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Restrictive relative clauses in English and Korean learners' second language Chinese

Xiaoling Hu *University of Sheffield and*

Chuanping Liu *Dalian University of Foreign Languages*

This study investigates the second language (L2) acquisition of restrictive relative clauses (RRCs) in Chinese by two groups of learners speaking typologically different first languages (L1s): English and Korean. English RRCs, unlike those of Chinese, are head-initial whereas Korean RRCs, like those of Chinese, are head-final. The difference could be predicted to hinder English learners' acquisition of L2 RRCs but facilitate it for Korean learners. This prediction was not confirmed in this study, in fact the reverse was observed, and our data show contrasting patterns of acquisition between the two groups of learners. The English learners distinguished between target-like RRCs and non-target-like RRCs earlier than the Korean learners. A corresponding difference was observed for acquisition of resumptive pronouns. It is argued that where the L1 and the L2 share salient properties (such as head direction) restructuring of less salient features encoded in functional categories takes longer and may be persistently problematic. We suggest that the fact that Korean is more similar to Chinese (perhaps superficially, same head direction) leads learners not to restructure quickly, while the surface dissimilarity of English and Chinese gives rise to rapid restructuring in L2 grammars of learners.

Keywords: L2 Chinese, relative clauses in L2 Chinese, L1 transfer in L2 Chinese, functional categories, restructuring in L2 Chinese

I Introduction

The effect of transfer of the first language (L1) to the second language (L2) has been a major concern in second language research. Some researchers argue for full transfer of the L1 to the L2. Schwartz and Sprouse (1994; 1996) proposed the Full Transfer/Full Access hypothesis (FT/FA) which holds a full-transfer position and proposes that in the early state, the entire L1 grammar transfers. In other words, the L2 initial state is the L1 grammar with L2 lexical items. The hypothesis maintains that development away from the L1 grammar towards the L2 is driven by failure to parse input. This leads to restructuring of the inter-language grammar. Crucially, there is full access to Universal Grammar (UG) and transitional stages always fall within the class of grammars defined by UG. Other researchers argue for transfer of the L1 to the L2 that is constrained by UG. Hawkins and Chan (1997) proposed the Failed Functional Features hypothesis (FFF; compare Tsimpli and Smith, 1991; Smith and Tsimpli, 1995). According to this hypothesis, the initial L2 participants' mental grammar would consist of L2 lexical categories with L1 feature specifications, which is effectively the full transfer account of second language acquisition for the initial state of L2 learning by Schwartz and Sprouse (1994; 1996). With more exposure to the L2, participants would develop grammatical representations that are further away from their L1 but towards the L2. When there is a mismatch between the L1 and the L2 parameter settings and functional categories, L2 participants could develop functional categories absent from the L1 and the L2 as a result of misanalysis of L2 input but constrained by the principles of UG.

This study investigates the acquisition of restrictive relative clauses (RRCs) in L2 Chinese by two groups of learners speaking typologically different L1s: English and Korean. English, unlike Chinese, is head-initial for RRCs with operator movement in overt syntax whereas Korean, like Chinese, is head-final for RRCs though it also involves operator movement in overt syntax. However, English, like Chinese, has a complementizer, whereas Korean does not. Furthermore, Chinese allows resumptive pronouns (RPs) in direct object, indirect object and genitive positions, whereas English and Korean do not. Will the differences in head direction between English and Chinese hinder the acquisition of L2

RRCs by English-speaking learners? Will the similarity in head direction between Korean and Chinese facilitate the acquisition of L2 RRCs by Korean-speaking learners? Will the absence of complementizers in Korean hinder the acquisition of L2 RRCs by Korean-speaking learners? Will both groups of L2 learners find it difficult to acquire the RPs of Chinese because they are unavailable in their L1s? An empirical study was conducted to address these questions. The results show contrasting patterns of acquisition between the English-speaking learners and the Korean-speaking learners. Both the observed acquisition patterns are compatible with the FT/FA hypothesis (Schwartz and Sprouse 1994; 1996) and the contrasts seem to indicate that learners' acquisition of L2 RRCs can be constrained more by the absence of features of functional categories in the L2 that are present in the L1 than by the mismatch of head direction between the L1 and the L2. We suggest that the fact that Korean is superficially more similar to Chinese (same head direction) leads Korean-speaking learners not to restructure quickly, while the surface dissimilarity of English and Chinese gives rise to rapid restructuring in L2 grammars of English-speaking learners.

II Studies of L2 relative clauses

Many studies have been carried out to investigate acquisition of relative clauses in L2 English and other languages. They include investigations by Cook, 1973; Schachter, 1974; Ioup and Kruse, 1977; Gass, 1979a; 1979b; Chiang, 1979; Gass and Ard, 1980; Schumann, 1979; Hyltenstam, 1984; Pavesi, 1986; Flynn, 1989; Hansen-Strain and Strain, 1989¹; see also Hawkins 1989; Hawkins and Chan 1997; Yuan and Zhao 2005. Of these only Yuan and Zhao (2005) is concerned with L2 Chinese although Hawkins and Chan (1997) involves mainly L1 Cantonese-speaking learners.

