response was assigned to a score of “1” and a FALSE response to a score of “0”, regardless of the target response, following J. Kim et al. (2009) and C. Chen (2019). Then, the raw scores (range 0-6 in each condition) were converted to percentages across the participants in each group. The group results of the mean accuracy on RCs (in percentages) are shown in Figure 1. Figure 2 shows the group results of the mean acceptance of LD and local readings (in percentages). Error bars in both figures indicate standard error.

---

5 We focus on HS/L2 differences between proficiency-matched groups, and do not address effects of proficiency for reasons of space.
Two logistic mixed-effects models (Jaeger, 2008) were conducted using the \texttt{glmer} function in R (R Core Team, 2019). For RCs, the independent variables are group (NSs, HSs, and L2ers), RC type (SRC vs. ORC), and picture type (matching vs. mismatching). The random effects are subjects and items. To get the overall main effect, the \texttt{Anova} function (from the car library) was used. There is a main effect of RC type, picture type, and group; the two-way interactions are significant but not the three-way interaction; see Table 5. Since there are significant interactions between the variables, pairwise comparisons were run using the \texttt{emmeans} function in R (Lenth, 2019). Pairwise comparisons show that NSs differ significantly from HSs and from L2ers on all four conditions, but HSs and L2ers perform similarly, despite clear numerical differences. In terms of SRC/ORC asymmetry, NSs performed similarly on SRCs and ORCs. HSs performed significantly better on SRCs than ORCs on the matching condition, but not on the
mismatching condition. L2ers performed significantly better on SRCs than ORCs on the matching condition, and marginally better on the mismatching condition.

Table 5. Results from the logistic mixed-effects model on RCs

<table>
<thead>
<tr>
<th></th>
<th>Chisq</th>
<th>Df</th>
<th>Pr(&gt;Chisq)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>163.6853</td>
<td>1</td>
<td>&lt;2.2e-16 *</td>
</tr>
<tr>
<td>RC Type</td>
<td>7.3597</td>
<td>1</td>
<td>0.006670 *</td>
</tr>
<tr>
<td>Picture Type</td>
<td>18.1866</td>
<td>1</td>
<td>2.003e-05 *</td>
</tr>
<tr>
<td>Group</td>
<td>19.6504</td>
<td>2</td>
<td>5.407e-05 *</td>
</tr>
<tr>
<td>RC Type × Picture Type</td>
<td>6.2603</td>
<td>1</td>
<td>0.012348 *</td>
</tr>
<tr>
<td>RC Type × Group</td>
<td>11.5132</td>
<td>2</td>
<td>0.003162 *</td>
</tr>
<tr>
<td>Picture Type × Group</td>
<td>80.9597</td>
<td>2</td>
<td>&lt;2.2e-16 *</td>
</tr>
<tr>
<td>RC Type × Picture Type × Group</td>
<td>3.1241</td>
<td>2</td>
<td>0.209711</td>
</tr>
</tbody>
</table>

Note: * indicates p<.05

For binding, the independent variables - group, anaphor (\(\text{ta}, \text{ziji}, \text{and taziji}\)) and picture (matching local vs. LD readings of the anaphor) - are modeled as fixed effects. The random effects are subjects and items. There is a main effect of anaphor, antecedent, and group; the two-way and three-way interactions are all significant; see Table 6. Pairwise comparisons show that NSs differ significantly from L2ers on all conditions, and differ significantly from HSs on all conditions besides the LD binding of \(\text{ta}\) and the local binding of \(\text{taziji}\). HSs and L2ers differ significantly on all conditions besides local binding of \(\text{ta}\). For \(\text{ta}, \text{ziji}, \text{and taziji}\), all three groups make a reliable distinction between the local vs. LD readings.\(^6\) NSs’ responses on \(\text{ziji}\) and \(\text{taziji}\) are significantly different in both LD and local readings while HSs treated \(\text{ziji}\) and \(\text{taziji}\) similarly. While L2ers treated the local reading of \(\text{ziji}\) and \(\text{taziji}\) similarly, they treated the LD reading of \(\text{ziji}\) and \(\text{taziji}\) differently, but the direction is the opposite from NSs.

