

Doubled-Gapped Restrictive Relatives in Chinese: A Syntactic or a Processing Account?

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1. Introduction

Double-gapped restricted relatives in Chinese provide an interesting environment to investigate whether native and non-native speakers are guided by syntactic competence or by processing strategies when they are asked to assign referents to specific empty categories. Namely, a sentence such as (1), with two empty categories, could in principle be ambiguous in that it could have the sentence (2) or the sentence (3) reading. However, in the analysis proposed by Huang (1984), according to which the subject gap would have to be bound by the subject of the matrix clause, only the interpretation in (2) can yield a grammatical result.

- (1) Li Xiaojie hai zhao-bu-dao [_{NP}[_{CP}[_{IP} e xinzhong xihuan e] de] nanran]
Li Miss yet find not in heart like DE man
- (2) Li Xiaojie_i hai zhao-bu-dao [_{NP}[_{CP}[_{IP} e_i xinzhong xihuan e_j] de] nanran_j]
Li Miss yet find not in heart like DE man
'Miss Li still cannot find a man who she loves in her heart.'
- (3) *Li Xiaojie_i hai zhao-bu-dao [_{NP}[_{CP}[_{IP} e_j xinzhong xihuan e_i] de] nanran_j]
Li Miss yet find not in heart lik DE man
'Miss Li still cannot find a man who loves her in his heart.'

Cao (2001) uses this type of constructions to show that child and adult native speakers of Chinese do not systematically accept the competence account conveyed by Huang's (1984) analysis, since they also choose the relative head noun as identifier for the subject gap. Cao argues that speakers are not guided by a competence grammar but rather by a processing grammar which leads them to identify on-line so that the first empty category is to be identified as soon as possible, namely by the first N, which, in the case of sentence (1) happens to be the subject of the matrix clause.

Taking as point of departure the assumption that processing strategies are more vulnerable to attrition than principles related to a competence grammar, this study investigates first language attrition of Chinese immigrants in Canada, focusing on the relativization of null arguments in these double-gapped relative clauses in order to determine whether age of arrival and length of stay in the L2 country have an effect on how native speakers interpret these constructions.

2. Null arguments in Mandarin

In Mandarin, both subjects and objects can be dropped in sentences such as (4).

- (4) a. Zhangsan_i shuo [e_i bu renshi Lisi]
Zhangsan say not know Lisi
'Zhangsan said that [] did not know Lisi'.

- b. *Zhangsan_i shuo [Lisi bu renshi e_i]
 Zhangsan say Lisi not know
 ‘Zhangsan said that Lisi did not know []’

However, the treatment is different for null subjects and null objects in terms of their referentiality with the matrix subject. That is, the matrix subject can be the antecedent of the null subject, but not of the null object. This is known as the null subject-object asymmetry phenomenon.

Huang (1984) argues that the null subject in (4a) is A-bound by the matrix subject; therefore it can be seen as a *pro*. On the other hand, a null object has more restrictions on its reference. For instance, a null object cannot be A-bound as shown in (4b); therefore it is not a *pro*. However, it can be bound by a topic as shown in (5); it is thus regarded as a variable.

- (5) Ta_j, Zhangsan_i shuo [Lisi renshi e_j/*_i]
 He, Zhangsan said Lisi know
 Zhangsan said that Lisi knows him.

As Cao (2001) states, if Huang’s argument is extended to double-gapped relative clauses such as (1) above, where both the relative subject and the relative object are null, the head noun as the relative object as shown in (2) has to be the only possible interpretation, while an interpretation with the head noun as relative subject would not be possible as shown by the ungrammaticality of (3) above.

Xu (1986) questions Huang’s (1984) analysis by arguing that the reference of null objects should also take lexical and pragmatic properties into consideration. For instance, in (6a), the null object cannot be bound the matrix subject as Huang predicts. However, if we change *keyi* (can) to *ken* (will), as shown in (6b), the null object can be bound by the matrix subject.

- (6) a. *Li Xiaojie_j zhao bu zhao [e_i keyi qu e*_j de] nanren_i
 Li Miss find not ASP¹ can take-as-wife DE² man
 ‘Miss Li can’t find any man who can take her as his wife’.
 b. Li Xiaojie_j zhao bu zhao [e_i ken qu e_j de] nanren_i
 Li Miss find not ASP will take-as-wife DE man
 ‘Miss Li can’t find any man who can take her as his wife’.

Cao (2001) examined the status of double-gapped relative clauses in child and adult L1 Mandarin speakers using an act-out task and found that Huang’s proposal was not categorically supported by his data. For instance, Cao found that in the case of the sentence such as (7), which he called a subject-binder sentence, the head noun of a relative clause is sometimes construed as a relative subject, as in (7b), instead of as a relative object as in (7a) which is what Huang’s (1984) analysis predicts³. As we have indicated above, Huang’s analysis states that a null object is a variable which cannot be A-bound, thus the head noun of the relative clause must bind the null object.

