Use of the "*ba*" construction in Heritage Chinese speakers and L2 speakers of Chinese

A Thesis Submitted to the
College of Graduate and Postdoctoral Studies
In Partial Fulfillment of the Requirements
For the Degree of Master of Arts
In the Department of Linguistics
University of Saskatchewan
Saskatoon

By

XIAODAN WU

PERMISSION TO USE

In presenting this thesis/dissertation in partial fulfilment of the requirements for a Postgraduate degree from the University of Saskatchewan, I agree that the Libraries of this University may make it freely available for inspection. I further agree that permission for copying of this thesis/dissertation in any manner, in whole or in part, for scholarly purposes may be granted by the professor or professors who supervised my thesis/dissertation work or, in their absence, by the Head of the Department or the Dean of the College in which my thesis work was done. It is understood that any copying or publication or use of this thesis/dissertation or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of Saskatchewan in any scholarly use which may be made of any material in my thesis/dissertation.

DISCLAIMER

Reference in this thesis/dissertation to any specific commercial products, process, or service by trade name, trademark, manufacturer, or otherwise, does not constitute or imply its endorsement, recommendation, or favouring by the University of Saskatchewan. The views and opinions of the author expressed herein do not state or reflect those of the University of Saskatchewan and shall not be used for advertising or product endorsement purposes.

Requests for permission to copy or to make other uses of materials in this thesis/dissertation in whole or part should be addressed to:

Department of Linguistics
College of Arts & Sciences
University of Saskatchewan
908 Arts Building, 9 Campus Drive Saskatoon,
Saskatchewan S7N 5C9
Canada

OR

Dean
College of Graduate Postdoctoral Studies

University of Saskatchewan
116 Thorvaldson Building, 110 Science Place
Saskatoon, Saskatchewan S7N 5A5
Canada

ABSTRACT

This thesis analyses the differences in using the *ba* construction in heritage Chinese speakers and L2 speakers of Chinese. The study compares the use and knowledge of the *ba* construction by L1 native speakers, heritage speakers (HL), and L2 learners of Mandarin Chinese. Heritage language speakers are exposed to minority languages from birth, and they are exposed to a majority language later in life (Polinsky & Kagan, 2007), which then causes the L2 to become the dominant language. Other L2 learners tend to retain their L1 as a dominant language. The *ba* construction is an active sentence in which the particle *ba* is used before the predicate verb to introduce the subject and dispose of the object. The focus is on the result or change to the object instead of the event in a regular active sentence. These meaning changes are accompanied by a change in word order from the regular SVO to SOV. Language transfer, linguistic environment, age, and age of language acquisition were considered factors influencing the use and judgment of the *ba* construction.

In this study, 88 participants were included: 25 in the HL group, 24 in the L2 group, and 39 in the CN group. Support for this proposal comes from an online experiment that investigated three groups and the usage of *ba* sentences. The participants of the three speaker groups were evaluated based on a grammatical judgment task, a multiple-choice test, and a controlled production task in the GORILLA Experiment Builder.

The results show that HL and L2 speakers differ from L1 speakers in the **use** of *ba* sentences, while HL and L1 speakers differ from L2 speakers in the **judgement** of *ba* sentences. Compared to L1 speakers, HL and L2 speakers used simple complements in *ba* sentences more frequently. The results also demonstrated that the age of second language acquisition had the most significant influence on the usage of HL and L2 in *ba* sentences, followed by the dominant language, dominant language environment and lastly the age of the participants. These results support the importance of language dominance and age of acquisition in the usage patterns for heritage and L2 speakers.

Keywords: heritage speakers, heritage Chinese, L2 Chinese speakers, *ba* sentences, language transfer, language environment, age of acquisition

ACKNOWLEDGEMENTS

It is an excellent opportunity to acknowledge the many people who have contributed to making this thesis possible. My thesis supervisor, Spreng, Bettina, Ph.D., for her insightful advice, and constant support, which helped me become a good researcher and present this thesis in the best possible way. Her continuous guidance, encouragement, concern, and ever-cheery disposition throughout the thesis process were so important to me, and working with her was one of the most joyful experiences.

I would like to thank my committee members, for their valuable comments and suggestions. And thanks to the interview participants for contributing to my research. I am grateful for their time and participation.

Above all, my sincere appreciation goes to my parents for their steadfast support and encouragement during this long process and for their love and great confidence in me through these years. Moreover, I would gratefully acknowledge the support of my dearest friends for their encouragement, friendship, and support since the beginning of my study.

TABLE OF CONTENTS

PERMISSION TO USE ..... **ii**

DISCLAIMER ..... **ii**

ABSTRACT ..... **iv**

ACKNOWLEDGEMENTS ..... **v**

LIST OF FIGURES ..... **ix**

LIST OF ABBREVIATIONS ..... **x**

CHAPTER 1 INTRODUCTION **1**

1.1 Heritage languages **1**

1.2 Heritage language speakers **1**

1.3 Comparison of heritage language speakers, second language learners and native speakers **2**

CHAPTER 2 LITERATURE REVIEW **4**

2.1 The difference between *ba* and non-*ba* sentences **4**

2.2 The properties of the Chinese *ba* construction **5**

2.2.1 Properties of negation in *ba* sentences 6

2.2.2 The verbs in the *ba* sentences 7

2.2.3 Complements in *ba* sentences 7

2.3 The acquisition of *ba* sentences **12**

2.3.1 First language acquisition 12

2.3.2 L2 acquisition of *ba* sentences 13

2.3.3 Errors in the acquisition of the complement 15

2.4 Difference between native speakers and HL speakers in using *ba* sentences **17**

2.5 Language transfer **18**

2.5.1 Forward and backward transfer 19

2.6 Age **21**

CHAPTER 3 METHODOLOGY **24**

3.1 Research questions **24**

3.2 Participants **25**

3.2.1 Experimental groups 25

3.2.2 Recruitment 26

3.3 Instruments and Procedure **26**

3.3.1 Biographical and demographic information 27

3.3.2 Three tasks 28
CHAPTER 4 STUDY RESULTS 34
4.1 Test on Task 1: Syntax judgment 35
4.1.1 Descriptive summary 35
4.1.2 Statistical analysis summary 37
4.2 Test on Task 2: Multiple choice (fill in the complement task) 40
4.2.1 Descriptive summary 40
4.2.2 Statistical analysis summary 42
4.3 Test on task 3 multiple choice task (word order) 54
4.3.1 Descriptive summary 54
4.3.2 Statistical analysis summary 56
4.4 Summary 63
CHAPTER 5 DISCUSSION 65
5.1 Speaker Group 65
5.1.1 Acceptability judgments 65
5.1.2 Complements of *ba* sentences 66
5.1.3 Basic word order 68
5.2 Predominant language environment 70
5.2.1 Complements of *ba* Sentences 70
5.2.2 Word Order 71
5.3 Age 73
5.4 Age of acquisition of the second language 74
5.4.1 Second language learners 74
5.4.2 Heritage language speaker 76
REFERENCES 81
APPENDIX 85

LIST OF TABLES

Table 1. Comparison of the heritage language speakers, second language learners and native speakers 3
Table 2. Five types complement in *ba* sentences 7
Table 3. HSK levels 15
Table 4. Number of participants in their groups 33
Table 5. Summary of the generalized linear model on Task 1 38
Table 6. Summary of the generalized linear mixed model on sentences type (Task 1) 39
Table 7. Summary of the generalized linear mixed model 2 (Task 2) 43
Table 7.1. Results of the generalized linear mixed model 2 on Group HL (Task 2) 45
Table 7.2. Results of the generalized linear mixed model 2 on Group L2 (Task 2) 46
Table 7.3. Results of the generalized linear mixed model 2 on Pred_Chinese (Task 2) 48
Table 7.4. Results of the generalized linear mixed model 2 on Pred_English (Task 2) 50
Table 7.5. Results of the generalized linear mixed model 2 on Age_Post (Task 2) 52
Table 7.6. Results of the generalized linear mixed model 2 on Age_L2Bef11 (Task 2) 54
Table 8. Summary of the generalized linear mixed model 3 (Task 3) 57
Table 8.1. Results of the generalized linear mixed model 3 on Group HL (Task3) 58
Table 8.2. Results of the generalized linear mixed model 3 on L2 group (Task3) 59
Table 8.3. Results of the generalized linear mixed model 3 on Pred_English (Task3) 60
Table 8.4. Results of the generalized linear mixed model 3 on Age_Post (Task3) 61
Table 8.5. Results of the generalized linear mixed model 3 on Age_L2Bef11 (Task 3) 63

LIST OF FIGURES

Figure 1. Experiment process 27
Figure 2. Biographical and demographic question 28
Figure 3. Task 1: Grammatical judgment task.....29
Figure 4. Task 2: Multiple choice task.....30
Figure 5. Task 3: Constructing *ba* sentences task.....32
Figure 6. Participants' state 33
Figure 7. Original figures of Task 1.....35
Figure 8. Overall responses by participant groups (Task1) 36
Figure 9. Each group's acceptability rate by sentence type (Task1) 37
Figure 10. Overall responses by participant groups (Task 2) 42
Figure 11. Overall responses by participant groups (Task3) 56

LIST OF ABBREVIATIONS

A=Acceptable

Age L2= Acquiring the second language

Adj= Adjective

Age_L2Aft11= After 11

AO= Age of onset

Age_L2Bef11= Before 11

CN= Chinese native speakers

CNHL= Chinese native speakers and Heritage language speakers

DOM= Differential object marking

DC= Direction complement

EFL= English as a foreign language

ELLs= ELLs

L1= First language

GJT= Grammatical Judgement task

HSK= *Hanyu Shuiping Kaoshi*

HLs= Heritage language speaker

HL= Heritage languages

NEE= National Entrance Examination

NA= Not acceptable

NS= Not sure

NP= Noun phrase

PFV= Perfect Aspect of Verbs

Pred L= Predominant language

PC= Preposition complement

QC= Quantity complement

RC= Result complement

L2= Second language

SLA= Second language acquisition

L2 learners= Second language learners

STT= Sentence translation task

SFP= Sentence-final particle

SOV= Subject object verb

SVO= Subject verb object

TEM4= Test for English Majors Grade Four

CHAPTER 1 INTRODUCTION

The thesis aims to study the difference in usage and knowledge of *ba* sentences in Mandarin Chinese between heritage (HL) and second language (L2) speakers of Mandarin Chinese. The *ba* construction is a common and widely used construction that introduces a change in focus on the object and a word order change from regular SVO to SOV in the *ba* construction. As Polinsky (2018) notes, the study of heritage speakers is a fairly recent focus of research in linguistics. It has been debated how the L1 and the L2 of such speakers differ from L1 speakers who use their L1 predominantly, and how their L2 compares to other L2 speakers. This study aims to shed a light on some of the aspects of heritage language use in a situation where the L1 is a minority language.

1.1 Heritage languages

Heritage Languages (HL) are languages associated with the ethnocultural heritage of minority language populations, which are often devalued for many historical and political reasons (Montrul, 2008). The term heritage language has been in use, particularly in Canada, since the early 1970s; it has been a significant topic in U.S. research, policy, and practice only in the 1990s (Brinton et al., 2017).

Fishman (2014) divides heritage languages into two categories in the North American context. 1. Immigrant heritage language refers to any language spoken by immigrants after arriving in the United States, such as Chinese spoken by Chinese Americans. 2. Aboriginal heritage language refers to the languages spoken by the Indigenous peoples of North America. Heritage languages are most commonly spoken in specialized settings such as families or communities. In less American-centric terms, a heritage language is a home language that family groups and linguistic minorities predominantly speak in an immigrant or indigenous context and is the L1 compared to a majority L2. (Polinsky & Kagan, 2007).

1.2 Heritage language speakers

The term Heritage Language speaker (HLs) was first introduced in the mid-1970s but has gained ground in the acquisition literature since the 1990s (Cummins, 2005). Heritage language speakers are exposed to minority languages from birth (Polinsky & Kagan, 2007) but have later exposure to a majority language. They, therefore, live in a multilingual environment. According to Campbell & Peyton (1998), HL speakers speak their native language at home or are foreign-born (p.38). HLs may speak the mother language at home with their parents and grandparents. At school or other places, they speak the dominant language.

