Subjacency versus Grammatical Extraction in Chinese Focused Cleft Wh-Questions: L1 Understanding and L2 Performance*

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Previous research (Schachter 1990, 1998; Johnson and Newport 1991; White and Juffs 1998) investigating Chinese L2-English learners' performance using grammatical judgment tests of English sentences suggests that Chinese subjects tend to reject grammatical control sentences yet accept ungrammatical ones with subjacency violations. This study examines the Chinese focused cleft wh (FCW) construction by manipulating the presence or absence of a resumptive pronoun (RP). The results suggest that the amnestying effect of RPs for island violations in the L1-Chinese FCW construction can be transferred to L2-English learning, and that Chinese L2-English learners might use the RP strategy to facilitate their comprehension of English wh-questions with subjacency violations.

1. Introduction

In theoretical linguistics, one line of inquiry explores the question of whether locality constraints such as restrictions on extraction from wh-islands are obeyed in languages that do not share the same structural configuration as English. In second language (L2) studies, one direction of research is to investigate whether adult L2 learners still have access to universal grammar (UG), particularly the subjacency principle. Researchers in both of these areas have taken Mandarin Chinese as a test case in comparison to English, and results in both areas have been controversial. Mandarin Chinese is interesting theoretically because its canonical wh-question formation does not involve dislocation or movement processes. Although Chinese is commonly referred to as a wh-in-situ language, the presence or absence of wh-movement in Chinese is debated among theoretical linguists (Huang 1984, Xu 1990, Aoun and Li 1993). Likewise, investigations of L2 learners of English whose L1 does not contain overt wh-movement (and thus no subjacency violations) have produced mixed empirical results as to whether these learners can correctly reject English sentences with subjacency violations (Johnson and Newport 1991, Li 1998, White and Juffs 1998).

Rather than treating these two areas of linguistic inquiry in isolation, the research reported in this paper attempts to achieve a connection between L1-Chinese comprehension and L2-English performance by shifting the perspective to a lesser-known structure of Mandarin Chinese, namely, the focused cleft wh-construction, in which the wh-phrase is focused and clefted to sentence-initial position.

The present study consists of two major components. The first examines L1-Chinese speakers' comprehension of Chinese focused cleft wh-questions. The second explores L2-English learners' performance on tests of English sentences with subjacency violations.

The close examination of the syntactic structure of the focused cleft wh-construction presented in this paper suggests that the fronted focus wh is base-generated and binds a resumptive pronoun (RP), thus being insensitive to islands. The subjacency constraint is therefore obeyed in this particular construction. This finding is further supported here by the results of an empirical study showing that native speakers of Mandarin differ in their judgments of Chinese sentences that contain extraction of wh-phrases from within

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islands that do or do not have an RP. The first study naturally explains the second, which is a replication of Johnson and Newport's influential (1991) L2 study, suggesting that the amnestying effect of RPs for island violations in the L1-Chinese focused cleft wh construction somewhat facilitates L2-English learners' comprehensions of English wh-questions with subjacency violations when sentences are presented aurally.

The organization of this paper is as follows. Section 2 focuses on Mandarin Chinese. In this section, I first discuss the controversies in Chinese theoretical linguistics regarding the status of wh-movement in Chinese. I then turn to the focused cleft wh-construction, in particular the question of the status of subjacency constraints in this construction. I then test my analysis with a grammaticality judgment (GJ) experiment that solicited judgments of Chinese sentences from Mandarin speakers. Section 3 presents an L2 experiment on English wh-questions with subjacency violations. In this section, I argue that the less-than-satisfactory Chinese L2 speakers' performance, similar to what Johnson and Newport (1991) obtained, is attributable to some L1 transfer from the focused cleft wh structure, the reason for which has never been seriously considered in L2 research. Section 4 briefly discusses the implications of this study and directions for future research.

2. Chinese focused cleft wh-constructions

2.1. Issues investigated

Unlike English wh-questions, where the wh-phrase is fronted to sentence-initial position, Chinese wh-questions do not involve fronting, and thus are commonly known as wh-in-situ. Nevertheless, there exists in Chinese an optional, less well-known type of wh-question formation: the focused cleft wh (henceforth FCW) construction. In this construction, the wh-phrase moves to the initial position preceded by the focus particle SHI. An example of the FCW question is given in (1) a-b.

(1) a. Yuhan jiejue le shenme wenti? Wh-in-situ
John solve ASP what problem
'What problem did John solve?'

b. Shi shenme wenti$_i$, Yuanhan jiejue le t_i? Focused cleft wh
SHI what problem, John solve ASP
'What problem is it that John solved?'

This construction raises some interesting questions as to whether complex FCW sentences involve movement, and whether such dislocation of wh-phrases is subject to syntactic constraints including subjacency. The present study therefore examines to what extent the wh-phrase can be fronted and clefted to the left peripheral position and still render the sentence grammatical. I address these questions by testing various kinds of island conditions, which are the focus of experiment 1. Before describing the study in greater detail, I will review the relevant literature.

2.2 Literature review

Previous research on Chinese wh-questions revolves around the question of whether, as in English, there is wh-movement in Chinese and, if so, at what level. Huang (1984) argued for operator movement at LF, whereas Aoun and Li (1993) proposed that Chinese wh-words are interpreted in-situ. Xu (1990) further posited that there is no movement at any level of the grammar for wh-phrases in Chinese. Strikingly, despite a wealth of work on wh-in-situ, there are very few studies (Huang 1982, Shi 1994, Drubig 2000), albeit only indirectly related, on the FCW construction at issue. This is probably because the focus marker SHI can occur in a cleft sentence, as well as optionally in a wh-in-situ question. In the sections below, I will review the existing work on wh-questions in Chinese, highlighting relevant connections to cleft structure when they arise.

2.2.1 Huang's (1982) cleft structure analysis

Huang (1982) proposed that the focus marker SHI is a focus operator that has the status of an adverb. According to his analysis, it combines with the emphasized element to form a phrase-level focus operator, which is raised to Comp at LF on a par with wh-phrases in Chinese. Two arguments support his LF movement analysis. First, the focus maker SHI is ungrammatical inside a relative clause (RC) or inside a subject island, as shown in (2) a-b:

(2). a. * Wo xihuan [**shi** Zhangsan mai de neizhi gou]. RC island
I like SHI buy RC that-CL dog
'*I like the dog that it is Zhangsan that bought'.

b. * [Zhangsan **shi** mingtian lai] mei guanxi. Subject island
Zhangsan SHI tomorrow come no matter
'That it is tomorrow that Zhangsan will come does not matter'.

Second, the focus marker is not possible inside a wh-island:

(3) * [$_{CP}$ ta xiang-zhidao [$_{CP}$ [**Shi** Zhangsan da-le **shei**]]? wh-island
he wonder SHI Zhangsan beat-ASP who
'He wonders who it is Zhangsan that beat?'

Given that focus SHI is subject to constraints on movement, Huang suggested that it is an LF movement operation. However, Huang only discussed the occurrence of focus SHI in wh-in-situ sentences, where the wh-phrase itself never got focused, as in sentences (2) and (3) above.

2.2.2 Shi's (1994) analysis

Like Huang, Shi (1994) discussed the distribution and properties of emphatic SHI[1] in the wh-in-situ structure. He pointed out that emphatic SHI cannot occur in direct wh-questions unless the wh-element is the emphasized element. As illustrated in (4), *a* is grammatical whereas *b* is not.

(4) a. Ni [**shi** zai **nali**] mai de zhezhong yao?
You SHI at where buy DE this CL medicine
'Where is it that you bought this medicine?'

b. * Ni zai **nali** [**shi** mai de zhezhong yao]?
You at where SHI buy DE this CL medicine

Shi also made the generalization that a wh-question will be acceptable if emphatic SHI occurs in a clause subordinate to the one where the wh-element is located, as shown in (5), where the in-situ wh-phrase *shei* 'who' occupies a higher position than the focus operator SHI. According to Shi, it is also the case that a wh-question will be ungrammatical if the wh-phrase appears in the same embedded clause as, or in a clause subordinated to, the emphasized element, as shown in (6) and (7), respectively:

(5) [$_{CP}$ **Shei** [$_{VP}$ shuo [$_{CP}$ **shi** wo de le guanjun]]]?
Who say SHI I win ASP championship
'Who says that it is I who has won the championship?'