Hawkins and Chan (1997; compare Tsimpli and Smith, 1991; Smith and Tsimpli, 1995) investigated the L2 acquisition of English RRCs by Cantonese-speaking learners. They observed that following an initial period of transfer from the L1 their participants move towards the surface patterns of English RRCs in their mental representations. They

¹ For detailed discussion of the first 12 references in this list, see Ellis, 1994.

argue that it cannot be taken as the Cantonese-speaking participants' acquisition of L2 RRCs because their internalized grammars for English are different from those of native speakers in that their L2 RRCs do not involve *wh*-operator movement. Hawkins and Chan attribute this result to the Cantonese participants' failure to reset a parametric value of their L1 to a different setting in the L2: Cantonese RRCs disallow *wh*-operator movement in overt syntax while English RRCs do. They further argue that the interlanguage grammars of their Cantonese-speaking participants are subject to 'a presumed universal concerning pronominal binding in a domain for which there is no evidence in overt syntax in Chinese'.

Yuan and Zhao (2005) investigated acquisition of resumptive pronouns (RPs) in relative clauses in L2 Chinese through a sentence-acceptability judgement test by Palestinian Arabic-speaking participants and English-speaking participants of L2 Chinese. English is head-initial for relative clauses and disallows RPs. Palestinian Arabic is also head-initial for relative clauses but allows RPs in direct object, indirect object and genitive positions. Chinese is head-final for relative clauses and, according to Yuan and Zhao (2005), allows RPs in indirect object and genitive positions.² They observe that English participants' interlanguage grammars seemed to approach the target language grammar whereas Palestinian Arabic-speaking participants failed to progress to a native-like grammar. They suggest that there is no L1 transfer in the case of English-speaking participants' acquisition of RPs in L2 Chinese relative clauses because, in contrast with Hawkins and Chan's (1997) argument (to which they do not refer), transfer of L1 properties was interrupted by 'psychotypology' (Kellerman, 1979; 1983), a constraint on L1 transfer in L2 acquisition where L1 speakers perceive the L1 and the L2 to be typologically distinct. They further suggest that overgeneralization of the use of RPs occurs in the case of the Palestinian Arabic-speaking participants because they perceive Chinese not to be typologically distinct from their L1 and this leads to fossilization of this particular aspect in their interlanguage grammars.

In this study, we focus our attention on restrictive relative clauses involving subject and direct object relatives because they are the relatives

² Following Huang (1984) and Xu and Langendoen (1985) we assume that in Chinese, the RP is allowed in [+HUMAN] direct object position.

that are most commonly used and they relate to the aspects of L2 Chinese RRCs of interest in this study.

III Syntactic background

1 English

It is generally assumed that restrictive relative clauses are clauses which are complements to nouns. English RRCs are head-initial; the RRC follows the head noun that it modifies. They are shown in (1–2).

- | | | | |
|----|----|------------------------------------|-----------------------|
| 1) | a. | a man who bought the car | (N- <i>wh</i> -RRC) |
| | b. | a man that bought the car | (N- <i>that</i> -RRC) |
| | c. | * a man \emptyset bought the car | (*N-RRC) |
| 2) | a. | the car which a man bought | (N- <i>wh</i> -RRC) |
| | b. | * the car that a man bought | (N- <i>that</i> -RRC) |
| | c. | the car a man bought | (N-RRC) |

The head nouns ‘a man’ in (1) and ‘the car’ in (2) precede the RRC. The head noun in (1) is co-referential with a null element in subject position in the complement clause and the head noun in (2) with a null element in object position in the complement clause. The RRC is introduced by an overt *wh*-word ‘who’ as illustrated in (1a) and ‘which’ in (2a) and by the complementizer ‘that’ as in (1b) and (2b). There is no explicit indicator introducing the RRC in (2c) as the head noun is co-referential with a null element in object position of the complement clause but this is not possible for subject relative as illustrated in (1c).

The general assumption is that the English RRC contains a complementizer phrase (CP) and the head complementizer (C) specifies [predicative] and [*wh*] features (Rizzi, 1990). The [*wh*] feature motivates operator movement in relative clauses, assuming that all movements are feature-driven. As a result, both the *wh*-phrase and a null operator, usually referred to as Op, move overtly to the specifier position (Spec) of CP for feature checking purposes, leaving a variable trace (*t*) (Chomsky, 1995). A *wh*-phrase like ‘who’ in (1a) moves into the Spec of CP to check the [+*wh*] feature. The null operator moves to the Spec of CP to check the [-*wh*] feature. The complementizer ‘that’ is the lexical realization of [-*wh*] in C. Under this analysis, relative clauses in English are derived by operator movement. The structure of English RRCs in (2) is illustrated in (3).

- 3) a. the car [_{CP} which_i Ø [_{IP} a man bought t_i]]
 b. the car [_{CP} Op_i that [_{IP} a man bought t_i]]
 c. the car [_{CP} Op_i Ø [_{IP} a man bought t_i]]

(compare Hawkins, 2001: 156)

2 Korean

Unlike English, Korean, being a head-final language, is head-final for RRCs. In other words, the restrictive relative clause is left-adjoined to the noun that it modifies. There are no overt relative pronouns in Korean. The main verb of a Korean RRC is marked with an adnominal morpheme *-(n)un* (glossed as *adn*), which indicates that it is modifying a noun as illustrated in (4).