HLs are viewed in this study as a subset of bilinguals, namely, unbalanced bilinguals for whom the stronger language is often the dominant language of their society and whose home language, the one referred to as heritage language, typically corresponds to the minority language of their society (Polinsky & Scontras, 2020). Native speakers as viewed in this study are seen as speakers who use their L1 predominantly and live in an environment where their L1 is the dominant language in society. While native speakers may provide some of the input for 1.5 generation immigrants, the input thus differs for this generation, since it is a bilingual environment where the L1 input is often more limited to the home environment. At the same time, a direct comparison between heritage speakers and monolinguals is difficult since heritage language input may come from speakers outside the home environment assuming there is a suitable linguistic community for the heritage language. In any case, if we want to assess heritage language attainment, it is particularly important to understand how the heritage language might differ from the input language and how a bilingual child can be exposed to the language successfully. The baseline in this context is the language of first-generation immigrants, who provide vital input to heritage speakers. The baselines may include immigrants from 1.5 generations (Polinsky, 2018).

1.3 Comparison of heritage language speakers, second language learners and native speakers

First, Nygaard (2019) notes that Heritage Language speakers are exposed to their native language, i.e., heritage language, from birth in highly communicative circumstances where auditory input and spoken output predominate. Second Language Learners' (L2 learners) learning has predominantly written input and output, which characterizes typical adult L2 classroom learning. An L2 learner learns a language after having little exposure to it in their home, and almost all exposure to the target language will occur in a formal educational context, such as a school or an online course (Nygaard, 2019). Montrul (2012) mentions that when L2 learners learn the first language at home and later learn a second language, the first language is also often the more robust, dominant, or primary language, while the second language is the secondary language used less frequently. Moreover, Nygaard (2019) points out that native speakers learn their first language (L1) from their parents. They also speak the first language(s) of the nation where they reside or have resided for most of their lives. Work, education, and hobbies such as music, sports, and religion will undoubtedly employ the dominant language. The main difference between L2 learners and heritage speakers is the dominant language environment, which is the L2 for heritage speakers while it is the L1 for L2

learners. The L2 being the dominant language in society and possibly in the input may influence proficiency in the L1 to varying degrees.

Table 1. Comparison of the heritage language speakers, second language learners and native speakers

	Heritage speakers	Second language learners	Native speakers
Dominance	Second language	First language	First language
Proficiency and Fluency	1. Their first language levels are beginners to advanced level; fewer are native-like. 2. Most of them are more fluent in the second language than the first language.	1. Their second language are beginners to advanced level; fewer are native-like. 2. The first language has more fluency than the second language.	1. Native-like fluency in the first language. 2. The first language has more fluency than the second language if they speak one.
Age of acquisition	Infants	Most over 3 years old	Infants
Learning environment	Home or school	School or other ways	Home and school

Some studies show similarities and variations in language acquisition across these three groups. As an example, in L2 English, the learning of negation often starts with external negation ("No you are playing here"), followed by internal negation ("You no playing here" or "You not playing here"). A third step is a negative attachment to modal verbs, as in "You can't play here." Negative attachment to auxiliary verbs is found in the last stages of English negation learning, as in "You don't play here" or "You didn't play here" (Ellis & Ellis, 1994), like example such orders are involved in both L1 and L2 acquisition processes. Research in both L1 and L2 acquisition has shown that language acquisition follows particular orders and stages as it proceeds, therefore, this order must eventually be included in HL acquisition procedures (Lynch, 2003).

In Spanish, for example, the verb system, present indicative, past indicative, and periphrastic future forms are the most common in ordinary conversation and the earliest learned by youngsters (Lynch, 2003). Less common forms such as subjunctive, conditional, and perfect tenses do not ultimately attain adult-like standards in monolingual Spanish-speaking children's conversation until the age of 12 (Blake, 1983). As a result, it is not unexpected that these are the verb forms with which Spanish L2 and HL learners have the most difficulty (Lynch, 2003).

CHAPTER 2 LITERATURE REVIEW

The overview of the literature includes five parts: a discussion of the differences between *ba* sentences and non-*ba* sentences, a discussion of the basic structure of *ba* sentences, a discussion of the acquisition of *ba* sentences, including L1 and L2 acquisition, and a discussion of the age of language acquisition and language transfer.

2.1 The difference between *ba* and non-*ba* sentences

Liu & Zhao (2005) analyse the differences between *ba* sentences and Chinese SVO sentences from syntactic, semantic, and pragmatic perspectives. As already noted, the structural order of the two sentence types is different. The *ba* sentence has *ba* (8a) and SOV order, while the non-*ba* sentence has SVO order (8b). Semantically, the *ba* sentence highlights the influence of V on NP2 through *ba*, and the *ba* sentence cannot be followed by a negative statement (1). This latter property further supports the sense that *ba* constructions are focused on the result state of the object or the completion of the event, which thus cannot be cancelled. Thus, while (1) has correct word order, it is semantically highly problematic.

On the other hand, the SVO sentence reduces the influence of V on NP2 and focuses on the action performed by NP1. Thus, in the SVO (2), the cancellation by indicating unsuccessful 'fooling' is still acceptable since the SVO construction does not require an end result of the event. In other words, only the *ba* sentence indicates a successfully fooled person.

1. *他把我骗了, 可我没有上当。

ta	*ba*	wo	pian	le,	ke	wo	meiyou	shangdang.
He	*ba*	I	lied	PFV,	but	I	not	fool.

'He fooled me, but I didn't fall for it.'

(Liu & Zhao, 2005: p111)

2. 他骗了我，可我没有上当。

ta	pian	le	wo,	ke	wo	meiyou	shangdang.
He	lied	PFV	me,	but	I	not	fool.

'He fooled me, but I didn't fall for it.'

(Liu & Zhao, 2005: p111)

Furthermore, pragmatically, the two patterns have different information to present. In the non-*ba* sentence, it focuses on NP1—what did NP1 do? It emphasizes *ta* '*he'* (3). He ate food and was full. The *ba* sentence (4) focuses on the state of the food (NP2). He ate the food, and there is no more food.

3. 他吃饱了饭。

ta	chi	bao	le	fan.
He	eat	full	PFV	food.

‘He is full.’

4. 他把饭吃了。

ta	*ba*	fan	chi	le.
He	*ba*	food	eat	SFP.

‘He ate the food.’

2.2 The properties of the Chinese *ba* construction

In Chinese, a *ba* sentence is a type of active sentence. Lv (2009) notes that it is used when focusing on the object to alter its state, place, or condition is conveyed by the verb. This change is also known as "disposal". The object is placed before the verb in the disposition style, representing a sentence imposing an action on the object. Subject + *ba* + object + verb is the fundamental structure (5). In (5), clothes are the object of washing, and the state of clothes is changed by washing with verbs.

5. 他把衣服戏里。

ta	*ba*	yifu	xi	le.
He	*ba*	clothes	washed	PFV.

‘He washed the clothes.’

The *ba* construction has SOV order Subject +*ba* + Object+ Verb + Complements (6a) (Zhu, 1982). The word order of the *ba* construction thus differs from the regular SVO word order (6b) of Chinese. Semantically, the *ba* sentence (6a) emphasizes the state of the object *boli ‘the glass’*, together with the result complement. The final state of the glass changes to a lot of broken pieces when this action (*da ‘broke’*) is applied. The SVO order (6b) instead focuses on the subject's action. SVO sentences are clearly subject-focused, whereas *ba* sentences are object-focused. It is similar (although not identical) to the difference between simple past and present perfect in English, where the latter focuses on the result state of the object while the former focuses on the event itself.

6a. 他把玻璃打碎了。

ta	*ba*	boli	da	sui	le.
He	*ba*	glass	broke	result complement	SFP[1] .

‘He broke the glass.’

6b. 他打碎了玻璃。

ta	da	sui	le	boli.
He	broken	result complement	PFV	glass.

‘He broke the glass.’

2.2.1 Properties of negation in *ba* sentences

The respective orders are retained when a sentence is negated (Lv, 2009). In a regular sentence where the action is negated, the order is Subject + negation + verb + result complement + Object. In *ba* sentences, the order is Subject + negative + *ba* + Object +Verb+ Complements (7b). Negation cannot follow *ba* (8a). It is not possible to place the negation before the verb in a *ba* sentence. Semantically, the *ba* sentence (6b) focuses on the state of the object boli 'the glass', which means that it did not break in its final state. The SVO order (6a) focuses on the subject's action, indicating that the subject did not take the action.

7a. 他没打碎玻璃。

ta	mei	da	sui	boli.
He	not	break	result complement	glass.

He did not break the glass.

7b. 他没有把玻璃打碎。

ta	meiyou	*ba*	boli	da	sui.
He	not	*ba*	glass	break	result complement.

‘He did not break the glass.’

8a. *我把信不保存了。

wo	*ba*	xin	bu	baocun	le.
I	*ba*	letter	not	keep	SFP.

‘I could not keep a letter.’

8b. 我没把信保存了。

wo	mei	*ba*	xing	baocun	le.
I	not	*ba*	letter	keep	SFP.

‘I could not keep a letter.’

[1] *le* is usually available in two cases. One place is at the end of the sentence as a Sentence-final particle (SFP), or the other place is in the middle of the sentence as a Perfect Aspect of Verbs (PFV). In the sentence, "le" is placed after the verb, which usually has an object or other component placed before the object as the definite article, indicating the completion of an action or a condition (Liu, 2020).

2.2.2 The verbs in the *ba* sentences

The *ba* construction is an active sentence in which *ba* is used before the predicate verb to introduce the subject and dispose of the object where the focus is on the result or change to the object. Therefore, in the *ba* construction, there are some limitations what kind of verb can be used. Liu & Zhao (2006) point out that the verbs in the *ba sentence* denote some change of state and usually, denote an event with an inherent endpoint marking the result's state. Verbs that lack endpoints or changes of state are not used in *ba* constructions. These include relational verbs such as *bianchen 'become'* and *xiang 'seem.'*, psychological verbs of emotional states, such as *ai 'love,' buxihuan 'dislike,' xihuan 'like,'* and directional verbs such as *shang 'up,' xia 'down'*.

2.2.3 Complements in *ba* sentences

Complements are a very common element in Chinese sentences. The term complement is used for any modifier element following the predicate in Chinese linguistics (see Table 2 below (Fu, 2013)). Complements are used after a verb or an adjective to modify the degree of an action, the nature of a thing, or the reached degree of a state (9b and 10b) (Zheng, 2009). *Ba* sentences also have complementary elements: like result complementary (9a and 10a). The result complement in (10) denotes the final state of the glass being broken.

Table 2. Five types complement in *ba* sentences

5 types of complements	*ba* sentence structure with complement
Result complement (RC)	NP1+ *ba* +NP2+V+ result complement
Direction complement (DC)	NP1+ *ba* +NP2+V+ direction complement
Quantity complement (QC)	NP1+ *ba* +NP2+V+ quantity complement
Preposition complement (PC)	NP1+ *ba* +NP2+ V + zai+ NP3 (locative) NP1+ *ba* +NP2+ V+ gei+ NP3 (goal) NP1+*ba*+NP2+ V+dao+ NP3(location) NP1+*ba*+NP2+V+ cheng/zuo/wei+ NP3 (patient)
de complement (Degree complement)	NP1+ *ba* +NP2+V+ *de* complement

9a. 我把他叫醒了。
wo *ba* ta jiao xing le.
I *ba* him wake up [result complement] SFP.
'I woke him up.'

9b. 我叫醒了他。

wo	jiao	xing	le	ta.
I	kill	up [result complement]	PFV	him.

‘I woke him up.’

10. Result complement (RC)
NP1+ *ba* +NP2+ V + result complement

10a. 他把玻璃打碎了。

ta	*ba*	boli	da	sui	le.
He	*ba*	glass	broke	[RC]	SFP.

‘He broke the glass.’

10b. 他打碎了玻璃。

ta	da	sui	le	boli.
He	broke	[RC]	PFV	glass.

‘He broke the glass.’

Commonly, the *ba* sentence can have five types of complements (Fu, 2013).

The direction complements (11a), introduced by *na ‘bring’*, illustrates the clothes moving towards the speaker's direction. If there is no direction complement, *ba* would be ungrammatical (11b). Using a direction complement without *ba* (11c) has a different meaning compared to (11a) and focuses on the clothes instead of the person bringing them in (11a).

11. Direction complement (DC)
NP1+ *ba* +NP2+ V + direction complement.

11a. 你把衣服拿进来。

ni	*ba*	yifu	na	**jinlai**.
You	*ba*	clothes	bring	in [DC].

‘You bring your clothes in.’

(Fu, 2013: p7)

11b. *你把衣服拿。

ni	*ba*	yifu	na.
You	*ba*	clothes	bring.

‘You bring your clothes in.’

11c. 你拿衣服进来。

ni	na	yifu	jinlai
You	bring	clothes	in [DC]

‘You bring your clothes in.’