(6) * [$_{CP}$ Ni yiwei [$_{CP}$ **shi** wo de le **shenme**]]?
You think SHI I obtain ASP what
'What is the thing such that you think that it is I who obtain it?'

[1] Shi used the term "emphatic" SHI because the element immediately following SHI is being emphasized. This is correct, as "SHI" and the immediately following emphatic phrase are pronounced with an accent.

(7) * Ni yiwei [$_{CP}$ **shi** wo shuoguo [$_{CP}$ **shei** lai le]]?
You think SHI I say ASP who come ASP
'Who is the person x such that you think that it is I who said that x had come?'

However, Shi does not discuss examples like (1b), where the focused wh-phrase and the preceding emphatic SHI appear in the same matrix clause and the sentence is grammatical. Also, following Huang (1982), Shi posited an operator movement analysis for focused wh at LF. The logic is that the matrix Comp of a Chinese wh-question can only bear one index. If the wh-word is the emphasized element, it will be combined with emphatic SHI to form one operator. When this operator is raised to the matrix Comp at LF, its index will be assigned to that Comp and its trace will be properly governed. This analysis implies that the focused category binds a gap.

However, since Huang and Shi failed to take into account the optional focused cleft wh-construction, a question remains as to whether the focused category binds a gap, or a resumptive pronoun, when the operator consisting of SHI combined with the emphatic wh-phrase is clefted to the initial position.

2.2.3 Drubig's (2000) typological analysis

In an attempt at a generalized typology of focus and focus constructions, Drubig (2000) observed that in some languages, such as the West African language Akan and the Athabaskan Language Babine-Witsuwit'en (Denham 2000), the position in which the left-peripheral focused category binds is not a gap but a resumptive pronoun, which may be phonetically empty under certain conditions (Drubig 2000: 65). The following Akan sentence pair is taken from Drubig (2000: 65), in which (8) is a focused question, and (9) is a possible answer to (8):

(8) **Adaka$_i$ bɛn** **na** wo nim [$_{DP}$ onipa [$_{CP}$ a [$_{IP}$ me rehwehwɛ **e$_i$**]] no].
box which FOC you know person REL (s)he is-looking-for (it) the
'Which box$_i$ do you know the person who is looking for (it$_i$)?'

(9) **Adaka$_i$ no** **na** wo nim [$_{DP}$ onipa [$_{CP}$ a [$_{IP}$ me rehwehwɛ **e$_i$**]] no].
box this FOC you know person REL (s)he is-looking-for (it) the
'This box$_i$ do you know the person who is looking for (it$_i$).'

Both the wh-phrase *Adaka bɛn* 'which box' and the focus *Adaka no* 'this box' occupy the sentence-initial focus position, both are accompanied by the obligatory focus particle *na*, and both bind an argument position, which is embedded in a complex NP.

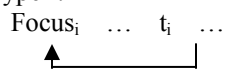
Drubig argued that the empty category must be analyzed as a resumptive pronoun (RP) without phonetic content because pronouns with inanimate antecedents are always empty. However, when the antecedent is animate, the RP has phonetic content, as shown in (10) (from Schachter 1973):

(10) baa$_i$ no **na** me huu **no$_i$**
WOMAN the FOC I saw her
'It was the woman I saw (her)'

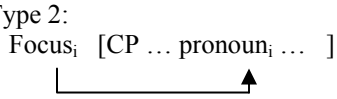
Drubig pointed out that the occurrence of resumptive binding is unexpected given the operator movement analysis of the focus construction and wh-questions. If there is movement, then movement is subject to subjacency constraints due to the fronted wh-question structure. The fact that a gap in (10) renders the sentence ungrammatical suggests that a movement analysis is not correct. Because the RPs are not subject to movement-related constraints, they are insensitive to islands. Therefore, Drubig proposed two types of focus and focused wh-constructions:

(11) Focus constructions

a. Type I:



b. Type 2:



Focus in the type I construction is an operator undergoing A'-movement, which is subject to locality restrictions. Focus in the type 2 construction is base-generated in-situ and binds an RP. Such a binding relationship cannot be based on overt movement since there are no locality effects and the extraction site is occupied by the RP.

When we apply Drubig's analysis to the Chinese FCW construction, the type 2 construction seems more promising, once the distribution of RPs and gaps in this construction is clear, as will be examined in the next section. Since an RP strategy is widely used by languages to salvage constructions in which movement is expected but ungrammatical for various reasons,[2] it is worthwhile to investigate whether an RP is also used in the Chinese FCW construction and how it alternates with a gap. This is the issue pursued in the next section.

2.3 Distribution of resumptive pronouns in the FCW construction

In this section, I will focus on island constructions and the interaction between islands and focused cleft wh-questions, and discuss the distribution of RPs in the FCW construction.

Three strong island constructions are consistently compared, specifically, object-modifying relative clause island (OMRC), subject-modifying relative clause island (SMRC) and adjunct island (AJ).[3] Each strong island contains two types of FCW constructions that are based on a declarative sentence (e.g. 12a), and each type of FCW has two variations: a gap or an RP. Type 1 FCW refers to the FCW sentences in which wh-phrases are directed towards the noun phrases (NPs) from within relative clauses (as in 12b and 13b) and from temporal/cause-effect subordinate clauses (as in 14b). Specifically, the phrases being questioned are *shuxue wenti* 'the math problem' for OMRC, *kaili* 'Cathy' for SMRC, and *fayan* 'speech' for AJ. Type 2 FCW refers to the FCW sentences in which wh-questions are directed towards the NPs from the matrix clause (as in 12c, 13c, and 14c). Specifically, the phrases being questioned are *gongshi* 'a formula' for OMRC, *jingli* 'the manager' for SMRC, and *juhui* 'party' for AJ.

Note that the acceptability of the gap or RP in each focused cleft wh-sentence is tentatively given by the author as a native speaker of Mandarin Chinese. The accuracy of these judgments will be tested in an empirical study involving a wide range of informants. The rationale for experiment 2 will be explained later in this paper.

[2] For languages with an alternation between RP and gap, see Sells (1987) and Shlonsky (1992) for Hebrew, McCloskey (1990) for Irish, Aoun and Li (2003) for Lebanese Arabic, Shlonsky (1992) for Standard Arabic, and Suner (1998) for Spanish.

[3] According to Huang's Condition on Extraction Domain (CED) (1982), Wh-movement is forbidden from non-complements, that is, from subjects and from adjuncts/modifiers. Therefore, adjuncts are strong islands.

1. Object-modifying Relative Clause island (OMRC):

(12) a. Bill found a formula [$_{RC}$ that solved the math problem]. (Object-modifying RC)
b. 是什么东西, Bill 找到了[$_{RC}$ 一个解决它/?*t 的]公式? (Type 1 FCW)
Shi shenme (dongxi), Bier zhaodao le [$_{RC}$ yige jiejue ta / ?*t de] gongshi]?
is what (thing), Bill find ASP one-CL solve it /?*t DE formula
'What is it that Bill found a formula that solved ?it /?*t ?'
or '*What did Bill find a formula that solved?' (English subjacency violation)

c. 是什么东西, Bill 找到了[$_{RC}$一个解决数学问题的]它/*t? (Type 2 FCW)
Shi shenme dongxi, Bill zhaodao le [$_{RC}$ yige jiejue shuxue wenti de] ?ta /*t?
Is what thing, Bill find ASP one-CL solve math problem DE ?it/*t
'What is it that Bill found t / *it that solved the math problem?'
or 'What did Bill find that solved the math problem?