- (7) Ma xihuan [_{NP} [_{CP} e wen e] de niu]
 horse like kiss DE cow
 a. ‘The horse_i likes the cow who he_i kisses.’
 b. *‘The horse_i likes the cow who kisses him_i.’

Cao argues that processing principles, rather than competence, may influence the choice of null objects as the preferred relativized position. The specific processing principle that he refers to is the Active Filler Strategy, which states that a filler should be assigned as soon as possible (Frazier & Flores D’ Arcais, 1989). That is, the null subject has to be identified as soon as possible so that the first

¹ ASP: aspect marker

² DE: relative clause particle

³ For adult subjects, 38% of the answers go with the head as a binder for relative subjects, and 62% as with the head as a binder for relative objects.

noun, for instance, *Ma* (horse) in the case of (7), will identify it. The null object will then be identified by the second noun, *niu* (cow). Although, Cao did not offer an explanation for why, contrary to the prediction of the Active Filler Strategy, more than one third of his subject's answers in his experiment chose the relative head noun as a binder for the relative subject rather than the relative object, by implication his explanation would be that the relative head noun could bind either. In other words, what Cao argues is that his results call into question Huang's (1984) analysis which attributes the status of variable to the object gap.

In order to determine whether Cao's (2001) results would be confirmed via a different experimental procedure, we used his experimental sentences in a grammaticality judgments task (Chen 2003). Our five adult Mandarin speakers were 18 to 50 years old. Three were born and educated in Taiwan. The other two were born and educated in mainland China. Their first language was Mandarin.⁴ Cao's subjects were all recruited in mainland China. Our subjects showed a strong preference (100%) for construing the relative head noun as the relative object, which led us to conclude that Huang's (1984) analysis does in fact provide an accurate account of native speakers' intuitions. However, processing principles may also go hand-in-hand with Huang's competence account.

3. Doubled-gapped Chinese restrictive relatives and L1 attrition

We have shown above that this is an area of Chinese grammar which seems to be rather vulnerable. In the first place, there is vulnerability at the interface syntax/pragmatics, since the choice of a referent for the two gaps may be determined by the nature of the empty category (*pro* versus variable as in Huang's account), the nature of the Noun which is closest to the subject (whether it is a subject or a topic) as shown in sentence (5), or by aspectual constraints (Xu 1986), as in (6a) versus (6b). These factors, together with the role that processing strategies may play, seem to contribute to the vulnerability of this area of the grammar, which suggests that it may be very difficult to tap native speakers' competence with any given experimental task. This is the reason why we decided to investigate whether language attrition data could shed light on this issue.

Language attrition and language acquisition have been regarded as two sides of the same coin (Sharwood Smith 2001), or a continuum of language acquisition (Seliger and Vago 1991). Several studies have indicated that language attrition does not take place at random (De Bot and Weltens 1991; Seliger and Vago 1991, among others). In other words, there is a universal mechanism governing language attrition which can be related to the concept of Universal Grammar in language acquisition. For instance, Seliger and Vago (1991) examined morphosyntactic aspect of first language attrition on an English-speaking child who immigrated to a Hebrew-speaking country at age of 6. The results showed that the subject was affected by her L2 because she has difficulty retrieving the relevant grammatical knowledge in English and she has to use her L2 as a source of information.

Kaufman and Aronoff (1991) conducted a longitudinal study on the verbal morphology of a child whose L1 was Hebrew and whose L2 was English. This subject exhibited four stages in the attrition of the L1 verbal system during a period of two years in the United States. First, the subject showed signs of attrition after 4 months. The bilingual period started on the 7th month and was followed by the disintegration of the L1 structure around the same time. Finally, the reconstruction of what ended up being an idiosyncratic L1 template began after one year in the United States.

Cuza-Blanco (2001), taking as point of departure the experimental tasks designed for Liceras' (1997) research project, investigated the L1 (Spanish) attrition of four constructions related to three syntactic phenomena: the 'compounding parameter', the 'verb movement' parameter and the specific characteristics of Spanish clitic pronouns. He argued that, as it is the case in the process of language acquisition, age of contact with the second language is a determining factor in the process of language attrition, working as the mirror image of L2 acquisition and due to the critical period; namely, in the process of language attrition constructions are lost in the reverse order that they are acquired. He also

⁴ Mandarin is the official language spoken in Taiwan and mainland China. There are variations in terms of pronunciation, lexical usage, etc. However, to the best of our knowledge, no differences whatsoever have been reported with respect to usage of double-gapped relative clauses.

argued that L1 language attrition mirrors L2 language acquisition in that the attrition of native's morphosyntax occurs locally and is not generalized across all the properties of native parameters.