The quantity complement (12a) indicates how many times or how long an event occurs. Without the quantity complement, *ba* would be semantically incomplete and ungrammatical (12c).

12. Quantity complement (QC)
NP1+ *ba* +NP2+ V + quantity complement.

12a. 我把这本书读了三遍。

wo	*ba*	zheben	shu	du	le	**sanbian**.
I	*ba*	this	book	read	PFV	three times [QC].

'I read this book three times.'

(Fu, 2013: p7)

12b. 我读了三遍这本书。

wo	du	le	**sanbian**	zhe ben	shu.
I	read	PFV	three times [QC]	this	book.

'I read this book three times.'

12c. *我把这本书读。

wo	*ba*	zheben	shu	du.
I	*ba*	this	book	read.

'I read this book.'

The complements of the preposition-NP3 (Noun Phrase 3) have four categories. NP3 represents the location where the event takes place (13a) and completes. *Fang 'put'* this action happens on the table. If there is no preposition complement, then *ba* would be ungrammatical (13b).

13. Preposition complement (PC)

NP1+ *ba* +NP2+ V + zai+ NP3 (locative)

13a. 他把一本书放在桌子上。

ta	*ba*	yiben	shu	fang	**zai**	**zhuozi**	shang.
He	*ba*	a	book	put	on [PC]	table	upside.

'He put the book on top of the table.'

(Fu, 2013: p7)

13b. *他把这本书放。

ta	*ba*	yiben	shu	fang.
He	*ba*	a	book	put.

'He put the book.'

In (14a), NP3 *wo* is the goal the event moves toward. If there is no prepositional complement, *ba* would be ungrammatical (14b).

14. NP1+ *ba* +NP2+ V + gei+ NP3 (goal)

14a. 你把那本书送给我。

ni	*ba*	naben	shu	song	**gei**	**wo**.
You	*ba*	that	book	give	to	me.

'You give that book to me.'

(Fu, 2013: p7)

14b. *你把书送。

ni	*ba*	shu	song.
You	*ba*	book	give.

'You give that book to me.'

The meaning of (15a) is that the direction of the event has changed. The position of the table has been changed from the inside to the outside. If there is no prepositional complement, *ba* would be ungrammatical (15b). In addition, using a preposition complement without *ba* is also ungrammatical (15c).

15. NP1+*ba*+NP2+V +dao+ NP3(location)

15a. 他把桌子搬到教室外面了。

ta	*ba*	zhuozi	ban	**dao**	**jiaoshi**	waimian	**le**.
He	*ba*	table	move	of	classroom	out	SFP.

'He moved the table out of the classroom'.

(Fu, 2013: p7)

15b. *他把桌子搬。

ta	*ba*	zhuozi	ban.
He	*ba*	table	move.

'He moved the table.'

15c. *他搬到教室外面了桌子。

ta	ban	**dao**	**jiaoshi**	waimian	le	zhuozi.
He	move	of	classroom	out	PFV	table.

'He moved the table out of the classroom.'

In (16), NP3 is the patient, which is something or somebody that undergoes a change specifically targeted by the verb. If there is no preposition complement, then *ba* would be ungrammatical (16b). Moreover, using a preposition complement without *ba* would be ungrammatical such as in (16c, 16d) where the prepositional phrase complement occurs in different order without *ba* present. This shows again that using the result *mianfen 'flour'* requires the *ba* construction.

16. NP1+*ba*+NP2+V + cheng/zuo/wei+ NP3 (patient)

16a. 他把小麦磨成面粉。

ta	*ba*	xiaomai	mo	**cheng**	**mianfen**.
He	*ba*	wheat	grind	as	flour.

'He grinds wheat into flour .'

16b. *他把小麦磨。

ta	*ba*	xiaomai	mo.
He	*ba*	wheat	grind.

'He grinds wheat into flour.'

16c. *他磨成小麦面粉。

ta	mo	**cheng**	xiaomai	mianfen.
He	grind	as	wheat	flour.

'He grinds wheat into flour.'

16d. *他磨成面粉小麦。

ta	mo	**cheng**	mianfen	xiaomai.
He	grind	as	flour	wheat.

'He grinds wheat into flour.'

The complement *de* (17a) is a degree modifier for the predicate (Fu, 2013). If there is no *de* complement, *ba* would be ungrammatical (17b). Furthermore, using a *de* complement without *ba* would be ungrammatical (17c, 17d).

17. *de* complement (Degree complement)

17a. 他把教室打扫得干干净净。

ta	*ba*	jiaoshi	dasao	**de**	**ganganjingjing**.
He	*ba*	classroom	clean	too	completely.

'He cleaned the classroom completely.'

(Fu, 2013: p7)

17b. *他把教室打扫。

ta	*ba*	jiaoshi	dasao.
He	*ba*	jiaoshi	clean.

'He cleans the classroom.'

17c. *他打扫得干干净净教室。

ta	dasao	**de**	**ganganjingjing**	jiaoshi.
He	clean	too	completely	classroom.

'He cleaned the classroom completely.'

17d. *他打扫教室得干干净净。

ta	dasao	jiaoshi	**de**	**ganganjingjing**.
He	clean	classroom	too	completely.

'He cleaned the classroom completely.'

The complements are essential in *ba* constructions indicating the state of the object or providing and endpoint of the event denoted by the predicate. Using these in *ba* sentences is a source of errors in L2 learners of Mandarin Chinese (Fu, 2013). Therefore, the use of complements was tested in this study.

2.3 The acquisition of *ba* sentences

2.3.1 First language acquisition

The *ba* construction plays an important role in Chinese. As Wen (2012) notes: "it (the *ba* construction) is an extremely prominent pattern in Chinese, very commonly used in daily speech." It thus should play a prominent role in language acquisition. Chang & Zheng (2017) investigate the development of the *ba* construction in a longitudinal first language acquisition study following a child from the age of 24 to 35 months, tracking records and collecting the natural corpus of a child (named CY). The researchers recorded the language of CY's conversation with family members during the observation. They found that the child predominantly uses *ba* sentences with experiencer NP2 (18). Moreover, the child tends to use more *ba* sentences with complements than without, accounting for 68.1% of *ba* sentences (19).

18. 把宝宝气坏了。 (With experiencer)
ba baobao qi huai le.
ba baby angry complement SFP.
'Made the baby very angry.'

(Chang & Zheng, 2017: p102)

19. 那个小孩会把我们吃掉的。 (Without complements)
nage xiaohai hui *ba* women chidiaode.
That child could *ba* we eat.
'That kid will eat us.'

(Chang & Zheng, 2017: p103)

From 30 months, the child uses increasingly complex *ba* constructions utilizing the result complement (20, 21). These two complex *ba* constructions are nearly identical to that used by adults. At most, the verb is used differently. Given that adults have a broader vocabulary compared to infants, they are more likely to utilize verbs that are both precise and fitting for the context at hand. As a result, the accuracy and appropriateness of verbs used by adults surpasses those used by infants.

20. 把奶倒地上了。

ba	nai	dao	di	shang	le.
ba	milk	spill	floor	DC	SFP.

'Made the milk to spill on the floor.'

(Chamg & Zheng, 2017: p104)

21. 我没有把你的眼镜摔坏。

wo	meiyou	*ba*	nide	yanjing	suai	huai.
I	not	*ba*	your	glasses	break	RC.

'I did not break your glasses.'

(Chamg & Zheng, 2017: p103)

Chang & Zheng (2017) conclude that children use increasingly sophisticated *ba* phrases as they grow older and accurately utilize accurate *ba* sentences from a young age.

Chinese native speakers usually use simple *ba* sentences in early childhood, beginning at 24th months (18). By the age of 48 months, their *ba* constructions become syntactically complex (Chang & Zheng, 2017).

2.3.2 L2 acquisition of *ba* sentences

In L2 acquisition, the learners' knowledge of the rules of the L1 may substantially influence their acquisition processes in the L2 (Benati, 2013). For English-speaking Chinese learners, the *ba* construction poses a variety of challenges. It necessitates a non-canonical SOV word that does not exist in English and generally necessitates using a post-verbal complement to expound on the result state of the direct object.

Jin (1993) analyses the process of acquiring *ba* sentences by English-speaking Chinese learners, focusing on acquiring a topic-prominent language like Chinese from a subject-prominent language like English. His study comprised 46 people instructed to perform grammatical assessment and production tasks, including translation exercises and speech output based on two cartoon films. The findings suggest that English-speaking learners are very sensitive to the rules of language classification (topic-prominent or subject-prominent) in acquiring *ba* sentences. They begin by applying the subject prominence to the analysis of *ba* sentences, ignoring the focused effect on the object in *ba* sentences. The second language learner's process of acquiring the *ba* sentence from the prominent subject to the prominent theme in *ba* sentences shows that language transfer can be overcome only gradually.

Wen (2012) also investigates how English speakers learning Chinese acquire the *ba* construction. The study involved 90 English-speaking Chinese learners at elementary, intermediate, and advanced levels. Their competency level was determined based on the participants' instructional level and the instructors' ratings. Seven questions in the experiment were

built on six pictures. Each image only had one question, except for picture 2, which included two questions. The questions were to be answered in writing by the participants.

> Please answer the following questions in complete sentences based on the given narratives and the pictures below. You may write in character or pinyin. Vocabularies in the parentheses are provided for your convenience. (The questions were originally written in Chinese. They were translated for the readers' convenience.)
>
> 1. Mrs. Li wants to go to JinYuan Store, but she cannot drive. What did Mr. Li do just then? (Wen, 2012: p276)
> 2. It is going to rain. Ms. and Mrs. Li are afraid that their plants and clothes are going to be wet. What is Mr. Li going to do? and Mrs. Li? (Wen, 2012: p276)
> 3. Anna went to the Great Wall and took lots of pictures. What is Anna doing? (Wen, 2012: p276)

Ninety English-speaking learners of Chinese participated in the study. In answer to seven questions, participants at three competence levels produced 603 clauses. Participants made 8.4% accurate *ba* constructions at the elementary level (according to HSK levels, see table 3 below), 13.8% at the intermediate level, and 27.1% at the advanced level. Even at the advanced level, the participants' portion of *ba* sentence generation is substantially lower than that of native speakers. According to the findings, learners comprehend the purpose of the *ba* structure, as evidenced by their typically right word choices and semantic groups. When given the option, students at the lower levels consistently selected the verbal complement's more simple structures. At the expert level, native-like variants have just recently begun to appear, which included the choice between directional words such as *jin "enter"* and dao *"to,"* omission of the locative particle *li "in,"* and the directional word *lai or qù "come" or "go,"* as demonstrated in.

For example, Chinese sentences, for instance, are SVO, and the locative words often come after the subject and appear before the verb to indicate where the action takes place (Wen, 2012). However, the *ba* construction demands that the locative words be post-verbal (22a). The incorrect placement of the locative words indicates that students overgeneralized the old form, which was the locative occurring before the verb in the SVO order, to the new purpose of the *ba* construction. It also implies that despite their proficiency with the basic form, learners could not have understood that the locative's primary purpose and context require them to be post-verbal. It is possible that form and function are not connected, having the correct function but the wrong form (22b).

22a. 安娜把长城的照片放在信封里。
Anna *ba* changcheng de zhaopian fang zai xinfeng li.
Anna *ba* Great Wall of picture put in envelop inside.
'Anna is placing the Great Wall pictures at /into the envelope.'

(Wen, 2012: p230)

22b. *安娜把长城照片在信封里放。
Anna *ba* changcheng zhaopian zai xinfeng li fang
Anna *ba* Great Wall picture in envelop inside put.
'Anna is placing the Great Wall pictures at /into the envelope.'

(Wen, 2012: p230)

2.3.3 Errors in the acquisition of the complement

The *ba* sentence is the basic sentence that L2 Chinese learners should master at the elementary stage (HSK 2) (Chinese Proficiency Test (HSK), n.d.). The Ministry of Education sets the exam of *Hanyu Shuiping Kaoshi (*HSK), the standardized Chinese test. It has six levels and is administered by the Confucius Institute Headquarters (*Hanban*), the Office of Chinese Language Council International.