2. Subject-modifying Relative Clause island (SMRC):

(13) a. The manager [$_{RC}$ who seduced Cathy] was watering the plant. (Subject-modifying RC)

b. 是谁 (哪个女孩), 那位[$_{RC}$ 引诱了她/*t 的]经理正在浇花? (Type 1 FCW)
Shi shei/nawei nuhai, nawei [$_{RC}$ yinyou le ta /*t de] jingli zhengzai jiao hua
Is who/which-CL girl, that seduce ASP her / *t DE manager –ing water flower
'Who/which girl is it that the manager who seduced her / t was watering the plant?'
Or '*Who was the manager who seduced watering the plant?' (English subjacency violation)

c. 是什么东西, 那位[$_{RC}$引诱了凯丽的]经理正在浇?它/?t? (Type 2 FCW)
Shi shenme dongxi, nawei [$_{RC}$ yinyou le kaili de] jingli zhengzai jiao ?ta /?t
Is what thing, that-CL seduce ASP Cathy DE manager –ing water ?it /?t
'What is it that the manager who seduced Kathy was watering it / t ?'
Or 'What was the manager who seduced Kathy watering?'

3. Adjunct island (AJ):

(14) a. Heidi left the party [$_{AJ}$ before Colin finished his speech]. (adjunct clause)

b. 是什么, 海蒂[$_{AJ}$在柯林斯结束了它/*t 之前]离开了聚会? (FCW)
Shi shenme, Haidi [$_{AJ}$ zai Kaolinsi jiesu le ta /*t zhiqian] likai le juhui?
Is what, Heidi at Colin finish ASP it / * t before leave ASP party
'What is it that Heidi left the party before Colin finished t / it?'
Or '*What did Heidi leave the party before Colin finished?' (English subjacency violation)

c. 是什么, 海蒂[$_{AJ}$在柯林斯结束发言之前]离开了?它/?t? (Type 2 FCW)
Shi shenme, Haidi [$_{AJ}$ zai Kaolinsi jiesu yanjiang zhiqian] likai le ?ta /?t?
Is what, Heidi at Colin finish speech before leave ASP ?it /?t
'What is it that Heidi leave t/ ?it before Colin finished speech?'
Non-cleft English translation "What did Heidi leave before Colin finished his speech?'

The overall pattern for the b and c sentences across all types of islands is that the FCW sentences with RPs seem to be grammatical whereas those without RPs are either ungrammatical or marginal. This is particularly so for b-type sentences, where the extraction is from within an embedded noun position (type 1

extraction). Such a contrast is less apparent for c-type sentences, where the extraction is from a matrix noun position (type 2 extraction).[4]

Note that the English translations of b- and c-type FCW sentences without RPs (not in the clefted form) correspond to ungrammatical sentences with subjacency violations (b-type) and grammatical sentences (c-type), respectively. It seems that instead of strictly conforming to their English counterparts in terms of acceptability at the two extremes, the Chinese FCW sentences without RPs are more or less equally unacceptable regardless of extraction types (i.e. from embedded noun position or from matrix noun position. Why is this the case? Does subjacency apply to the Chinese focused cleft wh-construction?

Subjacency is a property which is only activated by the movement of constituents in syntactic structures. According to early accounts (Chomsky 1973, 1977), subjacency requires that a constituent move only a short distance from its trace where distance is measured in terms of structural domains called bounding nodes, which are the maximal projections in a tree diagram. Later accounts of subjacency refer to Chomsky's notion of a barrier (1986b) (i.e. that any maximal project is a potential barrier to movement unless it is an argument which is governed by a lexical category) and Rizzi's (1990) relativized minimality (i.e., that moved constituents may not cross another constituent of the same type). Without going into too much detail, the syntactic structure is briefly examined here in terms of the notion of bounding nodes. Although bounding nodes vary by language, given the general understanding that subjacency does not apply to Chinese due to its lack of movement, it is not clear what constitutes a bounding node in Chinese. We therefore just assume that, as in English, bounding nodes in Chinese are IPs and DPs. Simply represented in bracket notation, the syntactic structures of the (b) and (c) sentences of the object-modifying RC in the FCW construction are as follows, and similarly for the other two types of island sentences:

(12) b. 是什么(东西)$_i$, [$_{IP\#1}$ Bill 找到了[$_{DP\#1}$ 一个[$_{CP}$ t_j [$_{IP\#2}$ 解决 t_i] 的]公式 $_j$]?
Shi shenme (dongxi)$_i$, [$_{CP}$ [$_{IP\#1}$ Bier zhaodao le [$_{DP1}$ yige [$_{CP}$ t_j [$_{IP\#2}$ jiejue t $_i$ de] gongshi$_j$]?
is what (thing), Bill find ASP one-CL solve it /?*t DE formula
'*What did Bill find a formula that solved?' (English subjacency violation)

c. 是什么东西 $_i$, [$_{CP}$ [$_{IP\#1}$ Bill 找到了[$_{DP\#1}$ 一个[$_{CP}$ [$_{IP\#2}$ 解决数学问题]的] t_i]?
Shi shenme dongxi, Bill zhaodao le [$_{DP1}$ jiejue shuxue wenti de] *t?
Is what thing, Bill find ASP solve math problem DE *t
'What did Bill find that solved the math problem?

[4] Some native Chinese speakers might not agree with my judgment of the b- and c-type sentences in (13) and (14), as Professor Jiangyu Dennis Zhang pointed out to me. This, I believe, is due to the animacy effect of Chinese pronouns. If we modify sentences (13) and (14) to use human nouns, my judgments should be borne out. The Chinese subjects' ratings of the b- and c-type sentences in the experimental study further verify this.

(13') a. 那位 [$_{RC}$ 引诱了凯丽的]经理正在训斥下属. (subject-modifying RC)
'The manager who seduced Kathy was scolding the underling.'
c. 是谁/哪个人 $_i$, 那位 [$_{RC}$ 引诱了凯丽的]经理正在训斥?他 $_i$/?t_i?
Shi shei$_i$ /nage ren$_i$, nawei [$_{RC}$ yinyou le kaili de] jingli zhengzai xunchi ?ta$_i$ /?t_i
Is who/which-CL man, that-CL seduce ASP Cathy DE manager –ing scold ?him/?t
'Who is it that the manager who seduced Kathy was scolding him /? t ?'
Or 'Who was the manager who seduced Kathy scolding?'

(14') a. 海蒂 [$_{AJ}$ 在柯林斯批评下属之前] 安顿好了孩子. (adjunct clause)
'Heidi settled down the child before Colin criticized the underling'.
b.是谁 $_i$/哪个人 $_i$, 海蒂 [$_{AJ}$ 在柯林斯批评他/*t 之前] 安顿好了孩子?
Shi shei$_i$ /nage ren$_i$, Haidi [$_{AJ}$ zai Kaolinsi piping ta$_i$ /*t_i zhiqian] andun hao le haizi?
Is who/which-CL man, Heidi at Colin criticize him/* t before settle-down well ASP child
'Who is it that Heidi settle down the baby before Colin criticized him/*t?'
Or '*Who did Heidi settle down the baby before Colin criticized?' (English Subjacency violation)
c.是谁 $_i$/哪个人 $_i$, 海蒂[$_{AJ}$ 在柯林斯批评下属之前]安顿好了?他 $_i$/?t_i?
Shi shei$_i$/nage ren$_i$, Haidi [$_{AJ}$ zai Kaolinsi piping xiashu zhiqian] andun haole ?ta$_i$ /?t_i?
Is who/which-CL man, Heidi at Colin criticize underling before settle-down well ASP ?it /?t
'What is it that Heidi settle down ?him/ ?t before Colin criticized the underling?'
Or "Who did Heidi settle down before Colin criticized the underling?'