- 4) a. ch'a-lul sa-n saram (RRC-N)
 car-acc buy-adn man
 'a/the man who bought the car'
 b. saram-i sa-n ch'a (RRC-N)
 man-nom buy-adn car
 'the car which a/the man bought'
 (acc = accusative case; nom = nominative case)

The head noun 'a/the man' in (4a) is co-referential with the null element in subject position in the embedded clause whereas the head noun 'the car' in (4b) with the null element in object position in the embedded clause. Following Han (1992) and Han and Kim (2004), we assume that there is a CP in the Korean RRC and the head C specifies [predicate] and [*wh*] features. RRCs in Korean involve the movement of a null *wh*-operator to the Spec of CP in the embedded clause. This movement leaves a trace in the position from which the null operator has moved, and the moved null operator binds the trace it leaves behind. Under this analysis, Korean RRCs are derived by operator movement.³ There is no complementizer in Korean. The restrictive relative clause in (4b) has the structure in (5) where the RRC is left-adjoined to the head noun that it modifies.

- 5) [_{CP} [_{IP} saram-i t_i sa-n] Op_i] ch'a_i

³ For a non-movement analysis of the RC in Korean, see Kim, 1998. Whether there is operator movement in Korean RCs or not is of no concern to us as we are primarily concerned with why the Korean participants acquired the Chinese RRC the way they did.

3 Chinese

Like Korean but unlike English, Chinese is consistently head-final for RRCs.⁴ The Chinese RRC, which is left-joined to the head noun it is modifying, is introduced by the complementizer *de* (Henry, 1988; Simpson, 1997) which is illustrated in (6).

- 6) a. na ge ren mai de che (RRC–de–N)
 that cl man buy C car
 ‘the car that the man bought’
 b. mai che de na ge ren (RRC–de–N)
 buy car C that cl man
 ‘the man who bought the car’
 (cl = classifier)

The head noun ‘the car’ in (6a) is co-referential with the null element in object position in the embedded clause whereas the head noun ‘the man’ in (6b) with the null element in subject position in the embedded clause. Following Huang (1980; 1995), Xu and Langendoen (1985) and Xu (1986), we assume that there is CP in the Chinese RRC and the head C specifies [predicate] but not the [*wh*] feature. As there is no [*wh*] feature in C, there is no motivation for any operator to move to the Spec of CP. Therefore, Chinese relative clauses are not derived by operator movement. The complementizer *de* is a lexical realization of a minimally specified predicative C.

One important property of relative clauses in Chinese, observed by Huang (1984) and Xu and Langendoen (1985),⁵ is that a resumptive pronoun may occur optionally in direct object position (referring to person) but obligatorily in indirect object and genitive positions. This suggests that in fact a resumptive is also obligatory in direct object position, but may be phonologically overt or phonologically null. The general assumption is that when it is null, the empty category is *pro*, not a variable bound to a moved operator (Huang, 1984; Xu and Langendoen, 1985). This is illustrated in (7): no RP (indicated by \emptyset) in direct object position in (7a), RP in direct object position in (7b), RP in indirect object position in (7c) and in genitive position in (7d).

- 7) a. ni jiao \emptyset de xuesheng
 you teach \emptyset C student
 ‘the student that you teach’

⁴ For different accounts of the language, see Li and Thompson, 1974a; 1974b; 1975; Aoun and Li, 2003.

⁵ For a different account, see Yuan and Zhao, 2005.

- b. ni jiao ta de xuesheng
 you teach RP C student
 'the student that you teach him'
- c. ni gei ta shu de xuesheng
 you give RP book C student
 'the student that you gave him the book'
- d. ta muqin shi laoshi de xuesheng
 RP mother is teacher C student
 'the student whose mother is a teacher'

Restrictive relative clauses in (7a–b) have the structure in (8) where the RRC is left-adjoined to the head noun that it modifies.

- 8) [_{CP} Top_i [_{IP} ni jiao ta_i/pro_i] de] xuesheng_i
 (compare Hawkins and Chan, 1997: 193)

To sum up, RRCs are right-branching in English but left-branching in Korean and Chinese. Second, RRCs in English and Korean involve *wh*-operator movement whereas RRCs in Chinese do not. Third, there are complementizers in English and Chinese but not in Korean. Finally, Chinese allows RPs optionally in direct object position but obligatorily in indirect object and genitive positions, whereas English and Korean do not allow RPs. This study was carried out to examine the role of target-native language differences and similarities in the development of L2 learners' interlanguage grammars.

IV The study

This study involved two different groups of non-native speakers (NNS) of Chinese: 41 English-speaking participants from the University of Sheffield in Britain and 47 Korean-speaking participants from Dalian University of Foreign Languages in China. At the time of the investigation they were all undergraduates at university. There was a control group of 15 native speakers of Chinese. The NNS participants are placed in different groups according to the length of time they had studied Chinese at university. The information about the participants is shown in Table 1.