Table 3. HSK levels

Level	Oral Level	Vocabulary	Description
HSK 1	HSK (Elementary)	150	Learners can understand and use some simple Chinese characters and sentences to communicate, and prepares to continue their Chinese studies
HSK 2		300	Elementary learners can use Chinese in a simple and direct manner, applying it in a basic fashion in their daily lives
HSK 3	HSK (Intermediate)	600	Elementary-intermediate learners can use Chinese to serve the demands of their personal lives, studies, and work and are capable of completing most of the communicative tasks they experience during their Chinese tour
HSK 4		1200	Intermediate learners can discuss a relatively wide range of topics in Chinese and are capable of communicating with Chinese speakers at a high standard
HSK 5	HSK (Advanced)	2500	Learners can read Chinese newspapers and magazines, watch Chinese films, and are capable of writing and delivering a lengthy speech in Chinese
HSK 6		Over 5000	Learners can easily understand any information communicated in Chinese and are capable of smoothly expressing themselves in written or oral form

Fu (2013) notes that L2 Chinese learners err when acquiring the complements of *ba* sentences. She analyses *ba* sentences from the data of HSK tests, listing several common errors in using *ba* sentences among L2 learners, such as the error of quantity complements (23), the error of direction complements (24), and the error of missing preposition complements (25).

The quantity complement (23a) relates to the time required by the action. In Chinese, *kan 'watch'* is not a durational verb, which could not collocate with *yixiaoshi 'one hour'*. However, *du 'read'* is a durational verb that could collocate with *yixiaoshi 'one hour'*.

23a. *他把文章看了一小时。

ta	*ba*	wenzhang	kan	le	yixiaoshi.
He	*ba*	article	watch	PFV	one hour.

'He reads the article one hour.'

(Fu, 2013: p35)

23b. 他把文章读了一小时。

ta	*ba*	wenzhang	du	le	yixiaoshi.
He	*ba*	article	read	PFV	one hour.

'He read the article one hour.'

In (24), *changqilai 'sing'* contains the direction complement *qilai* and has an abstract meaning, which is not allowed to appear in the *ba* sentence. The fixed structure is "NP1+*ba*+NP2+V+ *cheng/zuo/wei*+ NP3" (24c). The L2 speaker constructs this sentence missing the verb cheng*/zuo/wei 'do'.* The reason is "*kan/dang*+ *cheng/zuo/wei*" called the verb bounding (it indicates that the event ends), which could not separate two parts "*kan/dang," "cheng/zuo/wei*" to use alone in *ba* sentences. As language changes, the verbs *cheng 'become'* and *zuo 'make,'* and the former verb *dang 'to be,'* come together to form bounding verbs. Despite having the same meaning, they cannot be split up and employed as two different verbs. Fu said L2 speakers often ignore the verb *cheng/zuo/wei* (24b), which leads to missing preposition complements.

24a. *我们大家把这首歌唱起来。

womendajia	*ba*	zheshouge	chang	qilai.
We	*ba*	this song	sing	[direction complement].

'We sing this song.'

(Fu, 2013: p36)

24b. *那天开始我把书朋友。

natian	kaishi	wo	*ba*	shu	pengyou.
That day	beginning,	I	*ba*	book	friend.

'From that day, I made a book to be my friends.'

(Fu, 2013: p37)

24c. 那天开始我把书当成朋友。

natian	kaishi	wo	*ba*	shu	**dang cheng**	pengyou.
That day	beginning,	I	*ba*	book	**make to be**	friend.

'From that day, I made a book to be my friends.'

(Fu, 2013: p36)

For L2 learners, these omissions occur regularly during the acquisition process (Fu, 2013). One of the goals of this thesis is to see what kinds of complement mistakes L2 and heritage speakers perform and if they behave similarly in that respect.

2.4 Difference between native speakers and HL speakers in using *ba* sentences

Polinsky, Zhang, & Gallo (2010) study the differences between native and heritage speakers of Mandarin when using *ba* structures in controlled production. Polinsky et al. (2010) point out that native speakers use the *ba* construction with complex objects and preposition complements that denote locations (25). *jiaoshang you lingxingde 'corner has a diamond'* modifies *xiao zhengfangxing 'small square'* and speakers locate this square in Beijing. Beijing is the location where the action takes place.

25. 把角上有菱形的小正方形放到北京。

ba	jiaoshang	you	lingxingde	xiao	zhengfangxing	fangdao	Beijing.
ba	corner	has	diamond	mall	square	put	Beijing.

'Put a small square that has a diamond at its corner in Beijing.'

(Polinsky et al., 2010)

However, heritage speakers do not construct complex *ba* such as (25). They instead use multiple short utterances (26,27,28) with SVO word order to express the meaning of a *ba* sentence such as (25). HL speakers would use short non-*ba* sentences to express where and what happens (26)— *to Beijing put a square*. And then describe the appearance of this object (26,27,28)— *square's corner has a diamond, and it is small*. Polinsky, Zhang, & Gallo (2010) suggest that heritage speakers preferring (26,27 and 28), instead of (25), shows an influence of the dominant language English. The meaning of the sentence (25) equals the meaning of the short sentences (26), (27), and (28) and the word order is mostly acceptable in English. Thus, the influence of English is shown in the avoidance of *ba* sentences.

26. 在北京放一个正方形。

zai	Beijign	fang	yige	zhengfangxing.
To	Beijing	put	a	square.

'To Beijing put a square.'

(Polinsky et al., 2010)

27. 正方形角上有一个菱形。

zhengfangxing	jiaoshao	you	yige	lingxing.
Square's	corner	has	a	diamond.

'Square's corner has a diamond.'

(Polinsky et al., 2010)

28. 是一个小的。
shi yige xiaode.
Is a small one.
'Is a small one.'

(Polinsky et al., 2010)

2.5 Language transfer

The term "transfer" is applied in linguistic research to refer to the influence of one language on the learning of another language (Richards & Schmidt, 2010). Ellis & Ellis (1994) stated that transfer is a general theory about foreign language acquisition because the role of the mother tongue is difficult to separate from other factors that affect the development of foreign languages. The L1 significantly influences second language acquisition (SLA); L2 learners will use properties of their L1 to learn the L2 grammar. In SLA, language transfer refers to the urge to employ L1 properties in pronunciation, morphology, and syntax. Saville-Troike & Barto (2006) pointed out that if the rules of the L1 are consistent with the rules in the L2, transfer is called *positive transfer*. If the language rules of the L1 do not conform to the rules of the L2, transfer is called *negative transfer*. Saville-Troike & Barto (2016), and Bardovi-Harlig & Sprouse (2017) explain that positive transfer is an L1 structure or rule used in an L2 utterance and is appropriate in the L2. Negative transfer or interference occurs when an L1 structure or rule is used in an L2 utterance and s inappropriate and considered an error. In syntax, this may mean that the L1 order is transferred to the L2 in some instances.

Montrul (2010) questioned that L1 influence in adult L2 learners is similar to the L2 effect in the L1 of heritage speakers. To answer this question, she examined 72 L2 learners and 67 Spanish heritage speakers' knowledge of Spanish clitics, clitic left dislocations, and differential object marking (DOM). These syntactic features do not exist in the contact language, English. Understanding clitics and other object expression elements in Spanish was tested using two primary tasks. The first task was an oral story task to encourage the use of clitics in semi-spontaneous production. The second assignment consisted of another task of acceptability judgements. Another task to judge acceptability was the second assignment. Sentences with dislocations, which did not naturally occur in the oral production task, were included in the acceptability test. To the results, neither native nor heritage speakers gave these sentence ratings as high as those given to the native speaker control group. However, heritage speakers performed better than L2 learners and were more native-like, regardless of proficiency level. These results show that L1 limitations still affect L2 learners. The oral production test demonstrated that heritage speakers fail to indicate animate direct objects and considered

these sentences to be grammatical in the acceptability assessment task. All skill levels of the heritage speakers recognized Spanish formulations with an ungrammatical double object. Although the L2 learners were statistically more correct than the heritage speakers in the acceptability assessment test, the L2 groups still made mistakes with DOM and double objects. The judgments of the CN group are compared to the judgements of the other groups as a baseline. This does not mean that those judgments are considered "correct", only most likely to be in line with most monolingual Mandarin speakers. In contrast, the L2 learners made more DOM mistakes than the heritage speakers throughout the oral production assignment. Montrul (2010) also demonstrates that L2 learners outperform heritage speakers in oral activities, whereas heritage speakers typically exceed L2 learners in written tasks.

2.5.1 Forward and backward transfer

Wang (2014) argues that transfer is bidirectional, meaning that the L1 and the L2 may influence each other. L1 to L2 transfer is considered a forward transfer, while L2 to L1 transfer is considered a backward transfer. Wang examined the influence of the L2 on the L1 by investigating the effect of knowledge of English causal clauses on the use of Chinese causal clauses. There were two groups of participants, a group of 40 English majors with English as L2 and 30 Chinese native monolingual speakers. They had two tasks. The first task asked them to connect twenty independent sentence pairs, of which twelve were to be connected by causal connectives while the remaining eight served as interfering pairings. The second task was to create a short story telling what happened to a motorcycle rider. They were instructed to use at least three causal phrases for the composition.

Additionally, they selected 20 individuals for interviews to learn more about their thought processes throughout the experiment to further support the study's findings. The English proficiency levels of the participants, as determined by their TEM4 (Test for English Majors Grade Four) scores, were divided into three categories: the primary level (L1), the intermediate level (L2), and the advanced level (L3). According to the study's findings, the intermediate-level respondents preferred to transfer the structure of their second language to their first. Backward transfer happens in both the syntax task and the discourse task. For example, some subjects tended to use one *yinwei "because, since"* or *suoyi "so, therefore"* rather than two *yinwei...suoyi "because.....so....."* (English does not allow using two connectives, although Chinese can.) to connect the two clauses.

Additionally, many participants believed that in Chinese, placing the adverbial phrase after the main sentence focused attention on the content. Although primary level students'

second language ability was lower than average, it is doubtful that they will be able to transfer their second language skills to their mother tongue since they do not have access to sufficient second language resources. The advanced level participants have greater second language skill levels and are aware of how the information sequencing of the causative phrase differs between their mother tongue and the second language. Therefore, individuals can distinguish between the structures of their L1 and their L2 and apply them appropriately.

Belfihadj (1999) studied features of interference of L1 on L2 and what their effects are on the syntactic structure of a written task of a second language learner. There were four participants in the study a Spanish-speaking female (Bianca), a Vietnamese-speaking female (Cath), a Cambodian-speaking female (Sabi), and an Italian-speaking male (Mato). Two sets of sequential pictures were given to them, and they were asked to write a story beginning with the first picture and ending with the last picture. They wrote individually without group interaction initially; after an individual attempt, they could interact with each other. They wrote in a second language (English) and then wrote the same story a second time in their native language. After that, they were asked to write a story with a second set of pictures in English and their L1. After the writing tasks, they were asked to explain why they used a specific structure in L1 and L2 in an individual interview. The four learners have errors in their L1 and L2 texts, which can be found by analyzing the results. When a mistake is made in L2, it shows a lack of understanding of L2, and the learners use the L1 form in L2. For instance, all four students made punctuation mistakes. Due to the absence of this structure in their L1, Mato and Bianca did not employ the repeating pronoun. In her L2 essays, Bianca employed subject pronouns correctly. The learners used their structures to help them with their L2 texts, indicating a direct interference between L1 and L2. Learners use the L2 more effectively when their L1 and L2 are similar; otherwise, some difficulties may arise.

Cao (2016) study whether the Chinese passive voice (*bei* structure), similar to the English passive voice, is a backward transfer from English to Chinese. In this study, 104 college students were included. English language learners (ELLs) are asked to complete the questionnaires during their first year. The National Entrance Examination allowed these pupils admission to the school (NEE). Throughout middle and high school, they took at least five English lessons every week as one of their required subjects. According to their NEE English scores, Level 1 participants' English scores varied from 100 to 114, Level 2 participants' scores ranged from 116 to 124, and Level 3 participants' scores ranged from 126 to 133. The questionnaire has two tasks: a sentence translation task and a discourse task, a writing test based on the supplied visuals. Participants in the sentence translation task (STT)

should translate sentences into Chinese. As part of their discourse task, the EFL students are expected to describe the event in the following six consecutive pictures in between 100 and 150 words. To explain what has happened to the motorcyclist in each photo, participants are instructed to use at least four bei structures in their discourse-level narration. The data showed that most translations of Chinese sentences had errors different from those in the originals. For example, (1) using the passive voice in the sentence where the passive voice is considered improper: *The house is being built. *房子正在被建设. The window needs to be repaired. *窗子需要被修理.* (2) Using incorrect time adverbs in the translation. *The house is being built. *房子盖好了*. (3) Using incorrect language patterns in the translation. *The violin was made by my father. *父亲创造了小提琴.* Cao (2016) finds that English Level 2 learners have a negative L2 impact their performance in the Chinese STT because they employ fewer non-*Bei* structures than Level 1 and Level 3 learners. Level 2 English proficiency students utilize fewer L1 non-*Bei* structures in their STT than Level 1 and Level 3 students. The Chinese STT underutilizes their L1 non-*Bei* structures while misusing *Bei* structures that resemble English. Cao independently verified that backward transmission took place in their L1 environment.