(13) b. 是谁 (哪个女孩)$_i$, [$_{CP}$ [$_{IP\#1}$ [$_{DP\#1}$ 那位 [$_{IP\#2}$ 引诱了*t 的]经理]正在浇花]?
Shi shei/nawei nuhai$_i$, [$_{CP}$ [$_{IP\#1}$ [$_{DP\#}$, nawei [$_{RC}$ yinyou le *t de] jingli zhengzai jiao hua
Is who/which-CL girl, that seduce ASP *t DE manager –ing water flower
'*Who was the manager who seduced watering the plant?' (English subjacency violation)

c. 是什么东西 $_i$, [$_{CP}$ [$_{IP\#1}$ [$_{DP\#1}$ 那位[$_{RC}$ 引诱了凯丽的]经理正在浇?t]?
Shi shenme dongxi$_i$, [$_{CP}$ [$_{IP\#1}$[$_{DP\#1}$ nawei [$_{RC}$ yinyou le kaili de] jingli zhengzai jiao ?t]
Is what thing, that-CL seduce ASP Cathy DE manager –ing water ?t
'What was the manager who seduced Kathy watering?'

(14) b. 是什 $_i$, [$_{CP}$ [$_{IP\#1}$ 海蒂[$_{PP}$ 在 [$_{CP}$ [$_{IP\#2}$ 柯林斯结束了[$_{NP\#1}$ 它 $_i$/*t$_i$ 之前] 离开了聚会?
Shi shenme, Haidi [$_{AJ}$ zai Kaolinsi jiesu le ta /*t zhiqian] likai le juhui?
Is what, Heidi at Colin finish ASP it / * t before leave ASP party
'*What did Heidi leave the party before Colin finished?' (English subjacency Violation)

c. 是什么 $_i$, [$_{CP}$ [$_{IP\#}$ 海蒂[$_{PP}$ 在[$_{CP}$ [$_{IP\#2}$ 柯林斯结束[$_{NP\#1}$ 发言之前]离开了?它/?t?
Shi shenme$_i$, [$_{CP}$ [$_{IP\#}$ Haidi [$_{AJ}$ zai [$_{CP}$[$_{IP\#2}$ Kaolinsi jiesu [$_{NP\#1}$ yanjiang zhiqian] likai le ?ta /?t?
Is what, Heidi at Colin finish speech before leave ASP ?it /?t
"What did Heidi leave before Colin finished his speech?'

As evidenced by the data in (12) through (14), in order for an embedded noun (b-type) or a head noun (c-type) to reach the [Spec, CP] position, both must bypass the same number of bounding nodes. If the movement analysis is correct, this implies that both types of FCW sentences are equally ungrammatical. However, the author's intuition is that b-type extractions are less degraded than c-type extractions. Closer examination indicates that the distance between the focused phrase and the original gap position from which it is extracted is greater for c-type sentences than for b-type sentences. As a result, the c-type sentences with gaps should be more severely degraded than the b-type sentences with gaps. The fact that this is indeed the case suggests that a movement analysis means violations of the locality principle and, thus, should not be correct. Instead, the fact that those sentences with RPs will render them more acceptable suggests that the wh-phrase and the focus marker are base-generated and bind the RP.

However, FCW questions are not always grammatical with the presence of an RP. Why is this so? Given that the NP being questioned is inanimate for all three example sentences, the less salient difference between an RP and a gap is probably due to the reduced acceptability of inanimate *ta* 'it'.[5]

Another point worth noting is that Chinese strictly requires an overt pronoun as a possessor when it cannot be an empty pronoun. This is reflected by the c-type sentence for OMRC, where the overt pronoun *ta* 'it' is obligatory as the possessor or head of the relative clause (that is, *jiejue shuxue wenti de* 'solve math problem DE'), which is head-initial:[6]

(12) c. 是什么东西, Bill 找到了[$_{RC}$ 解决数学问题的]它/*t?
Shi shenme dongxi, Bill zhaodao le [$_{DP}$ [$_{CP}$ [$_{IP}$ jiejue shuxue wenti de] ?ta /*t?]]
Is what thing, Bill find ASP[$_{DP}$ [$_{CP}$ [$_{IP}$ solve math problem DE] ?it /*t]]]?
'What is it that Bill found t / *it that solved the math problem?'
Or the standard English translation 'What did Bill find that solved the math problem?

Given that the most common wh-questions in Chinese are the in-situ forms, judgments of RPs that are embedded in less-common focused cleft wh-constructions are expected to vary by individual. Thus, a single native speaker's intuition might not stand for all cases. While RP judgments might be tricky or slippery, the distribution of RPs in subjacency islands is crucial to the questions we wish to investigate. Therefore, we did a grammaticality judgment test with native Chinese speakers.

[5] I am grateful to Audrey Li for pointing this out to me. However, for sentences constructed for the two experiments in this study, we did not actually avoid inanimate *ta*, because we wanted the wh-phrase to be half referring to person *shei* 'who' and half to thing *shenme* 'what'.
[6] Again, thanks to Audrey Li for pointing this out.

2.4 Experiment 1

2.4.1 Method

2.4.1.1 Participants:

40 native speakers of Mandarin Chinese participated in this experiment. They were researchers or graduate students at either Chinese or American universities, or white-collar business representatives in Shanghai. They were not paid for their participation.

2.4.1.2 Materials:

A total of 36 sentence sets were designed. They consisted of the three types mentioned earlier: OMRCs, SMRCs, and AJs. Each type had 12 sentence sets, each of which contained a minimum of seven sentences:[7] one declarative, three type 1 extractions (one wh-in-situ, one with a gap, and one with an RP), and three type 2 extractions (one wh-in-situ, one with a gap, and one with an RP). All sentences were randomized into four experimental lists, each list consisting of nine sentence sets. Thus, each participant saw nine sentence sets.

2.4.1.3 Procedure

Since the notion of grammaticality is relative, we used a rating scale, rather than a categorical acceptable/unacceptable task. Participants rated sentences on a 5-point scale, 1 being very bad and 5 being very good. Participants were also told that some sentences might not be very bad or very good but rather something in between and that, in those cases, they should use the other points of the 5-point scale.

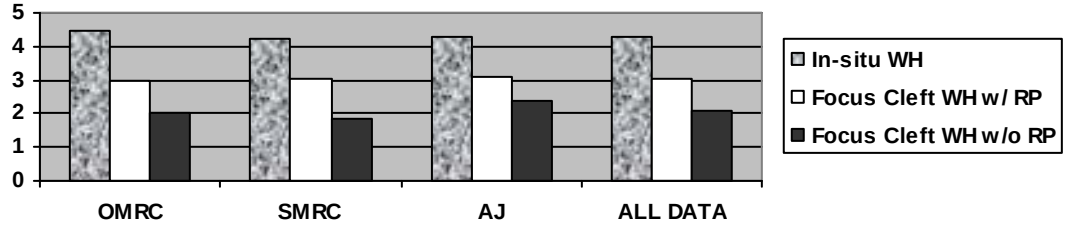
For the cut-off points that are adopted in our analysis but not shown in the instruction sheet, 4-5 is the range for grammatical, 1-2 is the range for ungrammatical, and 3 is neither grammatical nor ungrammatical.

For a few of the sentences (out of the nine-sentence sets), they also needed to indicate, by circling, highlighting, or underlining, their choice for those that contained both bare wh-phrases and D-linking ones.[8]

2.4.1.4 Results

Figure 1 shows participants' ratings to type 1 extraction (which corresponds to an English subjacency violation) for OMRC, SMRC, AJ as well as all the results combined. For each island condition, three bars are given, representing in-situ wh-sentences, FCW sentences with RPs, and FCW sentences without RPs.

Figure 1: Ratings of type 1 extractions (in-situ, focus cleft wh w/ RP, focus cleft w/o RP) for OMRC, SMRC, AJ and all three combined



[7] There is one sentence set that contains 5 sentences only. This is because when the wh-phrase is extracted from the non-island position, 'What did the neighbor do while Janet was cleaning the floor?', the Chinese translation in the focused Cleft wh constructions did not make much sense. Therefore, only 5 Chinese sentences were formulated for that sentence set.