Sharwood Smith and Van Buren (1991) argue that by examining language attrition from a psycholinguistic perspective, we should be able to differentiate the loss of linguistic competence from the loss of accessibility to retrieve linguistic knowledge, e.g. performance. Our paper addresses a related issue, namely whether native Mandarin speakers are guided by a competence grammar rather than by processing principles when they choose a binder for the empty categories in double-gapped relative constructions.

Our initial hypothesis is that vulnerable areas of the grammar should be specially sensitive to attrition and that processing principles which are by definition related to performance mechanisms should be more vulnerable than syntactic competence. In the case of the double-gapped restricted relatives described above, what our hypothesis predicts is that when processing principles are eroded, subjects will show more instances of relative subjects bound by the relative head noun, which implies that it was processing principles that guided the choices before attrition took place. On the other hand, if binding of relative subjects by the head noun were rejected by the competence grammar, as suggested by Huang (1984), and as supported by the clear-cut results that we obtained from our five native speakers of Mandarin, then the Mandarin L1 should not be affected by attrition. Consequently, we hypothesize that if native speakers' choices (judgments) concerning the relativization of null objects were guided by their competence grammar, learning a second language would not cause L1 attrition. However, if their choices (judgments) were guided by processing principles, L1 attrition would manifest itself in that they would have variable judgments concerning whether the relative head noun would bind the subject or the object gap.

3.1. The study

Subjects

Fifteen Mandarin-speaking subjects who had immigrated to Canada at least 5 years before the study took place participated in this experiment. The length of their stay ranged from 5 years to 45 years. Their age at arrival ranged from 17 to 62 years old. They had had various degrees of contact with English. The specific characteristics of the individual subjects are shown in Table 1.

Table 1: The background of the subjects in Canada:

Subject	Age of arrival	Length of stay	Contact with English
A	16	9	Frequent
B	16	6	Frequent
C	17	7	Frequent
D	28	35	Frequent
E	28	10	Frequent
F	29	37	Limited
G	29	31	Frequent
H	36	40	Frequent
I	37	5	Frequent
J	18	13	Limited
K	18	45	Frequent
L	24	33	Frequent
M	26	33	Frequent
N	31	25	Frequent
O	62	8	Limited

As a control group, we also recruited fifteen monolingual Mandarin speakers in Taiwan. They all had had very little contact with English.

Experiment

The experimental task consisted of an interpretation test with five subject-binder relative clauses. Each relative clause was given two possible interpretations: subject relativization or object relativization. As shown in (8), the subjects were required to choose the interpretation that according to them described what the relative clause meant.

- (8) Ma taoyen [e ti e] de niu
 horse hate kick DE cow
 ‘the horse hates the cow that he kicked’—object relativization
 ‘the horse hates the cow that kicked him’—subject relativization
 Which animal did the action of ‘kick’?
 1) horse 2) cow

When designing the test sentences, we took the following factors into consideration: First, we only used one lexical verb in each test sentence because we wanted to avoid ambiguities due to the aspectual properties of auxiliaries pointed out by Xu’s (1986). Second, to avoid an interpretation where the null objects could be bound by topics (Huang 1984), which usually occur in the beginning of a sentence as in (5) above, we did not include topics. Third, we gave the subjects a pre-test which included various types of subordinate clauses as well as single-gapped subject and object restrictive relative clauses to make sure that they were able to differentiate subject and object relativization.⁵

Results

Table 2 displays the percentages of subject and object construal of the head noun in subject-binder relative clauses.

Table 2: Subject versus object binding by relative head noun

	Experimental group	Control group
Head noun as subject	4% (3/75)	0% (0/75)
Head noun as object	96% (72/75)	100% (75/75)

In the case of the Mandarin speakers living in Canada (the experimental group), the percentage of cases in which the head noun binds the relative object is much higher than the percentage of cases where the head noun binds the relative subject. In the case of the control group, there was not a single instance of a relative subject bound by the relative head noun.

The three cases in which our subjects chose the relative subject instead of the relative object correspond to the test sentences (9) and (10).

⁵ The single-gapped relative clauses included object and subject relative clauses such as (i) and (ii) respectively.

- (i) Ma ti e de niu pao kai le
 horse kick DE cow run away ASP
 ‘the cow that the horse kicked ran away’
 Which animal did the action of ‘kick’?
 1) horse 2) cow
- (ii) e Ti ma de niu pao kai le
 kick horse DE cow run away ASP
 ‘the cow that kicked the horse ran away’
 Which animal did the action of ‘kick’?
 1) horse 2) cow

All subjects interpreted these sentences as expected.