2.6 Age

Age has often been shown to be one of the essential factors influencing SLA in general. Snow & Hoefnagel-Höhle (1978) provide evidence that most children are eventually more effective than adults in L2 acquisition (SLA), albeit they are not necessarily faster. Adults appear to advance more quickly than children in the early stages of learning, yet children eventually outperform adults and adolescents in proficiency (Bialystok et al., 1982; Hu, 2016; Krashen et al., 1979).

On the other hand, Patkowski (1980) investigated whether second language learners who began learning a second language before 15 might obtain greater syntactic competency in the target language (English) than adult learners. The control subjects were fifteen native-born Americans of similar backgrounds. Two researchers evaluated the English syntactic proficiency of 67 highly educated immigrants who had all lived in the United States for at least five years. The independent variables employed in this research were the following.

(a) The age at which second language learning started. Which was the participants' age when they first arrived in the United States,

(b) Years spent there, which served as a practice variable,

(c) Informal exposure to English, a more sophisticated practice variable that was calculated by balancing the number of years spent in the US with the subject's self-reported language use patterns.

(d) Informal exposure to English, a more sophisticated practice variable calculated by balancing the number of years spent in the US with the subject's self-reported language use patterns; A questionnaire was used to acquire information on these characteristics.

Patkowski (1980) found that the subjects had advanced degrees, were still in school, or had professional jobs. In these conditions, it is reasonable to assume that everyone was driven to learn English, yet the only variable significantly linked with the amount of syntactic proficiency obtained by learners was the age at which English learning started. The relationship between practice and instructional factors and the dependent variable was either weak or non-existent. Therefore, the findings seemed to strongly support the theory that learning a second language is limited as people age.

Granena & Long (2012) argued that for pronunciation, nativelike performance is most likely for individuals who begin learning between the ages of 0 and 6. It is still conceivable but less likely between 6 and 12 and impossible after that. Nativelike morphology and syntax are most likely for an age of acquisition between 0 and 6 but exceedingly unlikely beyond the mid-teens. Participants were 12 native Spanish speakers and 65 Chinese language learners. The participants took a series of computer-based examinations testing final proficiency in L2 phonology, lexical and collocational skills, morphology, and syntax. The exams were administered in various random orders to every participant. In the Phonology test, participants were asked to read aloud a three-line. Every participant received their examinations in different, arbitrary sequences. Participants had to read a three-line passage out loud for the phonology exam. Five tasks were used to assess morphology and syntax. The first test was an aural GJT with 144 items focused on seven target structures: gender agreement, object clitics, prepositions por/para, aspectual contrasts, unaccusative and unergative verbs, the subjunctive, and ser/estar. The second one utilizes an auditory modality that requires the online processing of stimuli as a receptive measure, including the automatic application of L2 information. The proportion of error-free clauses was then determined via a picture-guided narrative, and two word-order preference tests measuring discourse-based word order in brief communicative exchanges and basic word order in sentences were then presented. Last, participants had to categorize the gender of uncommon (sometimes known as "zero frequency") Spanish words. Results for three learner groups, 3–6, 7–15, and 16-29 years, determined by the age of onset (AO), revealed the windows of opportunity for learning L2 phonology, lexis, and collocation,

and morphosyntax close in that order. With increased AO connected to sensitive times, all three age functions showed discontinuities in the rate of decrease. In the AO 16-29 group, there were significant connections between language aptitude and pronunciation scores and between language aptitude and lexis and collocation scores. Granena & Long (2012) mentioned that the age at which learning begins affects both the initial pace of acquisition and the eventual degree of accomplishment. According to Granena & Long (2012), late learners receive the same quality and quantity of information as early learners but do not apply it in the same way when acquiring native-like grammar. However, such a view is problematic since, in most cases, early learners have had decades of native input, whereas late learners have had far less. Furthermore, the various sorts of input offered to students may vary in length and quality. As a result, both age and input should be accounted for in SLA.

Generally, some studies focus on L2 acquisition, some on HL speakers, and some research distribution is apparent to discuss when L2 acquires Chinese *ba* sentences. Based on these previous studies, the present study investigates the usage of *ba* sentences between heritage speakers and L2 Chinese learners. Besides, the study's main research question is: are there any relationships between the responses of participants and the age of the speaker, the dominant language environment, and the age of the acquisition of L2 (Chinese for L2 and English for HL)? What is the difference between HL and L2 in using *ba* sentences?

CHAPTER 3 METHODOLOGY

This chapter covers firstly the hypothesis section, which presents several questions (see research questions below). The second section introduces recruitment of participants, experimental procedure, and experimental material, followed by the experimental part. In the final part, I present a brief description of the experimental data after processing.

3.1 Research questions

In the whole study, there is the leading research question guiding the study:

Research question: What is the relationship between the participants' responses and

- the age of the speaker?
- the dominant language environment?
- the age of acquisition of the L2 (Chinese for L2 and English for HL)?

Motivated by the previous claims and research findings on HL and L2 in using *ba* sentences, the following hypotheses were tested:

1. What is the difference between HL and L2 in judgment for each type of *ba* sentence?

It is hypothesized that HL and L2 speakers would be different receptive to each type of *ba* sentence, based on the results found in Polinsky et al. (2010) study and another study by Fu (2013) on L2 speakers. The study of Polinsky et al.(2010) showed that HL speakers have trouble making *ba* construction, and in Fu (2013), the L2 learners have more errors in making *ba* sentence with complements. I, therefore, expect that HL or L2 learners will be less receptive to each type of *ba* sentence. Task 1 syntax grammatical judgment task to test participants' knowledge about *ba* sentence structure.

2. What types of complements do HL or L2 learners use for *ba* sentences?

It is expected that HL and L2 learners will have different results when using certain types of complements with *ba* sentences (Fu, 2013), such as result complements, *de* complements an so on. Chang & Zheng (2017) also found that Chinese children acquire *ba* sentences from the 24th to 35th month and use more *ba* sentences with certain complements. Since HL speakers would have early L1 acquisition but not as much production in later years, they are expected to use *ba* sentences only with certain complements, similar to children around three. Task 2 will test the knowledge about making *ba* sentences participants.

3. What kind of word order errors do HL or L2 speakers exhibit with *ba* sentences (i.e., use SVO order instead of SOV)?

It is thought that HL and L2 speakers might have instances of SVO order with *ba* sentences based on the results in Polinsky et al. (2010). Their study showed that HL speakers tend to avoid *ba* constructions in favour of shorter SVO sentences. Furthermore, Fu (2013) found the same problem with L2 learners. Therefore, due to the influence of English SVO, L2 and HL speakers may have higher rates of word order errors, primarily exhibiting SVO order with *ba*-sentences. Task 3 will test the participants' knowledge of *ba* sentence structure with complements.

Since these studies all focus on HL or L2 as separate groups, I compare both groups' use of *ba* sentences. The major difference of this study is in comparing the influence of the dominant L2 on the L1 for the heritage speakers, which has not been investigated before. In general, the predictions for this study were:

- HL and L2 will use *ba* sentences differently from native speakers:
    - HL and L2 will use simple complements more than native speakers.
    - HL and L2 will use types of complements of *ba* sentences, such as missing verbs, missing complements, or incorrectly extra verbs or complements differently.
    - HL and L2 will have instances of SVO order with *ba* sentences.

3.2 Participants

3.2.1 Experimental groups

Heritage speakers and L2 Chinese learners were experimental groups. They need live in a dominant English environment, and group 3 was the Chinese native-speaker control group.

Group 1: Heritage speakers

1. They speak Mandarin Chinese as their first language (they were born and live in a family speaking Mandarin) and English as their dominant language. They were 1.5th or 2nd, 3rd generation immigrants.
2. They speak English as their dominant language.
3. Age: over 18 years old.

Group 2: L2 speakers

1. They learn Chinese in school or Confucius Institute.

2. They speak English as their first language (they were born and live in an English-speaking family).
3. Age: over 18 years old.

Group 3: Native speakers (control group)

Chinese native speaker group was a control group with the same sentence to test with the experimental groups.

1. They were born and live in dominant Chinese countries.
2. They speak English as their second language.
3. Age: over 18 years old.

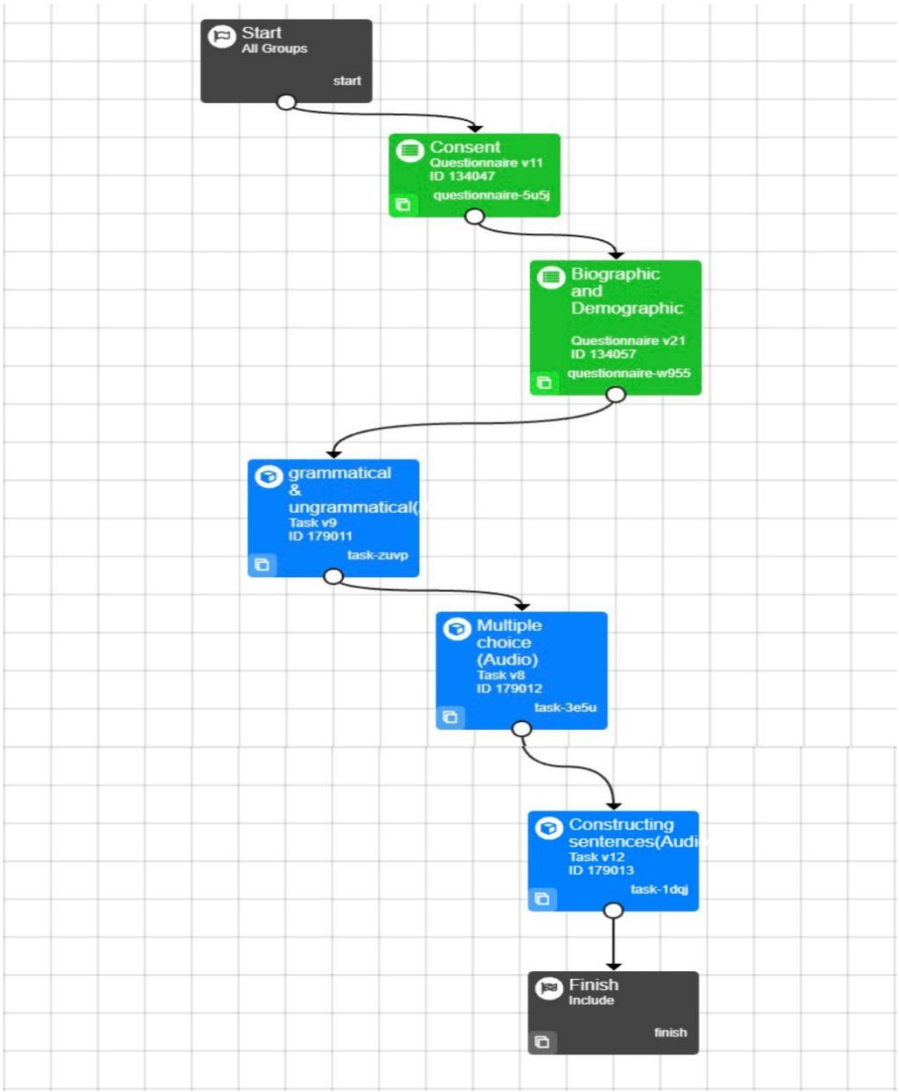
3.2.2 Recruitment

The University of Saskatchewan's PAWS channel, WeChat, Facebook, and linguistlist.org have all been used to attract volunteers. And the whole study got the ethics approval. Three groups of 30 persons each were to be recruited initially, totaling 90 people. Finally, 106 persons were invited to participate in the experiment to guarantee enough data. Being an online experiment, it was difficult to verify whether people were sincere about participating. To ensure the data's quality, more people were hired than the original 90. Three adult speaker groups were tested. The three groups were Heritage Chinese speakers who spoke English as their dominant language, Chinese L2 learners who spoke English as their primary language, and Chinese native speakers who spoke Mandarin as their first language.

3.3 Instruments and Procedure

The experiment was created using the Gorilla software (see https://gorilla.sc/). The experiment's general layout is depicted in the flow chart (see Figure 1 below). In the three tasks, every constructed sentence was random. This experiment included five parts (see Figure 1 below): consent, biographical and demographic information, grammatical and ungrammatical information, multiple choice, and constructing sentences. Figure 1 illustrates the experimental procedure.