As Table 1 shows, the NNS groups had studied Chinese for more or less the same lengths of time. However, although they had all learned Chinese in a classroom setting, the Korean participants had

Table 1 Information about the participants

Groups	Numbers of learners (<i>n</i>)	Age range	Average number of months of Chinese:	
			in home countries	in China
Elementary English	13	18–22	5	0
Intermediate English	15	18–22	9	0
Advanced English	13	18–22	9	3
Elementary Korean	13	18–25	0	6
Intermediate Korean	18	18–35	0	10
Advanced Korean	16	18–25	0	15
Chinese control	15	18–22	n/a	n/a

presumably had more exposure to the L2 than the English participants because they were learning Chinese in China. The elementary and intermediate English (EE and IE) groups had studied Chinese in their home country solely though the advanced English (AE) group had studied Chinese for three months in China by the time this investigation was carried out.

Participants were required to complete a written grammaticality judgment test (GJT) which consisted of 36 sentences together with 12 other sentences as distractors. As the study set out to explore to what extent the target-native differences and similarities facilitate the acquisition of RRCs in L2 Chinese, three different types of RRCs were designed:

- the target-like pre-nominal RRC with the complementizer *de* (RRC–*de*–N) which is grammatical in Chinese but ungrammatical in English and Korean;
- the non-target-like pre-nominal RRC without the complementizer *de* (RRC–N) which is grammatical in Korean but ungrammatical in Chinese and English; and
- the non-target-like post-nominal RRC introduced by the complementizer *de* (N–*de*–RRC) which is grammatical in English but ungrammatical in Korean and Chinese.

For each of these types there were 12 token sentences. Example sentences are illustrated in (9). For clarity here, the RRCs are put in square brackets, which was not the case in the actual test.

- 9) a. na ge shudian meiyou [nimen xiang mai
de] zidian. (RRC-de-N)
that cl bookshop not-have you think buy
c dictionary
'The bookshop does not have the dictionary you want to buy.'
- b. * women hen ai chi [ta zuo (de)] cai. (RRC-N)
we very love eat he make (c) food
'We love to eat the food he makes.'
- c. * women dou xihuan kan xiaoshuo [de ta xie]. (N-de-RRC)
we all like read novel c he write
'We all like to read the novels he wrote.'

As we indicated earlier, we restricted our attention to subject relatives and direct object relatives in the grammaticality judgement test. Each of the two relative types was presented in two subtypes in terms of the grammatical function of the relativized noun phrase in the matrix clause. They were subject relatives in subject position (SS) and object position (SO) and object relatives in subject position (OS) and object position (OO) of the matrix clause. Therefore, for each of these subtypes there were three token sentences.

In order to find out if the absence of resumptive pronouns in English and Korean would influence participants' acquisition of RPs in the L2, we included two sentences containing grammatical RPs (in direct object position) and two sentences containing ungrammatical RPs (in subject position) in the grammaticality judgement test, one in each of the two types of ungrammatical RRCs.

The lexical items used in the test were controlled and complicated grammatical structures were avoided. The sentences were written in Chinese characters and organized in a random order. Participants were asked to tick one of three responses: 'Grammatical', 'Ungrammatical' and 'Not sure'. They were given the option 'Not sure' to minimize overt guessing. They were also asked to correct the sentences they judged to be ungrammatical.

Although it was not possible to test all of each group of participants simultaneously, on every occasion we were careful to limit the time available. The participants in the Chinese control group were given an hour to complete the test.

V The results

Participants' judgements were given numerical codes as follows: correct judgement '2', incorrect judgement '0' and 'not sure' '1'. The 'Not sure' answers were excluded from the analysis. Corrections of the two types of ungrammatical RRCs were analysed separately. We consider the results of participants' performance on each of the three types of RRCs in the grammaticality judgement test in turn.

1 Grammatical RRCs (RRC-*de*-*N*)

The grammaticality judgement test contained 12 grammatical sentences containing simple target-like left-branching RRCs with the complementizer *de*. Participants' accuracy scores in judging the grammaticality of the grammatical RRCs is shown in Table 2, with the total mean accuracy scores in the right column preceded by the breakdown of the accuracy scores on subject relatives and object relatives.

A one-way ANOVA test indicated significant differences between the groups ($F_{6,96} = 12.80, p < 0.001$). A *post hoc* Scheffé test showed significant differences between the Chinese control group and the EE, EK and IK groups. No significant differences at the $p < 0.001$ level were found between the NNS groups. In Tables 2–5, starred (*) entries indicate the NNS groups where there were statistically significant differences (at $p < 0.001$ in all cases) between them and the Chinese control group. Significant differences between the NNS groups are given explicitly.

Table 2 Overall and breakdown scores on grammaticality judgements about the 12 grammatical RRCs (RRC-*de*-*N*) by all the groups (percentages)

Groups	<i>n</i>	Subject relatives	Object relatives	Total
Elementary English	13	*64	*65	*64
Intermediate English	15	76	71	73
Advanced English	13	87	90	88
Elementary Korean	13	*63	*58	*61
Intermediate Korean	18	*71	73	*72
Advanced Korean	16	89	83	86
Chinese control	15	100	98	99

Note: Starred (*) entries indicate the NNS groups where there were statistically significant differences (at $p < 0.001$ in all cases) between them and the Chinese control group.