- (9) xiao laoshu xihuan [e zhui e] de laohu
 small mouse like chase DE tiger
 ‘the little mouse likes the tiger that she chases’ [object relativization]
 ‘the little mouse likes the tiger that chases her’ [subject relativization]
 Which animal did the action of ‘chase’?
 1) tiger 2) mouse
- (10) yu xihuan [e chi e] de mao
 fish like eat DE cat
 ‘the fish likes the cat that he eats’ [object relativization]
 ‘the fish likes the cat that eats him’ [subject relativization]
 Which animal did the action of ‘eat’?
 1) fish 2) cat

We believe that a possible explanation for choosing the relative subject instead of the relative object could be the type of animate entity referred to by both the subject noun and the object noun. For instance, in (9), *the tiger* should be the one who chases *the mouse*. The same could be said in the case of the relationship between *the cat* and *the fish*. Thus, the speaker might choose her answer based on common sense (knowledge of the world) rather than attempting to interpret the actual relative clause. The subjects who are responsible for the three cases of subject construal are subject B, G and O. By looking at their backgrounds in Table 1 above, we see that they are neither similar in terms of age of arrival (16, 29, 62 years old respectively), nor in length of stay (6, 31 and 8 years) or contact with English (frequent, frequent and limited). Therefore, we can conclude that these three cases of subject construal could be random.⁶

3.2. Discussion

Our results show that these Mandarin speakers living in Canada (the experimental group) behave like the Mandarin speakers living in Taiwan (the control group) in the way they construe null arguments in double-gapped relative clauses in their L1. We say this because only in 4% of the answers the experimental group construed the head noun as the relative subject. And even here, we have shown that the possibility of construing the head noun as the relative subject could be the effect of the subjects’ assumptions about the world, rather than evidence for a possible erosion of their native competence. Recall our hypotheses that if L1 attrition occurs, it is because this part of grammar is guided by processing principles. On the other hand, if it is guided by competence, as Huang has argued, L1 attrition would not take place, which is what we find.

Thus, the fact that subjects in the control group overwhelmingly converge with the predictions made by Huang’s account, provides support for his analysis and evidences that it is an accurate account of these native speakers’ competence grammar. The data elicited from the experimental group further supports the competence account, since this area of the grammar does not seem to be subject to attrition, something that would happen—we have hypothesized—if processing principles were responsible for the construal of the head noun as a subject relative.

Our results are even stronger since length of stay, the frequency of contact with English and age of arrival do not play a role in the choice of referents for null arguments in relative clauses.

⁶ It could also be argued that our subjects interpreted subjects of (9) and (10)—small mouse and fish—respectively as topics. However, if this were the case, they would have interpreted subjects in all the test sentences as topics, which they did not. In fact, there is nothing in our experimental design that would favor a topic interpretation of the subjects in any of the sentences.

4. Conclusion

Our results suggest that Huang's (1984) analysis accurately accounts for Mandarin speakers' competence in this area of their grammar. They also show that this area of Mandarin grammar is not eroded by attrition. We believe that the reasons for this are, in the first place, the fact that English is very different from Mandarin in terms of the environments where null arguments can occur. Thus, the chance of losing this part of grammar via their contact with English might be slim. In English, double-gapped relatives do not exist and in relative clauses, the empty category is always identified by the closest NP as in (11) and (12).

(11) John_i doesn't know the girl_j he_i is looking for e_j.

(12) John_i doesn't know the girl_j who_j e_j is looking for him_i.

In (11), the dependency between the fillers and the gaps crosses the pronominalization path, whereas in (12), it is nested with respect to the pronominalization path.

Double-gapped relatives in Mandarin have nested dependency relations as shown in (13).

(13) Ma_i xihuan [NP [CP e_i wen e_j de] niu_j]
 horse like kiss DE cow

'The horse_i likes the cow who he_i kisses.'

The nested dependency is considered to be unmarked since it is easier to process (Cao, 2001). Therefore, it is unlikely that L2 English, being marked in terms of filler-gap and pronominalization dependencies affect Mandarin speakers' competence in double-gapped relative clauses.

Another reason for the lack of attrition may be that most of the subjects continue to have contact with Mandarin despite of the fact that they have lived in Canada for a long time and have used English frequently at school or at work. We may obtain different results if we test speakers who came to Canada before puberty (Kaufman and Aronoff 1991; Seliger 1991; Newport, 2002).

As we have discussed before, both Huang's competence account and the Active Filler Strategy (Frazier and D' Arcais, 1989) processing account support the choice of object relativization of head nouns in subject-binder relative clauses. Our results, contrary to Cao's (2001), do not allow us to question the validity of Huang's (1984) competence account. In fact, what needs to be accounted for is the mixed results obtained by Cao, which are in conflict with the consistency of our results. We suspect that the different experimental tasks are the reason for this disparity. Therefore, a possible way of solving this puzzle could be to carry out further studies using experimental tasks that are neutral in terms of tapping at processing strategies or grammatical competence, and making sure that both the test sentences and the experiment itself are controlled for pragmatic contexts and aspectual values.

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