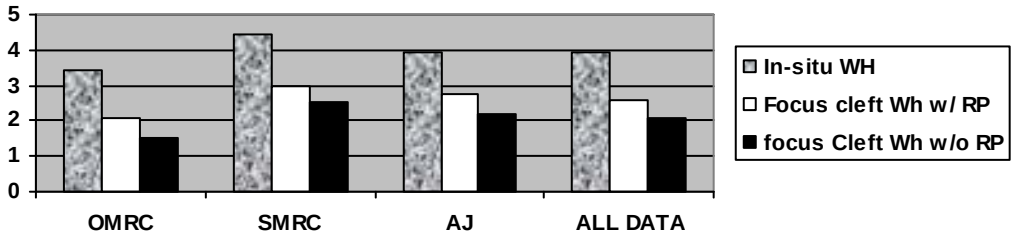
[8] Due to the scope of this paper, the analyses of the choices of bare wh-phrases or D-linking ones are not covered here.

In Figure 1, the canonical wh-in-situ sentences were rated highest (mean=4.30) for all island types. The ratings for wh-in-situ sentences were significantly higher than those for FCWs with RPs and without RPs ($p<0.001$). This suggests that wh-in-situ is the most acceptable way of forming questions.

Regarding FCW constructions, those with RPs were rated higher (mean=3.03) than those without RPs (mean=2.10), and this difference is significant as well ($p<0.001$). This suggests that although the FCW construction is generally rated less acceptable than the in-situ wh-questions, those with RPs are significantly more acceptable than those without RPs.

With the same three bar representations for each island as Figure 1, Figure 2 shows participants' ratings of type 2 extractions (that correspond to grammatical English sentences without subjacency violations) for OMRC, SMRC, AJ as well as all the results combined.

Figure 2: Ratings of type 2 extractions for OMRC, SMRC, AJ and all three combined



Again in Figure 2, the wh-in-situ sentences are most acceptable (thus, the canonical way to form questions). Moreover, although the ratings were not evenly distributed, the average rating was approximately 4 (mean=3.94), and the ratings of wh-in-situ sentences were significantly higher than those of the two FCW constructions ($p<0.001$ for both), regardless of whether an RP was present or not.

Regarding FCW constructions, again those with RPs were rated higher (mean=2.59) than those without RPs (mean=2.06), although both were below 3, which indicates that people did not find them to be particularly well-formed. The difference between the two was significantly different ($p<0.001$). This suggests that the FCW sentences in which the extraction is from a non-island are largely unacceptable, yet those with RPs have some amnestying effects.

A comparison of the two graphs shows that for the FCW sentences without RPs, those with type 1 extractions from embedded noun positions were slightly higher (mean=2.10) than those with type 2 extractions from matrix noun positions (mean=2.06), but this difference was not statistically significant ($p=0.647$). This suggests that, regardless of the extraction type, the FCW constructions without RPs are equally ungrammatical. The interesting thing is that these two types of sentences correspond to subjacency violations and grammatical wh-questions in English.

However, for the FCW sentences with RPs, those with type 1 extractions from embedded noun positions were rated higher (mean=3.03) than those with type 2 extractions from matrix noun positions (mean=2.59). The difference between the two is significant ($p<0.001$). This suggests that the amnestying effects of RPs in focused cleft constructions are more robust for the type 1 extractions, which correspond to subjacency violations in English.

2.4.2 Discussion

The overall results seem to suggest the following major points. First, regarding the FCW sentences *without* RPs, participants' ratings for type 1 extractions (corresponding to subjacency violations in English) are as low as the ratings for type 2 extractions (corresponding to grammatical wh-questions in English). Second, regarding the FCW sentences *with* RPs, participants' ratings for type 1 extractions (corresponding to subjacency violations in English) are significantly higher than those for type 2 extractions (not corresponding to subjacency violations in English). This suggests that the former are more grammatical than the latter in Chinese. Third, participants' ratings of the FCW sentences *with* RPs seem to be significantly higher than those *without* RPs, suggesting that the presence of RPs largely amnesties the unacceptability of the FCWs, particularly when the extractions are from embedded noun positions (subjacency violation sentences in English).

Given these results, we conclude that the FCW construction in Chinese also obeys the subjacency constraint, and that RPs reduce the magnitude of the subjacency violation. Furthermore, the fact that FCW sentences with gaps are judged to be less acceptable,[9] whereas those with RPs are judged as grammatical, supports Drubig's type 2 analysis of focus constructions.

Based on the results of the rating experiment, we can draw the following three conclusions. First, in-situ wh-questions as the most common question formations apparently are most acceptable to native speakers of Chinese. Therefore, in-situ wh-constructions are the default way of forming questions. Relatively speaking, focused cleft wh-constructions are an alternative way of forming questions when the speaker wants to focus on the question part.

Secondly, although focused cleft wh-constructions are less acceptable, there is an apparent dichotomy in terms of the presence or absence of an RP. Given the same focused cleft wh-sentences, the presence of an RP leads to increased acceptability.

Thirdly, the results show that type 1 extractions from embedded noun positions are judged more acceptable than type 2 extraction from matrix noun positions in Chinese. Note that the corresponding English version of the former is a violation of the subjacency condition, whereas the English counterpart of the latter is a grammatical wh-question. This is an important finding because it sheds light on the Chinese-L1, English-L2 learners' performance on English sentences with subjacency violations. That is the question we would like to further pursue in the second experiment.

3. Chinese-L1, English-L2 performance

3.1. Introduction and Aims of Experiment 2

The previous section investigated Chinese speakers' interpretations of FCW constructions, particularly when the focused wh-phrases are extracted from either embedded noun positions or matrix noun positions. Since the FCW sentences without RPs are not acceptable to Chinese speakers, and those sentences are counterparts of either English subjacency violations or grammatical English sentences, such results can shed light on Chinese-L1, English-L2 speakers' sensitivity to English sentences with subjacency violations.

English wh-questions and Chinese focused clefted wh-constructions share one surface similarity: the wh-phrase occurs in the left peripheral position. It is possible, therefore, to hypothesize that Chinese L2 learners of English process English wh-questions by resorting to the FCW construction in their L1, especially for beginning learners of L2 English. That is, there might be certain amount of L1 transfer going on for Chinese L2-English learners when they understand English wh-questions with subjacency violations. Since the RP strategy largely renders the Chinese FCW sentences more acceptable, they might apply that strategy to help them understand English wh-questions. Moreover, given that type 1 and type 2 extractions in Chinese FCW constructions correspond, in English, to ungrammatical subjacency-violating sentences and grammatical wh-questions, respectively, the preference for either of the Chinese types of extraction will be hypothesized to be transferred to the L2 English. Given that the amnestying effects of RPs in Chinese FCW constructions are more robust for the type 1 extractions (from embedded noun positions) than for the type 2 extractions (from matrix noun positions), we predict that Chinese learners of L2 English will more or less accept English sentences with subjacency violations, as compared to the grammatical wh-sentences.

To test these general hypotheses, we therefore designed the Experiment 2 using native Chinese speakers who learn English as a second language. Before going to the experimental details, a review of prior studies on Chinese L2 learners' processing of English wh-questions is due.

3.2 Literature Review

In second language acquisition research, there has been a standing issue of whether adult L2 learners still have full access to universal grammar (UG). Regarding the L2 learners' sensitivity to subjacency constraints, there is little controversy for Spanish, French and German L2 learners, because their L1s observe subjacency. Yet for L2 learners whose L1s do not obey subjacency, no consensus has been reached.

[9] Recall that the cut-off point for ungrammaticality was 2 on the 5-point scale, whereas the cut-off point for grammaticality was 4.

White (1992) tested native speakers of different languages, and found that L1 speakers of Spanish, Dutch and French detected subjacency violations in English more accurately than L1 speakers of Chinese, Korean or Japanese. This suggests that the existence of subjacency constraints in the L1 facilitates the detection of English ungrammatical sentences. However, such L1 transfer cannot play a role for speakers of East Asian languages, where wh-questions are in-situ.