Table 2 shows that most of the NNS groups tended to accept the L2 RRCs, and acceptance increased with experience as would be expected. This is not only the case with the Korean participants whose RRCs are left-branching but also the case with the English participants whose RRCs are right-branching. The results indicate that differences in head direction did not have much effect on the participants' acceptance of grammatical RRCs. Table 2 also shows that the total scores of the Korean participants were very slightly lower than those of the English participants and that there are no substantial differences between subject relative scores and object relative scores.

2 Ungrammatical RRCs (RRC-N)

The grammaticality judgement test contained 12 ungrammatical sentences with non-target-like left-branching RRCs without the complementizer *de*. The overall and breakdown judgement and correction scores of all the groups on this type of ungrammatical RRCs are shown in Table 3. A one-way ANOVA test on judgement indicated significant differences between the groups ($F_{6,96} = 19.14, p < 0.001$). A *post hoc* Scheffé test showed significant differences between the Chinese control group and the groups indicated. Significant differences were also found between the EK and IK groups and the AE and AK groups.

Table 3 shows that the English participants started out rejecting *RRC-N fairly strongly, and their rejection increased with experience.

Table 3 Overall and breakdown scores on judgements and correction of the 12 ungrammatical pre-nominal RRCs (*RRC-N) by all the groups (percentages)

Groups	n	Judgement scores			Correction scores		
		Subject relatives	Object relatives	Total	Subject relatives	Object relatives	Total
Elementary English	13	60	65	*63	*49	*49	*49
Intermediate English	15	66	81	73	64	67	66
Advanced English	13	88	94	91	71	68	70
Elementary Korean	13	*42	*54	*48	*21	*31	*26
Intermediate Korean	18	*58	64	*61	*33	*49	*41
Advanced Korean	16	82	86	84	58	61	60
Chinese control	15	100	100	100	90	97	93

Note: *see note at Table 2.

In contrast, the Korean participants scored much lower than the English participants in rejecting *RRC–N: 48% vs. 63% at the elementary level, 61% vs. 73% at the intermediate level and 84% vs. 91% at the advanced level. The results seem to indicate that even if the Korean participants – especially at elementary and intermediate levels – appear to be rejecting *RRC–N, they are still transferring the L1 RRC into their L2 grammar because the RRC–N form corresponds to the order of their L1 RRC. If this is the case, then we would expect the elementary and intermediate Korean participants to score equally low on correction of this type of non-target-like RRCs. The prediction was confirmed by their correction results discussed below.

The breakdown of the judgement scores in Table 3 reveals that the sentences with object relatives – whether the head noun is a subject or an object of the main clause – seemed to be relatively easier for both the English and Korean participants than the sentences with subject relatives. The findings seem to be consistent with Tarallo and Myhill's (1983; compare Ioup and Kruse, 1977; Schumann, 1979) observation that learners of left-branching languages found it easier to make judgements involving the direct object function. They attribute this to 'the proximity of the relativized noun phrase (NP) site in the embedded sentence to the head of the relative clause' (Ellis, 1994: 423). Thus, for L2 learners of Chinese, the subject relative causes more difficulties than the direct object relative because the extraction site (indicated by a) is further away from the head noun (in bold) than is the case for direct object relative as illustrated in (10).

- 10) a. na ge shudian meiyou nimen xiang mai de
zidian.
 that cl bookshop not-have you think buy c
 dictionary
 'The bookshop does not have the dictionary you want to buy.'
- b. wo mei kanguo jiao huanghe de na ge **dianying.**
 I not seen entitle yellow-river c that cl film
 'I have not seen the film that is entitled Yellow River.'

A separate one-way ANOVA test on correction scores showed significant differences between the groups ($F_{6,96} = 18.86$, $p < 0.001$). A *post hoc* Scheffé test indicated significant differences between the

Chinese control group and the groups indicated. We also found significant differences between the EK group and the AE group.

From Table 3 we can see that the English participants outperformed the Korean participants at all levels in making corrections to sentences containing *RRC-N. This corresponds to the performances of these two NNS groups on judgement but in our view it is more significant. Despite the superficial differences in head direction of RRCs between English and Chinese, the English participants were more accurate than the Korean participants at rejecting and correcting *RRC-N they correctly judged to be ungrammatical. This apparently suggests that the English participants, very early on, were making a distinction between grammatical RRCs and ungrammatical RRCs. In contrast, the surface similarity in head direction of RRCs in Korean and Chinese does not seem to contribute positively to the Korean participants' ability to make such a distinction; rather the Korean participants, especially at elementary level, are simply transferring their L1 RRC. The lower correction scores of the Korean participants confirm this. In this case, the lack of a complementizer in Korean C seems to have an adverse effect on the development of this particular aspect in their L2 grammar.