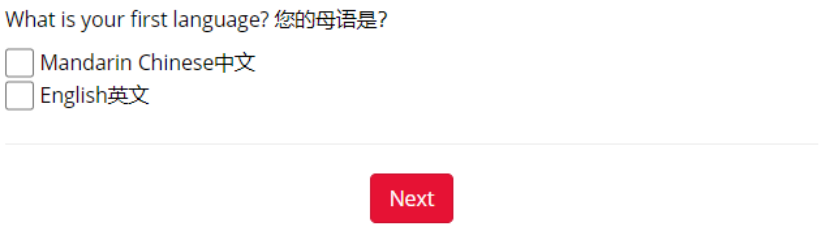
Figure 1. Experiment process



3.3.1 Biographical and demographic information

Using a questionnaire to collect the essential demographic and proficiency information was instrumental in identifying the fluency of a speaker. Since it is not always straightforward to distinguish L2 learners from heritage speakers, the questionnaire had ten questions for the participants. Some Heritage Chinese speakers and Chinese second learners could listen and speak Chinese; they could not read and write Chinese characters; therefore, the study provided each question with the Chinese and English translation for them, which could assist them to understand (see Figure 2 below). It would have been their only way to understand the meaning of the sentence since they cannot read character.

Figure 2. Biographical and demographic question



There were several types of questions, including a self-assessment inquiry, with three definitions to explain the characteristics of three groups: Heritage Chinese Speakers, Second Language Chinese Speakers, and Native Speakers. First, each participant needed to decide which group they are a part of.

The following two questions concerned the participants' ages. In this research, heritage language speakers and L2 Chinese learners spoke English as their dominant language, although they learned the *ba* structure at different ages. One of the influencing elements in language learning was age. It was commonly considered that younger children have certain advantages over older students regarding language acquisition. The younger generation is generally supposed to learn a language more easily and quickly than an older learner. The age of acquisition refers to language segments, or concepts learned early in life that have less change or attrition over time (Polinsky, 2018). It was, therefore, vital to collect this information.

Moreover, because this was an online experiment rather than a face-to-face one, fluency and proficiency were difficult to measure during the selection process. On the one hand, looking at correct response rates might be viewed as a subset of fluency in grammatical accuracy and lexical choice. On the other hand, asking self-assessment questions on fluency and proficiency was useful for determining the participants' language gradient scale. Participants should rate their fluency and competency on a scale of one to four: native-like, advanced, medium, and beginner (all questions were in appendices).

3.3.2 Three tasks

The entire experiment took approximately 15-20 minutes. The experiment had 66 sentences divided into three experimental parts. To help participants, each assignment provided a Chinese translation and Chinese audio recordings. In order to avoid complexity, my choice of

Chinese characters and sentence structures was uncomplicated, so I didn't use Pinyin. Before experimenting, I consulted my friends who are experts in teaching Chinese to foreigners to assess the difficulty level. After receiving their feedback, I made some changes to make sure that the participants wouldn't get too challenged. As an illustration, some sentences were deleted from the task. To simplify the difficulty and minimize interference, I removed sentences with complex sentence structures and those that conveyed similar meanings.

3.3.2.1 Grammatical judgment task

Grammatical judgment tasks are used to help diagnose grammatical structure and variation within a speaker of a language. It accesses unconscious knowledge not only for acceptability but also determines if a logically possible and existing structure is not acceptable to a speaker (Mandell, 1999).

Participants are presented with a set of linguistic materials and are asked whether a particular sentence is acceptable in their language (Polinsky & Kagan, 2007). In the grammatical judgments task of this study (see Figure 3 below), the participants were presented with *ba* sentences with different word orders, and they were asked to choose each sentence as acceptable, not acceptable, or not sure. It tested their knowledge of word order in *ba* sentences (29).

Figure 3. Task 1: Grammatical judgment task

29. 她把酒喝完了。
ta *ba* jiu he wan le.
she *ba* alcohol drink RC SFP.
'She finished the wine.'

3.3.3.2 Multiple choice task

The second task was a multiple-choice task (see Figure 4 below), which tested the participants' understanding of complements in *ba* sentences. Multiple choice test questions, often known as items, are useful for evaluating learning results. In this test, the participants were given a situation to describe and selected the appropriate complement phrases. There were five complements: *de* complement, direction complement, preposition complement, quantity complement, and result complement. Each sentence offered four options, each of which had a similar meaning but would be used differently in the sentences. The participants picked which complement was appropriate for the given sentence.

Figure 4. Task 2: Multiple choice task

In the first option A (30a), *zhuazhule* means to grasp, mainly refers to capturing and fixing with fingers. In second option B (30b) *zhuahaole* standards do well and commonly describe a problem or task that needs to be done well. In the third option C (30c), *zhua* means to grasp; it is a verb, not the complement, which does not further explain the results or effects of this action. D (30d) is not sure. This task simulates controlled production, focusing on the use of complements. 30a is the only option that's grammatically acceptable in this case.

30a. 我把鸡 A 抓住了。

wo	*ba*	ji	zhua	**zhu**	**le**.
I	*ba*	chicken	catch	RC	SFP.

'I caught the chicken.'

30b. *我把鸡 B 抓好了。
wo *ba* ji zhua hao le.
I *ba* chicken do well SFP.
'I caught the chicken.'

30c. *我把鸡 C 抓 。
wo *ba* ji zhua.
I *ba* chicken catch.
'I caught the chicken.'

30d. *我把鸡 D 不确定。
wo *ba* ji buqueding.
I *ba* chicken not sure.
'I caught the chicken.'

3.3.3.3 Constructing *ba* sentences

Syntax is often the part that is mastered later than morphology and/or phonology in language acquisition, even if the earlier components are not fully acquired. Studies of how L2 learners acquire grammatical morphemes, negation, questions, and reference to the past (Lightbown & Spada, 2006) showed that language learners with different language backgrounds go through similar developmental stages in acquiring these linguistic features. Mclaughlin (1992) argues that although oral communication abilities in a second language can be learned in two to three years, it can take up to four to six years to reach the ability level needed to understand the language when used for learning. That is why HL and L2 often have difficulties adapting to sentence structures in new languages (Mclaughlin, 1992). The final task assessed individuals' ability to appropriately integrate the *ba* phrases (see Figure 5 below) with direct objects ① or a second noun phrase combined with other complements ② and for negation ③. These are the only grammatical orders. Any change in word order would be unexpected in Mandarin Chinese.

①. Direct-object ba-phrase: NP 1+ *ba* + NP 2+Verb,
②. *ba*-phrase with second noun-phrase: NP 1+ *ba* + NP 2+Verb+others,
③. Negation: NP 1+ no/not + *ba* + NP 2+Verb.

Four or five words or phrases were shown to the participants, and these phrases may be combined to form new sentences. The participants had to compose a valid *ba* sentence using the *ba* sentence word order (31). This task simulates a controlled production focusing on word order.

Figure 5. Task 3: Constructing *ba* sentences task

31-1. *把门我锁好了。
ba men wo suo hao le.
ba door I lock RC SFP.
'I locked the door.'

31-2. 我把门锁好了。
wo *ba* men suo hao le.
I *ba* door lock RC SFP.
'I locked the door.'

31-3. *我锁好了把门。
wo suo hao le *ba* men.
I lock RC PFV *ba* door.
'I locked the door.'

31-4. *把门锁好了我。
ba men suo hao le wo.
ba door lock RC PFV I.
'I locked the door.'

31-5. *门把我锁好了。
men *ba* wo suo hao le.
door *ba* I lock RC SFP.
'I locked the door.'

31-6. 不确定
Not sure

When participants have completed all the tasks, they are taken to the final page, where they would click the "end" button to submit their survey. Participants who made all submissions would be marked as "complete." Those participants who completed all or a portion of the experiment but failed to reach the finish node would be assigned "live" (see Figure 6 below). Live participants were thus left out of the data. All participant data was created and saved as CSV files.

Figure 6. Participants' state

A total of 106 people completed the online experiment, with 42 Chinese native speakers (CN), 32 second-language learners (L2), and 32 heritage Chinese speakers (HL). Two Chinese participants and one L2 person could not communicate in a second language, and their data were discarded because they were over 50 years old. The submissions of 16 individuals were also discarded since their profile information conflicted with their language usage and proficiency answers. Four HL speakers indicated native-like as their initial competency and fluency, even though English is their dominant and primary language. They could not be chosen since, as HL speakers, their second language should be more proficient and fluent than their first, based on the study of Polinsky et al. (2010). For L2 learners, six L2 speakers' first language competency and fluency were medium, similar to their second language; this was unusual because L2 first language proficiency and fluency are usually higher than the second language in a predominant English setting. In the end, 88 responses in total were subjected to data analysis (see Table 4 below).

Table 4. Number of participants in their groups

Participants' groups	Participants' numbers
Heritage speakers	25
Second language learners of Chinese	24
Chinese speakers	39

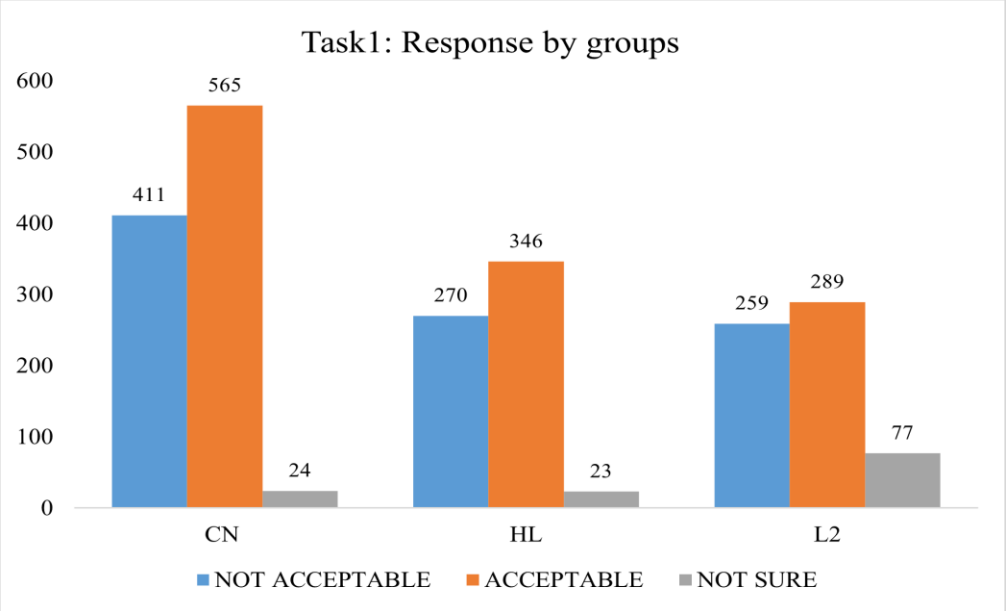
CHAPTER 4 STUDY RESULTS

This chapter is divided into three sections. Each section includes descriptive statistics and statistical analysis. Bar charts display descriptive statistics; the statistical analysis is created in R version 3.6.3 (R Core Team, 2019). There are four models, two regression liner models (Task 1) and two generalized linear mixed models (Task 2 and Task 3). The mixed effects model is created in R 3.6.3 with the *lmer* function of the *lme4* package (Bates et, al., 2015). Ninety-five percent confidence intervals (CI_{95}) were computed using the *confint* function from the *lmerTest* package (Kuznetsova, Brockhoff, & Bojesen, 2014). The three model are used 'stepwise' approaches in the modelling process. Non-significant predictors are removed from the model one-by-one based on the closest t-value to zero until only significant predictors remained. I am most interested in the coefficient estimate (β), a conservative estimate of the average difference in log-odds (a probability measurement) response between the predictors in question. In the statistic table includes coefficients, standard errors, t-values , p-values (to publish a significant difference, data should typically have only a 4.9% (0.049) chance or less of being a type error (<0.05), and confidence intervals (If the data was run again with a new sample, there is a 95% chance that the resulting difference between the new averages will fall within the confident range).

Each variable is coded using abbreviations: the first language is *L1*; the second language is *L2*; the age of acquiring the second language is *Age L2*, and the predominant language is *Pred L*. The predominant language is divided into *Pred English and Pred M Chinese (Mandarin Chinese)*. The age of participants divided into three levels: *Age_ Pre (18-30), Age_Mid (30-40), Age Post (40-50)*. The age of learning a second language is split into two groups, i.e., before 11 and after 11, which are coded as *Age_L2Bef11* and *Age_L2Aft11*. Snow & Hoefnagel-Höhle (1978) provide evidence that most children before puberty are eventually more effective than adults in L2 acquisition (SLA), albeit they are not necessarily faster.