Johnson and Newport (1991) tested 23 Chinese L2 speakers whose age of arrival in the United States ranged from 4 to 38 for their maturational (critical period) hypothesis. Subjects were asked to provide grammaticality judgments for aurally presented stimuli that contained three types of subjacency violations: noun phrase complement (NP-comp), relative clauses (RC) and wh-complements (wh-comp). To evaluate the possibility that subjects rejected ungrammatical sentences only because wh-movement is hard to process, they designed their stimuli in four forms: declarative, subjacency violation, grammatical wh control, and no subject-auxiliary inversion (examples will be given in the following section). They reported that L1-Chinese performance on English sentences with subjacency violations, although better than chance, was significantly worse than that of native speakers of English. Regarding subjects' responses to subjacency versus controls, they found that subjacency sentences were less acceptable than the control sentences, though the level of discrimination was very low (d'=0.84 versus d'=3.89 for native speakers of English). This was taken as evidence for a tendency in adult L2 learners to obey subjacency constraints. Johnson and Newport also conducted a paper-and-pencil question-answering test, in which subjects were asked to answer English wh-questions where the extractions were from embedded noun positions (ungrammatical in English). They found that Chinese L2 speakers were more likely to answer the questions than native controls, that is, "non-native speakers appear to be better than natives at understanding questions which contain RC subjacency violations" (p. 243). They did not speculate as to the basis of this result. If, however, our hypothesis is correct, this could be explained as a result of unconscious insertion of overt RPs that help Chinese subjects comprehend those sentences.

Johnson and Newport's study is influential and seminal, inspiring many follow-up studies by other researchers using similar methodologies. Here I will only summarize White and Juffs (1998) and Li (1998), the two most relevant studies. White and Juffs (1998) tested two groups of Chinese L2 speakers, 16 from China and 16 from Canada. The tasks were timed grammaticality judgment and question formation. Stimuli included extractions from noun complement, relative clause, adjunct, subject, and that-trace violations. The results showed that the China group was not significantly different from the native controls but performed better than the Canada group. White and Juffs concluded that L2 learners might achieve similar competence to native speakers, yet it takes longer for them to access that competence. It is interesting to note that the two Chinese groups rejected more grammatical wh-movement sentences, or at least their accuracy on the grammatical sentences was lower than on the ungrammatical, subjacency-violation sentences. White and Juffs did not offer an explanation for this, yet this is predicted by our findings in the Chinese-L1 data.

Li (1998) tested 180 Chinese college students from China and 16 Chinese L2 graduate students in the US. Subjects were given a grammaticality judgment task involving sentences with Complex NP constraint violations, wh-islands, sentential subject constraint violations, and NP islands, and were then asked to complete a question-formation questionnaire. She found that Chinese L2 learners' performance was better than chance, although they did not do as well as native controls. This was taken to indicate that they were sensitive to movement constraints. Interestingly, Li also found that, overall, the Chinese college students performed better than those from the US, which was interpreted as evidence against Johnson and Newport's maturational hypothesis. Instead, Li concluded that Chinese L2 learners do eventually obtain native-like sensitivity to subjacency.

The assumption that underlies these and other previous studies of Chinese speakers' performance in L2 English is that Chinese learners of English should not demonstrate knowledge of subjacency constraints unless UG is still available. This is so because, according to prior theoretical frameworks, Chinese does not have syntactic wh-movement and, thus, may not have derived structures comparable to English subjacency violation sentences. However, no prior research has paid attention to the FCW construction, nor has anyone noted the potential explanatory power achieved once this alternative construction is considered. Therefore, out goal in the study reported below was to explain the inconsistent results obtained in previous research by replicating Johnson and Newport's original study but with more explanatory power.

The specific hypotheses to be tested in experiment 2 are as follows. First, Chinese L2 learners of English will have more difficulty in judging the well-formedness of English wh-questions than declarative sentences because of structural complexity of the former and lack of movement + Aux Inversion in their L1.

Second, Chinese L2 learners of English are predicted to comprehend English via the mediation of the focused cleft wh-construction in their L1 due to its structural similarity to English wh-questions, especially when they process linguistic input aurally since they cannot go back and listen to the auditory stimuli again. Third, the unconscious insertion of an overt RP (in order to understand the English wh-question) will facilitate their online comprehension of subjacency violation sentences. Fourth, Chinese L2 learners of English will find the supposedly grammatical English wh-question without subjacency violations less acceptable compared with native speakers of English, even if they use the RP strategy.

3.3 Experiment

3.3.1 Method

3.3.1.1 Participants

Twenty-four native speakers of Chinese from a university in Shanghai, P. R. China, participated in the experiment in exchange of 50 Chinese yen (about $7). The majority of the subjects were second- or third-year students majoring in English Language and Literatures. The remaining subjects had all taken the Test of English as a Foreign Language (TOEFL) and scored above 600. Prior to the test, they also responded to a questionnaire about their language background, as well as a cloze test developed by Rutherford at the University of Southern California.

An additional twelve native speakers of American English were also tested as a control baseline. All were undergraduate students attending an American university and were recruited through flyers. Subjects were paid $7 for their participation.

3.3.1.2 Procedure

The experiment consisted of two parts. Part 1 was a grammaticality judgment task of aurally presented sentences, in which subjects were asked to rate the stimuli on a 5-point scale. As in experiment 1, participants were told that 1 meant very bad, and 5 meant very good.[10] This is where our experiment differs from that of Johnson and Newport (1991), who only gave subjects a categorical yes-no option. Subjects were told to listen carefully as each sentence would only be played once. Participants sat in front of a computer. They were instructed to click on an icon of a speaker at the center of the computer screen, which activated playing of the first sentence. From the second sentence on, they pushed the space bar to activate playing of the sound file. The procedure was designed in this way so that subjects could control the pace of the experiment.

Part 2 was a pencil-and-paper questionnaire that consisted of 18 pairs of sentences similar to those used by Johnson and Newport (1991). Each pair consisted of one declarative sentence and one question (examples will be shown in the following section). Subjects were asked to choose one of the following three options:

a. If subjects believe they know the correct answer, they should write down that answer;
b. If subjects have no idea what the question is asking, they should choose b "I don't know";
c. If subjects know what the question is asking, yet they don't believe that the answer is given in the declarative sentence, they should choose c "something/someone not mentioned."

3.3.1.3 Materials

For part 1, a grammaticality judgment test with a total of 180 sentences was designed. The format of the stimuli was exactly the same as that used in Johnson and Newport (1991) except that our study only focused on three types of strong subjacency islands. Johnson and Newport did not control for island types, leading to the noise in their data. Specifically, the test stimuli consisted of three types of island constructions: subject-modifying RC (SMRC), object-modifying RC (OMRC), and adjuncts (AJ). Each

[10] The cut-off points for analysis are the same as the Experiment 1. That is, [1-2] is taken as ungrammatical, [4-5] is grammatical, and 3 is neither grammatical nor ungrammatical.

type had twelve sentences for a total of 36. These 36 sentences were presented in the four different versions described below:

Version A: Declarative. Following Johnson and Newport, this form was included to ensure that these structures were judged as grammatical by subjects since the critical wh-question sentences were derived from this basic form.

Version B: Subjacency Violation. This form was the critical sentence type that involved violations of the subjacency constraint. The violation was instantiated in the simplest structure possible (i.e. without adjectives, adverbs or unnecessary embeddings) in order to test subjacency alone (as opposed to other possible complexities).

Version C: Grammatical wh-control. This form was created by extracting a wh-phrase from a non-island position and, thus, was grammatical. This was included to test whether subjects allowed wh-items to be moved out of complex sentences at all, as well as whether subjects' responses to this form were influenced by their L1.

Version D: No Subject-Auxiliary Inversion. This form was the same as version C except for the absence of subject-auxiliary inversion, which is necessary for forming questions in English. This was included to test whether subjects possessed this basic knowledge of English question formation, which is a language-specific rule.

An example of each version is given in Table 2.