3 *Ungrammatical RRCs (N-de-RRC)*

The grammaticality judgement test also contained 12 ungrammatical sentences containing right-branching RRCs introduced by the complementizer *de*. The overall judgement and correction scores of all participants on this type of ungrammatical RRCs are displayed in Table 4. A one-way ANOVA test on judgement scores showed significant differences between the groups ($F_{6,96} = 18.48, p < 0.001$). A *post hoc* Scheffé test indicated that there were significant differences in rejecting the non-target-like post-nominal RRCs introduced by the complementizer *de* between the Chinese control group and the groups indicated. There were also significant differences between the EK group and the IE, AE and AK group.

Table 4 shows that the EK group did poorly in grammaticality judgement of *N-*de*-RRC. This was not unexpected because the post-nominal RRCs are totally absent from their L1, and there is no evidence from input to establish this. However, their performance improved with

Table 4 Overall and breakdown scores on judgement and correction of the 12 ungrammatical post-nominal RRCs (N-*de*-RRC) by all the groups (percentages)

Groups	n	Judgement scores			Correction scores		
		Subject relatives	Object relatives	Total	Subject relatives	Object relatives	Total
Elementary English	13	72	73	72	*30	*16	*23
Intermediate English	15	82	81	82	*49	*55	*52
Advanced English	13	95	91	93	82	85	83
Elementary Korean	13	*55	*47	*51	*7	*11	*9
Intermediate Korean	18	65	82	74	*31	*40	*36
Advanced Korean	16	88	97	92	75	80	77
Chinese control	15	100	100	100	89	92	91

Note: *see note at Table 2.

experience and was near native-like at the advanced level. Table 4 also shows that the English participants scored noticeably higher than the Korean participants in correctly rejecting *N-*de*-RRC. Given that there is no evidence from input informing them that post-nominal RRCs are not allowed in the L2, their high performance suggests that the English participants were acquiring the L2 RRCs. Their correction scores support this view.

A separate one-way ANOVA test on correction scores showed significant differences between the groups ($F_{6,96} = 35.80$, $p < 0.001$). From a *post hoc* Scheffé test we found significant differences between the Chinese control group and the groups indicated. Significant differences were also found between the AE and AK groups and the EE, EK and IK groups.

We can see from Table 4 that here as elsewhere, correction scores are noticeably lower than judgement scores. We also notice that the English participants again outperformed the Korean participants in making corrections to this type of ungrammatical RRCs but the high performance level of both advanced NNS groups suggests that they at least are acquiring L2 RRCs.

4 Resumptive pronouns

Recall that in order to test whether the absence of RPs in a L1 would have any effect on the development of this particular aspect in L2 learners' grammar, we included four sentences containing RPs in the

Table 5 Overall judgement and correction scores on the four RRCs containing RPs by all the groups (percentages)

Groups	<i>n</i>	Judgement on grammatical RPs	Judgement on ungrammatical RPs	Correction on ungrammatical RPs
Elementary English	13	57	61	*47
Intermediate English	15	81	90	63
Advanced English	13	85	96	80
Elementary Korean	13	*42	*46	*15
Intermediate Korean	18	53	64	*30
Advanced Korean	16	56	84	63
Chinese control	15	93	100	90

Note: *see note at Table 2.

grammaticality judgement test. The judgement scores on the two grammatical RPs and the judgement and correction scores on the two ungrammatical RPs are shown in Table 5.

A one-way ANOVA test on the judgement scores on grammatical RPs indicated significant differences between the groups ($F_{6,96} = 4.46$, $p < 0.001$). A *post hoc* Scheffé test showed significant differences between the Chinese control group and the EK group. A separate one-way ANOVA test on the judgement and correction scores on ungrammatical RPs indicated significant differences between the groups ($F_{6,96} = 8.94$ for judgement and $F_{6,96} = 14.22$ for correction, $p < 0.001$ in both cases). A *post hoc* Scheffé test showed significant differences between the Chinese control group and the groups indicated. There were also significant differences between the AE group and the EK and IK groups.

Table 5 shows that the English participants accepted the grammatical RPs much more strongly than the Korean participants. They were also more accurate than the Korean participants in rejecting and correcting the ungrammatical RPs they correctly judged ungrammatical. From the scores of the Korean participants, particularly in corrections, it seems that they had difficulty establishing the correct use of L2 RPs.

5 Comparison within groups

In order to check whether the NNS participants have made any significant distinction between grammatical RRCs and ungrammatical RRCs, we compared the performance of NNS participants who accepted grammatical RRCs with their performance on sentences with ungrammatical

Table 6 Overall acceptance scores on grammatical RRC, ungrammatical RRC-N and ungrammatical N-*de*-RRC and RP by the NNS groups (percentages)

Groups	n	Grammatical RRC		Ungrammatical RRC-N		Ungrammatical N- <i>de</i> -RRC		RP	
		Subject	Object	Subject	Object	Subject	Object	* Subject	Object
Elementary English	13	64	65	33	32	23	27	27	57
Intermediate English	15	76	71	30	18	16	19	7	81
Advanced English	13	87	90	8	6	3	9	4	85
Elementary Korean	13	63	58	54	46	40	53	35	42
Intermediate Korean	18	71	73	40	29	34	16	31	53
Advanced Korean	16	89	83	14	14	11	3	16	56

Note: *Subject = ungrammatical subject RPs

RRCs. The ‘Not sure’ answers were excluded from the analysis. The results are produced in Table 6.