Table 6. Results from the logistic mixed-effects model on binding

<table>
<thead>
<tr>
<th></th>
<th>Chisq</th>
<th>Df</th>
<th>Pr(&gt;Chisq)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>514.583</td>
<td>1</td>
<td>2.2e-16 *</td>
</tr>
<tr>
<td>Anaphor</td>
<td>1759.538</td>
<td>2</td>
<td>2.2e-16 *</td>
</tr>
<tr>
<td>Antecedent</td>
<td>1405.767</td>
<td>1</td>
<td>2.2e-16 *</td>
</tr>
<tr>
<td>Group</td>
<td>49.897</td>
<td>2</td>
<td>462e-11 *</td>
</tr>
<tr>
<td>Anaphor × Antecedent</td>
<td>2267.717</td>
<td>2</td>
<td>2.2e-16 *</td>
</tr>
<tr>
<td>Anaphor × Group</td>
<td>839.043</td>
<td>4</td>
<td>2.2e-16 *</td>
</tr>
<tr>
<td>Antecedent × Group</td>
<td>174.729</td>
<td>2</td>
<td>2.2e-16 *</td>
</tr>
<tr>
<td>Anaphor × Antecedent Type × Group</td>
<td>893.834</td>
<td>4</td>
<td>2.2e-16 *</td>
</tr>
</tbody>
</table>

Note: * indicates p<.05

\(^6\) NS data on \(\text{ziji}\) reveal trial order effect and dialectal differences between mainland Mandarin vs. Taiwanese Mandarin; see C. Chen (2020).
6. Discussion

First, like what O’Grady et al. (2001) have found with Korean RCs, there is no clear HS advantage on RCs as HSs and L2ers pattern similarly on all conditions, despite clear numerical differences. In terms of the SRC/ORC asymmetry, results suggest that SRCs are easier to acquire than ORCs, supporting the Noun Phrase Accessibility Hierarchy (Keenan & Comrie, 1977). The present study thus adds new evidence to an SRC advantage with data from both heritage and L2-Mandarin, while excluding the possibility that the learners simply use SVO word order strategy.

Secondly, the present study replicated the results from C. Chen (2019). While HSs patterned with NSs in the binding of ta and taziji, they showed no HS advantage over L2ers on ziji. While NSs are not at ceiling on both LD and local bindings of ziji, it is clear that neither HSs nor L2ers acquired LD binding of ziji. The fact that L2ers in the present study accept the LD reading of taziji significantly more than the NSs and the HSs cannot be attributed to English transfer. While L2ers pattern with NSs in treating the LD reading of ziji and taziji differently, the direction is the opposite from NSs. NSs accept more LD reading of ziji than of taziji, while L2ers accept more LD reading of taziji than of ziji. However, as L2ers still accept the local reading of taziji at 90%, at least at the group level, L2ers did not misanalyse taziji as ta.

Taken together, there is likely no HS advantage on RCs, and clearly no HS advantage on LD binding, consistent with RCs being earlier-acquired than LD binding in L1 acquisition. The incomplete acquisition of LD binding even by HSs is likely due to the fact that it is late-acquired in the L1 (at age 8, Chien & Lust, 2006) and its low frequency in Mandarin. Furthermore, if LD binding involves the syntax/discourse interface (Huang & Liu, 2001), the difficulty may be traceable to problems with external interface phenomena (Sorace, 2011).

7. Conclusion

In this study, HSs and L2ers were tested on Mandarin RCs and LD binding. The results showed no clear HS advantage on RCs, and lack of HS advantage on LD binding. However, there are many possible reasons for why LD binding is more difficult than RCs, such as LD binding being at the interface, acquired later in monolingual children, and/or rare in the input. Future studies testing multiple structures or properties that are acquired at similar stages in monolingual children with proficiency-matched HSs and L2ers would help tease apart the age effects from linguistic domain effects.

References