Table 2: Examples of the four sentence versions for each of the three islands:

SMRC:	
(a) Bill found a formula that solved the math problem.	declarative
(b) What did Bill find a formula that solved?	subjacency
(c) What did Bill find that solved the math problem?	control
(d) What Bill did find that solved the math problem?	non-inversion
OMRC:	
(a) The manager who seduced Cathy was watering the plant.	declarative
(b) Who was the manager who seduced watering the plant?	subjacency
(c) What was the manager who seduced Cathy watering?	control
(d) What the manager who seduced Cathy was watering?	non-inversion
AJ:	
(a) Heidi left the party before Colin finished his speech.	declarative
(b) What did Heidi leave the party before Colin finished?	subjacency
(c) What did Heidi do before Colin finished his speech?	control
(d) What Heidi did before Colin finished his speech?	non-inversion

Filler items included 12 simple grammatical wh-questions, 12 that-trace sentences, and 12 complex sentences. All consisted of an equal number of grammatical and ungrammatical sentences. The 72 test sentences (in four versions) were counter-balanced and divided into four lists. For each list, the 36 test sentences and 36 filler sentences were randomized.

Part 2 consisted of 42 sentences divided into 3 lists. Each list contained 12 pairs of test stimuli and six control pairs. 36 pairs of test stimuli were from the A and B versions of the 3 types of islands (SMRC, OMRC, AJ). Items in each list were randomized. For the six control pairs, three were constructed to encourage subjects to use the option "someone/something not mentioned" (see example 16), and the other three were grammatical wh-questions to which subjects should supply the answer (see example 17).

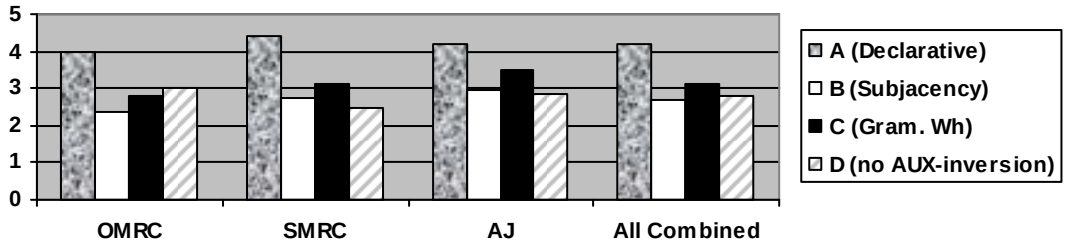
16. Lindsey persuaded her parents to attend the concert.	declarative
When did Lindsey persuade her parents to attend the concert?	question
17. The priest told us to read Chapter 2 of the bible.	declarative
Which chapter of the Bible did the priest ask us to read?	question

3.3.1.4 Results

Part 1

Figure 3 shows Chinese-L1, English-L2 subjects' ratings of the four versions of English sentences for the three island types (OMRC, SMRC, AJ) as well as all results combined.

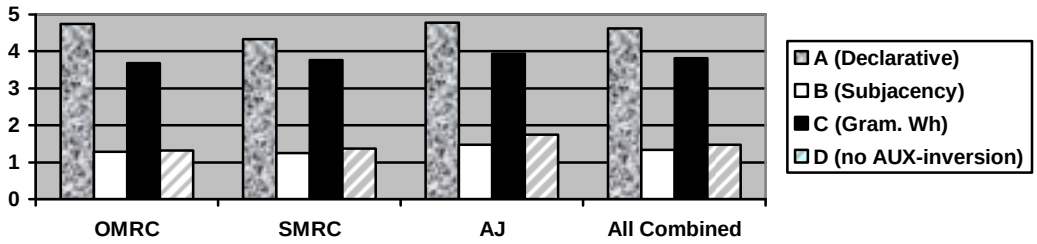
Figure 3 ChineseL1, English-L2 Subjects' Ratings for OMRC, SMRC, AJ and All Combined



In Figure 3, the declarative sentences (A) were rated the highest, with an average score of 4.19 for all types of islands. This suggests that adult L2 speakers correctly accepted declarative sentences as grammatical. However, subjects' mean ratings of the supposedly ungrammatical sentences with subjacency violations (B) and without aux-inversion (D), and the supposedly grammatical wh-sentences (C) all fell between 2.5 and 3. This suggests that adult L2 learners seem to incorrectly accept ungrammatical sentences and correctly accept grammatical sentences only marginally. A more detailed statistical analysis will be reported later in this section.

Figure 4 shows English native controls' ratings to each of the four versions of English sentences for the three island types (OMRC, SMRC, AJ) as well as all data combined.

Figure 4 English-L1 Speaker Ratings for OMRC, SMRC, AJ and All Combined



The graph in figure 4 shows clear differences in the ratings of grammatical versus ungrammatical sentences. For the grammatical declarative sentences (A) and wh-questions (C), English controls' rated them quite high, with mean scores of 4.62 for A and 3.81 for B. That declarative sentences never got a full 5-point rating might, again, have something to do with pragmatics, that is, the lack of context. The ratings of grammatical wh-questions were even lower than the ratings for declaratives, suggesting that the increased complexity in extracting wh-phrases from non-island positions increased processing difficulties, even for native speakers of English. For the ungrammatical sentences involving subjacency violations (B) and without aux-inversion (D), the ratings were very low, with means scores of 1.33 for B and 1.47 for D. The fact that sentences without aux-inversion were rated a bit higher than those with subjacency violations suggests that native controls found sentences violating a language-specific rule less degraded than those violating a UG principle. This makes sense because ungrammatical sentences without aux-inversion might still be understandable, whereas ungrammatical sentences with subjacency violations are basically 'word salad' (i.e. extremely difficult to process).

Main effects

An ANOVA for Chinese L2 learners showed significant main effects for A (p=0.042), B (p=0.039) and C (p=0.020), but no such effect for D (p=0.073). This suggests that Chinese L2 speakers differed rather significantly in their judgments of different types of English sentences (declaratives, subjacency violations, and no-subjacency violations). They were more or less uniform in rejecting the D-type sentences without aux-inversion.

The ANOVA for native controls showed a significant main effect for A (p=0.019), but no such effects for B (p=0.429) and C (p=0.638), and a marginal effect for D (p=0.078). This suggests that native speakers did not quite agree with the grammaticality of the declarative sentence, but they unanimously either rejected subjacency and non-inversion sentences or accepted grammatical wh control sentences. The variations in declaratives might be due to the 'out-of-blue' contexts in which those sentences were stated. The marginal main effect for D indicates that native speakers vary in their ratings of sentences without subject-aux inversion, particularly for adjunct sentences. To further explore these findings, paired sample t-tests were done, and were reported in the following with subtitles.

Declaratives (A) versus grammatical wh (C)

Both Chinese L2 learners and English native controls judged declarative sentences (A) acceptable. The mean scores for both individual island types and combined results from OMRC, SMRC and AJ are above 4 on the 1 to 5 scale.

The grammatical wh-sentences (C) were rated less acceptable by Chinese L2 learners (mean=3.14) than by native controls (mean=4.19).

For Chinese L2 speakers across all three island types, the difference between declaratives (A) and grammatical wh-sentences (C) is significant (p<0.001). This suggests that adult Chinese L2 learners find declarative sentences more acceptable than wh-questions.

Subjacency (B) versus no aux-inversion (D)

This comparison was done for adult L2 learners in order to evaluate the status of the subjacency constraint as a UG principle and aux-inversion as a language-specific rule. If L2 learners' performance on a language-specific rule is worse than performance on the UG constraint, it is possible that subjacency as a UG principle has a more privileged status. If L2 learners' performance on non-inversion sentences is similar or superior to their performance on subjacency violation sentences, subjacency cannot be considered privileged. For all results combined, Chinese L2 speakers rated subjacency (B) sentences as less acceptable (mean=2.69) than non-inversion sentences (mean=2.79), but the difference between the two was not significant (p=0.261). This suggests that their performance on subjacency violations is equally bad as on non-inversions.

Native controls' mean ratings of sentences involving subjacency violations (B) was 1.33 across all three island types. Comparison between Chinese L2 learners' ratings and native controls on B sentences shows that the difference is not significant (p=0.447). This suggests that both L1 and l2 subjects correctly rejected B-type sentences.