Table 6 reveals that the EE group accepted grammatical RRCs substantially more than ungrammatical RRC-N and N-*de*-RRC. This suggests strongly that the EE group are making a clear distinction between grammatical RRCs and ungrammatical RRCs, both right-branching and left-branching. In contrast, the EK group did not appear to be making much distinction between grammatical RRCs and ungrammatical RRCs. It is apparent that the EE participants have in some sense acquired the requirement for *de* and for left-branching RRCs, whereas the EK participants have not. We can also see from Table 6 that the EE group accepted overt grammatical RPs much more strongly than ungrammatical RPs, which is not the case with the EK group. This suggests that the EE group are quickly establishing the correct use of L2 RPs, whereas the EK group are not. The data also show that the Korean participants took longer than the English participants to establish the correct use of L2 RPs.

6 Non-target-like RRCs

Table 7 shows the types and numbers of non-target-like RRCs produced by the NNS groups in their correction productions. We can see that

Table 7 Types and number of non-target-like RRCs produced by the NNS groups

Groups	<i>n</i>	Types of non-target-like RRCs			
		N-(<i>de</i>)-RRC		RRC-N	
		<i>n</i>	Percentage	<i>n</i>	Percentage
Elementary English	13	16	50	0	0
Intermediate English	15	11	34	0	0
Advanced English	13	5	16	3	5
Elementary Korean	13	0	0	9	15
Intermediate Korean	18	0	0	19	33
Advanced Korean	16	0	0	28	47
Total	88	32	100	59	100

there are two major types of non-target-like RRCs produced by the NNS groups and they are mainly concerned with head direction. The non-target-like RRCs that the Korean participants produced were exclusively head-final without the complementizer which is their L1 form. The vast majority of the non-target-like RRCs that the English participants produced were head-initial though we also found three occurrences of head-initial RRCs without the complementizer produced by the advanced English participants. In the head-initial order, there were two sub-types: one introduced by the complementizer *de* and the other without. Examples of these errors are shown in (11–12), head-final in (11) and head-initial in (12).

- 11) * wo mei kangu [na ge jiao huanghe (*de*)] dianying. (RRC-N)
 I not seen that cl call yellow-river (C) film
 'I haven't seen the film that is called Yellow River.'
- 12) a. * wo mei kanguo na ge dianying [*de* jiao huanghe]. (N-*de*-RRC)
 I not seen that cl film C call yellow-river
- b. * wo mei kanguo na ge dianying [(*de*) jiao huanghe]. (N-RRC)
 I not seen that cl film (C) call yellow-river
 'I haven't seen the film that is called Yellow River.'

We can also see from Table 7 that the proportion of non-target-like RRCs that the English participants produced was reduced with experience, which is compatible with their overall performance in the grammaticality judgement test. However, the proportion of non-target-like

RRCs that the Korean participants produced somehow increased with level. This looks like evidence that the Korean participants, even as they became more proficient, had problems acquiring the L2 RRC.

VI Discussion

We start discussion with a summary of the main findings. The acquisition of L2 Chinese RRCs by the English- and Korean-speaking participants follows different patterns of development. The English participants started out accepting grammatical RRCs more than ungrammatical RRCs, both right-branching and left-branching, while the Korean participants appeared not to, because they accepted ungrammatical RRCs more or less as strongly as they accepted grammatical RRCs. The elementary English participants accepted overt grammatical RPs more strongly than ungrammatical RPs, which was not the case with the elementary Korean participants. Although at the advanced level, the Korean participants accepted grammatical RRCs significantly more than ungrammatical RRCs, they did not accept L2 RPs as strongly as the English participants. The results also show that the Korean participants took longer than the English participants to establish the correct use of L2 RPs.

The performance of the elementary Korean participants on L2 RRCs was unexpected, because recall that Korean, unlike English, is similar to Chinese in head direction of RRCs. Therefore they could be expected to find it easier than the English participants to distinguish between grammatical RRCs and ungrammatical RRCs. However there is no evidence for this in our study. That said, the case of the Korean participants would be expected 'if learners are constrained by the feature specifications of functional categories in their L1s' (Hawkins and Chan, 1997: 217). Recall that although Korean is superficially like Chinese with respect to head direction, there are differences between the two languages in terms of feature specifications of CPs that their RRCs are involved with. The Chinese RRC contains a CP structure whose head C specifies a [predicate] feature only. The complementizer *de* is a lexical realization of this minimally specified predicative C. On the other hand, the Korean RRC has a CP structure whose head C is specified for [predicate] and [*wh*] features and does not accommodate complementizers.

It is therefore possible that the elementary Korean participants assume that the L2 RRC falls in line with the RRC pattern in their L1 and contains a CP structure without a complementizer in C. Thus their mental representations for L2 RRCs are essentially those of their L1. Our data support this view. Although the elementary Korean participants learned the complementizer *de* and had some knowledge about the L2 RRC due to exposure to evidence from input, they had difficulty acquiring it because the functional category CP in their early L2 grammar was still Korean and did not accommodate an overt C.