There are three options for each sentence in Task 1: ACCEPTABLE, NOT ACCEPTABLE, and NOT SURE. Referring to the original figures, the quantity of NOT SURE responses was insufficient (see Figure 7 blow), therefore, the NOT SURE responses were eliminated.

Figure 7. Original figures of Task 1

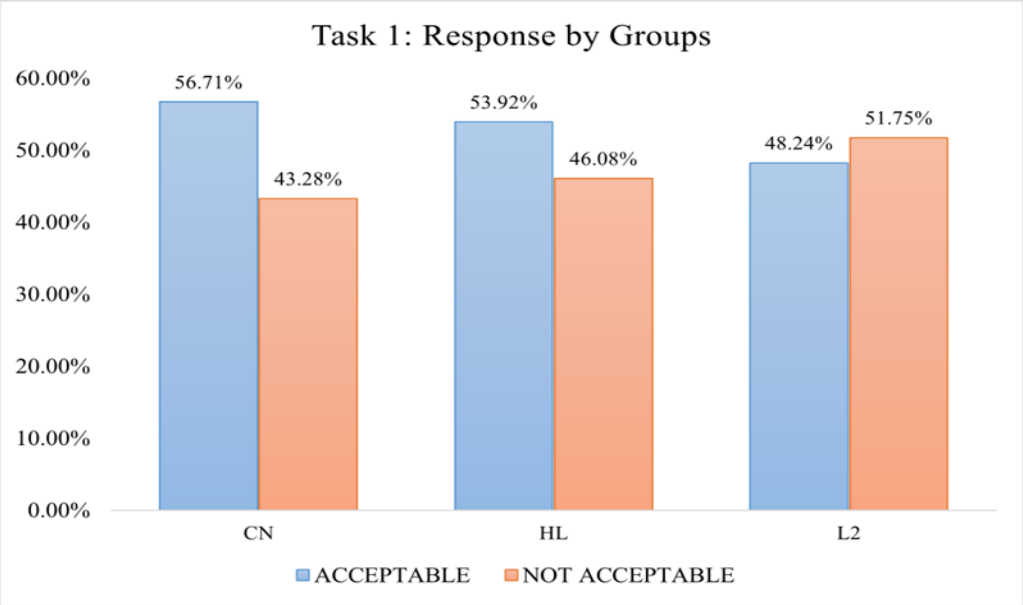


4.1 Test on Task 1: Syntax judgment

4.1.1 Descriptive summary

The first task is to test whether, comparing the CN group, there is a difference between HL and L2 in syntax judgment for each type of *ba* sentence. This task included 26 *ba* sentences; the participants needed to judge whether they find these sentences acceptable or unacceptable. Figure 8 presents each group's choices. Generally, the CN and the HL group have the same trend in judging sentences; they chose acceptable more than unacceptable. In the CN group, **56.71%** participants selected acceptable, **43.28%** selected not acceptable. In the HL group, **53.92%** participants chose acceptable, 46.08% chose not acceptable. In contrast, in the L2 group, the trend was reversed. 51.75% of participants chose not acceptable, and **48.2%** of participants chose acceptable.

Figure 8. Overall responses by participant groups (Task1)



In the experiment, there were several types of *ba sentence*s, and each group has different acceptability rate.

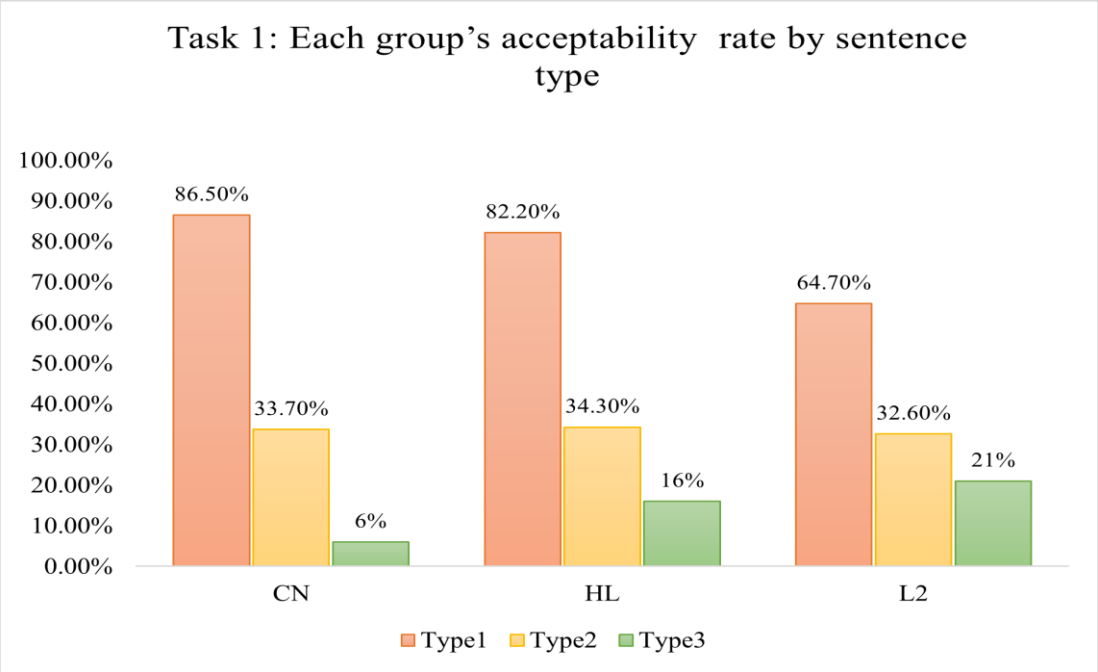
Type 1. Right word order.

Type 2. Right word order, but there are other problems.

Type 3. Wrong word order.

Figure 9 (see below) illustrates the acceptance rate of each group for various patterns. For Type 1, HL's acceptance rate was similar to that of the CN group, and HL's acceptance rate was also higher than that of L2. The L2 group had a greater acceptance rate for sentence pattern 3 than the other two groups. Except for sentence patterns 1, CN has a lower acceptance rate than the other two groups for the other sentence patterns 2, and 3.

Figure 9. Each group's acceptability rate by sentence type (Task1)



4.1.2 Statistical analysis summary

4.1.2.1 Statistical analysis summary of Model 1

In order to test the interaction between the answer patterns and the group/age/environment/age of acquisition of the speakers, datasets of task 1 was performed a generalized linear model (Model 1) analysis using the glmer function (Bates et al., 2015). The results are summarized in Table 5 below.

In Model 1, the independent variables were the groups, predominate language, age, and age of learning second languages (age of acquisition), the dependent variable was answering patterns (ACCEPTABLE and NOT ACCEPTABLE). The answers were coded as numerals, with 0 representing "A" (ACCEPTABLE) and 1 representing "NA" (NOT ACCEPTABLE). Therefore, the model treated "NA" as the default outcome. The output was the groups, i.e., the CN group, HL group, or L2 group. The model also included participants as a random effect. Model 1 compared CNHL (Mandarin Chinese native speakers and Heritage speakers) with L2 speakers. In the original figures, the quantity of NOT SURE responses was insufficient (see figure 7 above); therefore, the response of NOT SURE is not only removed from figure 7 but also from the model before running a regression model using the glmer (Bates et al., 2015) function in R.

Model 1 compared CNHL with L2 speakers. There is only a small difference between HL and CN speakers (Figure 8, see above in section 4). Therefore, CN was combined into the

intercept with HL. Basically, Model 1 compared CNHL with L2 speakers, which began with a large model and was gradually minimized by deleting insignificant independent variables. GroupL2, and Age_Post were significant variables. Pre_dominant language, Age_Pre, Age_Mid and Age_L2 were non-significant independent variables.

Pred English, Pred Chinese, Age_Pre, Age_Mid, and Age_L2Bef11 were non-significant independent variables. Therefore, these independent variables were deleted one by one based on the t-value closest to 0. The next step was to create a final model. This model was built with two independent variables with participants as a random effect: group L2, and Age_Post.

Table 5. Summary of the generalized linear model on Task 1

	Estimate	Std. Error	t value	Pr (>|z|)	Confidence intervals	
					2.5 %	97.5 %
(Intercept)	-0.23	0.06	-3.82	< .001	-0.35	-0.11
GroupL2	0.38	0.12	3.12	< .001	0.14	0.62
Age_Post	-1.01	0.38	-2.71	< .006	-1.80	-0.29

Based on the model output, the intercept with a log-odds value of **-0.23** means that the probability of CNHL speakers perceiving the whole pattern of *ba* sentence as unacceptable is **44.27%**. (This was calculated by statistical table calculator) (see http://vassarstats.net/tabs.html#odds1) [β=-0.23, SE=0.06, t=-3.82, p=0.000136, CI95=-0.35: -0.11] (see Table 5 above). L2 speakers chose NOT ACCEPTABLE, significantly different from CNHL speakers, with the L2 speaker having a higher NOT ACCEPTABLE rate of **0.15** (-0.23 (intercept) + 0.38 (Group L2)) [β=0.38, SE = 0.12, t = 3.12, p = 0.001830, CI95 = 0.14:0.62]. Moreover, age plays a significant role, with Age_Post of Group L2 having a substantially lower frequency when choosing NOT ACCEPTABLE than the same age group of CNHL, on average, about **29.74%** (-0.23 (intercept) + 0.38 (Group L2) + (-1.01) (Age_45_50)) [β=-1.01, SE = 0.38, t =-2.71, p = 0.006824, CI95 =-1.80: -0.29].

Obviously, speakers' group and speakers' age post define the participants answers distribution. Moreover, it tells us about the interaction between age (applies to all speakers) and their answers.

4.1.2.2 Statistical analysis summary of acceptability Model

The acceptability model shows each group's acceptability rate by sentence type. The results are summarized in Table 6 below. The model was built using groups as independent variables and answering patterns (ACCEPTABLE and NOT ACCEPTABLE) as dependent variables. The answers were also coded as numerals (same Model 1), with 0 representing "A" (ACCEPTABLE) and 1 representing "NA" (NOT ACCEPTABLE). Therefore, the model treated "NA" as the default outcome. The output was the groups and sentence types. The model included participants as a random effect as well.

Table 6. Summary of the generalized linear mixed model on sentences type (Task 1)

	Estimate	Std. Error	t value	Pr (>|z|)	Confidence intervals	
					2.5 %	97.5 %
(Intercept)	-1.66	0.11	-14.55	< .001	-1.89	-1.44
GroupL2	0.41	0.17	2.37	0.02	0.07	0.75
Type 2	2.09	0.11	18.58	< .001	1.87	2.32
Type 3	3.59	0.21	16.91	< .001	3.19	4.02

The acceptability model compared the three groups' acceptability rate by sentence type. Based on the model results, the intercept with a log-odds value of **-1.66** means that the probability of CN speakers perceiving Type 1 of *ba* sentence as unacceptable is **15.97%** [β=-1.66, SE=0.11, t=-14.55, p< .001, CI95=-1.89: -1.44] (see Table 6 above). For the CN group, the probability of unacceptable for Type 2 *ba* sentence is **60.59%** (-1.66(intercept) + 2.09 (Type 2)) and the probability of unacceptable for Type 3 is **87.32%**(-1.66(intercept) + 3.59 (Type 3)).

For L2, the probability of treating Type 1 *ba* sentences as unacceptable is **22.23%** (-1.66(intercept) + 0.41(Group L2)). The probability of treating Type 2 *ba* sentences as unacceptable is 69.85% (-1.66(intercept) + 0.41(Group L2) + 2.09 (Type 2)). Moreover, the probability of treating Type 3 *ba* sentence as unacceptable is **91.21%** (-1.66(intercept) +0.41(Group L2) + 3.59(Type 3)). Due to the insufficient sample size of sentence type 3, the bias would be present in the results of the data analysis. This bias appears in the acceptance rate of sentence type 3 for L2, which is not ideal compared to the descriptive result (see Table 6 above).

CN has the lowest non-acceptance rate for sentence type 1 and sentence type 2 compared to L2. As for type 3, there were no significant differences between the two groups (see

Table 6 above). In conclusion, speaker groups determine how participants' answers are distributed. It also provides information about the interactions of group responses with sentence types (see Table 6 above).

4.2 Test on Task 2: Multiple choice (fill in the complement task)

4.2.1 Descriptive summary

The second task involves testing what types of complements HL or L2 learners use for *ba* sentences, compared to the CN group. It also tests whether HL and L2 differ in the types of wrong complements they use, such as missing verbs, missing complements, or extra verbs or complements. This task included 23 sentences. Each presented sentence offered four choices (32). A, B, C were three options of complements, D was NOT SURE.

32. 我 把 鸡 ____。
wo *ba* ji ____。
I *ba* chicken____。
'I caught the chicken.'