Subjacency (B) versus grammatical wh control (C)

For all results combined, Chinese L2 subjects rated subjacency-violation sentences lower (mean=2.69) than grammatical wh control sentences (mean=3.14), and the difference between the two conditions was significant (p<0.001). However, for analyses of individual island conditions, the difference between subjacency and wh controls was only significant for AJ, and not significant for OMRC and SMRC. This suggests that Chinese L2 speakers found both subjacency violations and the grammatical wh control more or less unacceptable, and there is a trend that subjacency violation is even less grammatical than wh control sentences.

For native controls, paired t-tests show a significant difference (p<0.001) between subjacency and wh controls for different islands (OMRC, SMRC, AJ). So English native controls consistently rejected ungrammatical sentences with subjacency violations, and accepted grammatical wh controls.

OMRC versus AJ for C

In earlier sections, we discussed our prediction that the in Chinese L1 focused cleft wh-sentences the type 2 extractions from the matrix clause would be judged more acceptable for the AJ condition than for the object-modifying RC condition. Such a prediction was supported in experiment 1, in which statistical analyses showed that ratings of AJ sentences were significantly higher than ratings of OMRC sentences for type 2 extractions. If there is direct transfer from L1-Chinese to L2-English, then we would expect ratings of C sentences to be better for the AJ condition than for the OMRC condition. Unfortunately, this prediction was not borne out, as the paired t-tests did not reach significance (t=0.784). The lack of a significant difference might be due to noise that we did not control for.

Part 2

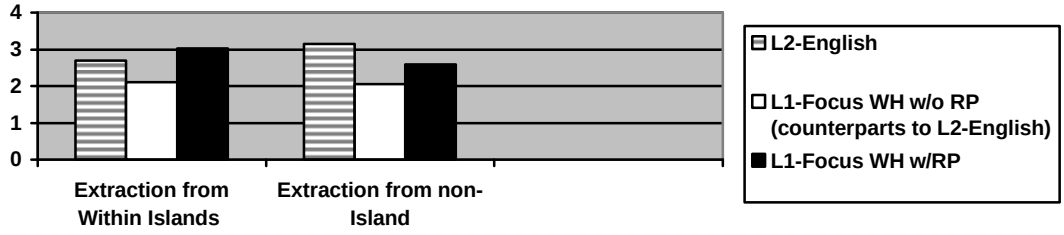
Like native controls, most Chinese L2 subjects answered "I don't know" to the questions with subjacency violations. Contrary to what Johnson and Newport (1991) found, this result suggests that subjects in the current study correctly detected the ungrammaticality of the sentences with a subjacency violation, despite the fact that exactly the same procedure was used. Such a result is not particularly surprising, however. According to Murphy (1997), different modalities affect performance on grammaticality judgment tasks. Thus, the offline reading task apparently gave subjects more time to accurately reject the subjacency violation sentences.

3.4 Discussion

The overall results supported our hypotheses. Specifically, Chinese L2 learners of English rated grammatical English wh-questions (C) significantly less acceptable than declarative sentences. This suggests that the structural complexity of the English wh-questions combined with the lack of movement and aux inversion in their L1 might make these sentences harder to process for L2 learners.

Secondly, if we concentrate on the wh-questions extracted from embedded noun positions (type 1) and from matrix noun positions (type 2), and compare the Chinese participants' ratings for English-L2 sentences and Chinese focused cleft wh-sentences with RPs (counterparts of English sentences) and without RPs, some interesting patterns emerge, as shown in Figure 5.

Figure 5 Chinese Speakers' ratings of English wh-questions and corresponding ratings of Chinese focused wh for two types of extractions



1) According to the English L2 data, Chinese participants seemed to find both subjacency violations and the grammatical wh control more or less unacceptable, although there is a trend that subjacency violation is a bit less grammatical than wh control sentences (leftmost bars).
2) For the Chinese L1 data (that is, the focused cleft wh-sentences), the English counterpart sentences without RPs were rated almost equally low (middle bars).
3) However, focus wh-sentences with RPs show exactly the opposite pattern of their English counterparts: ratings of type 1 extractions (from embedded noun positions) were higher than ratings of type 2 extractions (from matrix noun positions) (rightmost bars).

If Chinese L2 learners still have full access to the subjacency principle, they should behave like native controls by rejecting English wh-questions with subjacency violations while accepting grammatical English

wh-questions. However, our experiment only showed a trend that subjacency violations are less grammatical than wh control sentences. This suggests partial access to UG.

If there is direct transfer from L1 focused cleft wh with RPs, we would expect the L2 English data to show similar trend. What we find, however, is that the English L2 results as extracted from within islands and from non-islands are the mirror image of the Chinese L1 results. The reason might be the conflict between direct L1 transfer and partial access to UG. That is, on the one hand, since Chinese participants parsed the English L2 sentences via the mediation of their grammatical counterparts in L1, which are the focused cleft wh with RPs, they comprehended more English sentences with subjacency violations. On the other hand, as advanced-level L2 learners, Chinese participants tried to parse the English sentences by accessing the UG subjacency principle, which correctly informed them that what they derived from their L1 was actually incorrect. These results suggest slightly stronger access to UG.

Therefore, the finding that Chinese speakers' ratings of English wh-questions with extractions from within islands and from non-islands are exactly the mirror images of their ratings of Chinese focused cleft wh-questions with RPs supports the hypothesis that there is some L1 transfer. That is, Chinese L2 learners of English possibly comprehend English via the mediation of the focused cleft wh-construction in their L1 due to its structural similarity to English wh-questions. This is particularly so when these L2 learners have to process linguistic input aurally since they cannot go back and listen to the stimuli again. This argument is further substantiated by the results of the reading test, which showed that once L2 learners were given more time to reflect upon the structures of English sentences, they correctly detected the ungrammaticality of the sentences involving subjacency violations.

With L1 transfer, we speculate that when Chinese L2 speakers process sentences in real time, as in the experimental setting of this study with aurally presented stimuli, they might unconsciously insert an overt RP in order to understand the English wh-question in a timely manner. This will facilitate their online comprehension of English subjacency-violation sentences.

Hawkins (2001:302) also argued for a similar explanation. Hawkins suggests that UG is accessible to L2 learners, but it may be difficult for them to reset certain parameters from their L1 settings. He posits that in a sentence like **What did Freda discover who bought?* the complement to 'bought' is interpreted not as the trace of a moved wh-phrase, but rather a zero pronoun bound by the wh-phrase *?What did Freda discover who bought (it)*. That is, the wh-phrase would not be moved at all, and thus not be subject to UG constraints on movement. However, whereas Hawkins did not provide direct evidence for such a possibility, our study clearly shows the source of this misanalysis used by Chinese L2 learners of English.

This L1-transfer analysis can also explain the finding, reported in this study as well as previous studies, that Chinese L2 learners seem to be more likely to reject supposedly grammatical English wh-questions than native speakers of English. Simply put, the exact opposite pattern of the L1 focused cleft wh-construction leads them to do so.

4. Implications of the Findings and Future Directions

Focusing on an alternative wh-question formation construction, this study aimed to improve our understanding of possible L1 transfer in L2-English processing by using the results of Chinese L1 comprehension of Chinese sentences to interpret Chinese-L1, English-L2 speakers' performance on English sentences with subjacency violations. This constitutes a contribution to existing knowledge of Chinese wh-question constructions, specifically, the Chinese FCW construction that has not been explicitly discussed in the literature. It is also a contribution to our understanding of Chinese ESL learners' performance in the area of L2 language acquisition.

However, there is an alternative explanation for the Chinese L2 results obtained. Although the statistical analyses shows that Chinese L2 learners judged grammatical L2-English wh-sentences (C) significantly less acceptable than those with subjacency violations (B), the magnitude of the differences in the raw scores for either condition is actually quite small. Given that the ratings of B and C differ so little, it could be that subjects had a hard time processing complicated structures with wh-phrase displacement if their English was not proficient enough. To tease apart the effect of the insertion of RPs from the effect of the complexity of English wh-questions, some online tests with more sensitive measures of reading times might be done to see exactly in which region the delayed response times fall and whether they are due to the parsing difficulty, or to an RP strategy.

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