There is another possibility. Recall that although Korean does not have relative pronouns, the main verb of a Korean RRC is morphologically marked by an adnominal morpheme, which not only provides tense information but also indicates that the clause is modifying a noun. Morphological marking of this kind provides Korean speakers with a clause boundary that they can look for in identifying a relative clause. On the other hand, Chinese is a language that does not overtly specify tense, which results in absence of such a clause boundary. It could well be that the absence of such an identifiable clause boundary in a Chinese RRC caused problems for the elementary Korean participants.

Lack of the L2 CP in the Korean participants' early representations for L2 RRCs is supported by the finding that the elementary Korean participants appeared to be unable to make a clear distinction between grammatical overt RPs and ungrammatical overt RPs. This indicates that the Spec of CP still has its Korean value in the L2 grammar of the Korean participants, a direct consequence of lack of L2 CP. Recall that Korean does not allow RPs and its RRCs involve *wh*-operator movement. As a result, the Spec of CP is occupied by a moved null operator with which the gap in the relative clause is bound. On the other hand, Chinese has RPs. The assumption is that the RP in Chinese can be overt or covert. In either case, it is bound by a null topic, base-generated in the Spec of CP. If CP in these Korean participants' interlanguage grammar was the L2 CP, then the learners would be expected to accept overt grammatical RPs significantly more than ungrammatical RPs because the specifier position would be available for the null topic to be base-generated in. However, if CP in these Korean participants' interlanguage grammar was still Korean, then the learners would not be expected to make a clear distinction as their English counterparts did because the

specifier position would be occupied by a moved null operator and therefore would be unavailable.

If we accept this account, then two questions come to mind. Why are the English participants able, from very early on, to make a substantial distinction between grammatical RRCs and ungrammatical RRCs, both right-branching and left-branching, given that English is similar to Korean in feature specifications of CP in their L1 RRCs? Why are the English participants, in contrast with the Korean participants, also able to initially acquire null topics and distinguish between overt grammatical RPs and ungrammatical RPs, given the lack of RPs in English?

A possible answer, consistent with our data, is that perhaps the fact that English is superficially dissimilar to Chinese gives rise to rapid restructuring in learners' L2 grammars, while the surface similarity between Korean and Chinese in terms of head direction leads the learners not to restructure immediately. First, although Korean, like Chinese, is head-final for RRCs, there is no evidence in our data that the elementary Korean participants find it easier than the English participants to distinguish between grammatical RRCs and ungrammatical RRCs. What we observed was the reverse: the elementary English participants seemed to be able to make a clear distinction between grammatical RRCs and ungrammatical RRCs. Given that there is no positive evidence from L2 input that the non-target-like RRCs, especially the right-branching *N-de*-RRC, are disallowed, the English participants' initial performance on sentences involving grammatical and ungrammatical RRCs also suggests that there is no sustained L1 transfer from English in terms of head direction. This could be interpreted as evidence for the salience of head position for early L2 learners (Clahsen, 1988; Flynn, 1989; Hawkins, 2001) and is consistent with Clahsen's notion of perceptual saliency which is that initial and final positions are seen as more prominent (Clahsen, 1988). Second, our data show that the easy acquisition of the salient feature of head position by the English participants is followed by rapid restructuring of these learners' L2 grammars. According to the Full Transfer hypothesis, it would be predicted that as the CP projection is immediately available to the English participants from their L1, when they learned the L2 complementizer *de*, they would be able to identify L2 RRCs and to reject non-target-like RRCs. The clear distinction that the elementary English participants have made between grammatical RRCs

and ungrammatical RRCs demonstrates that. There is also evidence that rapid restructuring involves acquisition of features of functional categories that are unavailable in the L1. Recall that Chinese allows resumptive pronouns in direct object, indirect object and genitive positions, whereas English and Korean do not. According to the FFF hypothesis (Hawkins and Chan, 1997), both the English and Korean participants would be expected to have difficulty with RPs in the L2 that are absent in their L1s. Both groups of learners would also be expected to be initially identical in performance in their L2 grammars. This prediction was not borne out. We found that the elementary English participants seemed already to be making distinctions between overt grammatical RPs and ungrammatical RPs. This is possibly because the L2 CP may already be available in these learners' L2 grammars. Notice that if the CP in these learners' grammars still had the properties of English, then the specifier position would be occupied by a null operator and therefore would be unavailable for a null topic binding the L2 RP, overt or covert, to be base-generated there. If that had been the case, then the English participants would have behaved just like the Korean participants accepting overt ungrammatical RPs as strongly as grammatical RPs.

VII Conclusions

In this study we examined contrasting patterns of acquisition of restrictive relative clauses by English- and Korean-speaking learners of L2 Chinese. Both acquisition patterns are compatible with the FT/FA hypothesis (Schwartz and Sprouse, 1994; 1996). Together they provide evidence that the salience of head position, where different from the L1, leads to rapid acquisition of associated L2 properties (Clahsen, 1988; Flynn, 1989; Hawkins, 2001). By contrast, where the L1 and the L2 share salient properties like head direction, restructuring of less salient features takes longer and may be persistently problematic. However, this conclusion remains tentative until L2 learners of Chinese speaking other typologically different L1s are investigated.

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