A. 抓 住 了
A zhua zhu le
A. catch result complement SFP

B. 抓 好 了
B zhua hao le
B. catch good[2] SFP

C. 抓
C zhua
C. catch (without result complement)

D. 不确定
D. NOT SURE

[2] The term complement is used for any modifiers in Chinese. Although *good* is an adjective, it is treated as complement after the verb.

Their answers were divided into six types:

Type A: Completed complement.

Type B: Omission: Missing verb or missing complement.

Type C: Incorrectly added: Extra verbs or extra complements.

Type D: Misused complements: A semantically similar but ungrammatical

Type E: Wrong order of complements

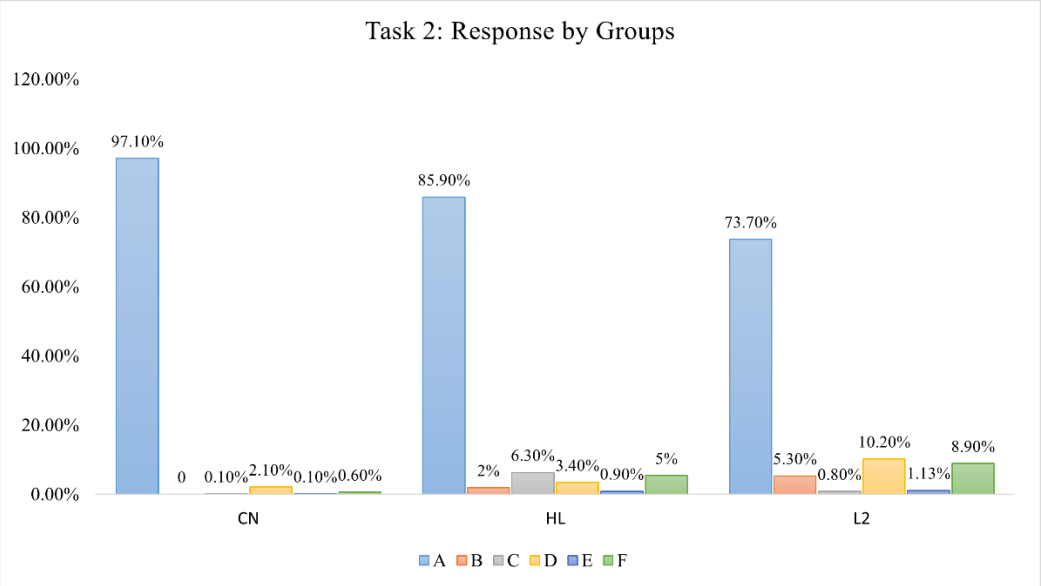
Type F: Uncertain.

Figure 10 below shows the distribution of the participants' response patterns. All groups presented similar responses in that A was chosen the most. The rest of the answer patterns B, C, D, E, and F are distributed differently. The CN group chose option A **97.10%** of the time. No one selected pattern B. Pattern C was chosen only **0.10%** of the time, D was chosen 2.10% of the time, and F was chosen **0.60%**. The incorrect patterns were chosen almost never.

The HL group chose pattern A **85.90 %** of the time. Pattern B was chosen 2% of the time. Pattern C was chosen 6.30%, pattern D 3.40%, pattern E only 0.90% and pattern F **5%**. While the overall responses align similarly to the CN group, the incorrect patterns B, C, D, E, and F were chosen more often by the HL group than by the CN group.

The overall pattern of responses for the L2 group is quite similar to the CN and HL groups. Like with the CN and the HL groups, A is used the most although quite lower with only **73.70%**. The responses for pattern F, NOT SURE, are much higher than in the other groups with **8.90%**; almost twice as high as the HL group and nine times higher than in the CN group. Pattern B response rate is 5.30%, pattern C is 0.80%, pattern D is 10.20%, and pattern E is 1.13%.

Figure 10. Overall responses by participant groups (Task 2)



4.2.2 Statistical analysis summary

In Model 2, the independent variables were the speaker groups, predominant language, age (divided into age_post=40-50 years, age, and age of learning second language, i.e., age of acquisition. The dependent variable was answering patterns (pattern A, B, C, D, E, and F). Model 2 used a multinomial logistic regression (Venables & Ripley, 2013) in R. The answers were coded as numerals, with 1 representing "A" (pattern A), 2 representing "B" (pattern B), 3 representing "C" (pattern C), 4 representing "D" (pattern D), 5 representing "E" (pattern E), and 6 representing "F" (pattern F). Therefore, the model treated "A" as the default outcome. The statistical results are shown in table 7 (see below). For more accessible reading and analysis, table 7 will be divided into several smaller tables based on the independent variables.

Table 7. Summary of the generalized linear mixed model 2 (Task 2)

Coefficients							
	(Intercept)	Group HL	GroupL2	Pred_Chinese	Pred_English	Age_Post	Age_L2Bef11
B	-16.91	13.50	14.15	-3.53	0.65	1.17	-0.89
C	-17.48	14.11	13.45	12.17	0.09	1.46	-1.79
D	-3.28	1.12	1.39	-0.16	0.46	0.61	-0.82
E	-5.03	2.03	1.09	-15.06	1.08	-12.82	-2.78
F	-5.62	2.78	2.97	1.39	1.23	0.76	-0.88
Std. Errors							
	(Intercept)	Group HL	GroupL2	Pred_Chinese	Pred_English	Age_Post	Age_L2Bef11
B	286.23	286.23	286.23	27.9	0.42	0.52	0.37
C	0.42	0.56	0.62	0.81	0.83	1.21	0.79
D	0.34	0.40	0.40	0.47	0.25	0.48	0.23
E	1.01	1.19	1.30	1.43e-06	0.84	1.08e-06	0.87
F	1.01	1.05	1.05	1.12	0.34	0.45	0.28
t value							
	(Intercept)	Group HL	GroupL2	Pred_Chinese	Pred_English	Age_Post	Age_L2Bef11
B	-0.06	0.05	0.05	-0.13	1.55	2.24	-2.41
C	-41.13	24.93	21.73	15.03	0.11	1.21	-2.25
D	-9.63	2.79	3.52	-0.35	1.81	1.31	-3.6
E	-4.98	1.71	0.84	-10527850	1.28	-1.19e+07	-3.21
F	-5.56	2.65	2.83	1.24	3.65	1.69	-3.17
P value							
	(Intercept)	Group HL	GroupL2	Pred_Chinese	Pred_English	Age_Post	Age_L2Bef11
B	0.929	0.962	0.961	0.899	0.120	0.024	0.015
C	0.000	0.000	0.000	0.000	0.915	0.227	0.024
D	0.000	< .005	0.000	0.727	0.070	0.187	0.000
E	< .001	0.087	0.403	0.000	0.199	0.000	< .001
F	< .001	< .008	< .004	0.215	0.000	0.091	< .002

Confidence intervals														
	(Intercept)		Group HL		GroupL2		Pred_Chinese		Pred_English		Age_Post		Age_L2Bef11	
	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %
B	-577.92	544.09	-547.51	574.50	-546.86	575.16	-58.25	51.18	-0.16	1.46	-1.62	-0.17	-1.62	-0.17
C	-18.31	-16.64	13.00	15.22	12.24	14.67	10.58	13.76	-1.53	1.71	-0.91	3.84	-3.34	-1.27
D	-3.95	-2.61	0.33	1.91	0.62	2.17	-1.07	0.75	-0.04	0.95	-0.30	1.53	-1.27	-0.37
E	-7.01	-3.05	-0.30	4.36	-1.46	3.64	-15.06	-15.06	-0.57	2.72	12.82	-12.82	-4.48	-1.08
F	-7.60	-3.64	0.73	4.83	0.92	5.02	-0.81	3.59	0.57	1.87	-0.12	1.64	-1.42	-0.33

As can be seen (Table 7, above), speaker group, dominant language environment, age post, and age of second language acquisition determine the participants answers distribution. Furthermore, it indicates how language environment/age post/age of second language acquisition interacts with their responses.

4.2.2.1 Generalized linear mixed model: Group HL

The intercept, which is the baseline, corresponds to the answer pattern A for the CN group. The coefficients, represented by log-odds values, indicate the change in the mean response

associated with a change in one predictor (Group HL is 13.50). In contrast, the other predictors in the model are held constant. If looking at the results horizontally, the coefficients in the intercept column indicate a distinctly increasing trend from pattern B. The following table 7.1 is a subset of table 7 and that will go into more interpretation. The log-odds value of choosing pattern B vs. pattern A will decrease by **16.91** [β=-16.91, SE=286.23, t=-0.06, p=0.929, CI95= -577.92: 544.09]; the log-odds value of choosing pattern C vs. patten A will decrease by **17.48** [β= -17.48, SE=0.42, t= -41.13, p=0.000, CI95= -18.31: -16.64]; the log-odds value of choosing pattern D vs. pattern A will decrease by **3.28** [β= -3.28, SE=0.34, t= -9.63, p= 0.000, CI95=-3.95: -2.61]; the log-odds value of choosing pattern E vs. pattern A will decrease by **5.03** [β= -5.03, SE=1.01, t= -4.98, p<.001, CI95=-7.01: -3.05]; the log-odds value of choosing pattern F vs. pattern A will decrease by **5.62** [β= -5.62, SE=1.01, t= -5.56, p<.001, CI95=-7.60: -3.64]. In other words, CN chooses pattern A at most, then D, then F, then E, then C, and finally B (See Table 7.1 below).

For group HL, the chance of choosing patterns A, B, C, D, E, and F had a decreasing tendency. The log-odds value of choosing pattern B vs. pattern A will decrease by **3.41**(-16.91(Intercept)+ 13.50(Group HL)), the log-odds value of choosing pattern C vs. pattern A will decrease by 3.37 (-17.48(Intercept)+14.11(Group HL)), and the log-odds value of choosing pattern D vs. pattern A will decrease by **2.16** (-3.28(Intercept)+ 1.12(Group HL)) choosing pattern E vs. pattern A will decrease by **3** (-5.03 (Intercept)+ 2.03 (Group HL)) choosing pattern F vs. pattern A will decrease by **2.84** (-5.62 (Intercept)+ 2.78 (Group HL)) (See Table 7.1 below).

Table 7.1. Results of the generalized linear mixed model 2 on Group HL (Task 2)

Coefficients			Std. Errors	
	(Intercept)	Group HL	(Intercept)	Group HL
B	-16.91	13.50	284.23	286.23
C	-17.48	14.11	0.42	0.56
D	-3.28	1.12	0.34	0.40
E	-5.03	2.03	1.01	1.19
F	-5.62	2.78	1.01	1.05
t value			P value	
	(Intercept)	Group HL	(Intercept)	Group HL
B	-0.06	0.05	0.929	0.962
C	-41.13	24.93	0.000	0.000
D	-9.63	2.79	0.000	< .005
E	-4.98	1.71	< .001	0.087
F	-5.56	2.65	< .001	< .008
Confidence intervals				
	(Intercept)		Group HL	
	2.5 %	97.5 %	2.5 %	97.5 %
B	-577.92	544.09	-547.51	574.50
C	-18.31	-16.64	13.00	15.22
D	-3.95	-2.61	0.33	1.91
E	-7.01	-3.05	-0.30	4.36
F	-7.60	-3.64	0.73	4.83

4.2.2.2 Generalized linear mixed model: Group L2

Table 7.2, which is a subset of Table 7, provides additional interpretation. For group L2, the chance of choosing patterns A, B, C, D, E, and F also decreased. The log-odds value of choosing pattern B vs. pattern A will decrease by **2.76** (-16.91(Intercept)+14.15(Group L2)), the log-odds value of choosing pattern C vs. pattern A will decrease by **3.94** log-odd (-17.48(Intercept)+13.54(Group L2)), the log-odds value of choosing pattern D vs. pattern A will decrease by **1.89** (-3.28(Intercept)+1.39 Group L2)), the log-odds value of choosing pattern E vs. pattern A will decrease by **3.94** (-5.03(Intercept)+1.09 Group L2)) and the log-odds value of choosing pattern F vs. pattern A will decrease by **2.65** (-5.62(Intercept)+2.97(Group L2)) (see Table 7.2 below).

Group L2 chose pattern F differently from HL and CN speakers, with HL having a higher frequency to choose pattern F on average (i.e.-**2.65>-2.84>-5.62**). Specifically, the L2 group has a higher frequency in choosing pattern F compared to the groups CN and HL; the CN group has the highest frequency in choosing pattern A in three groups.

Table 7.2. Results of the generalized linear mixed model 2 on Group L2 (Task 2)

Coefficients			Std. Errors	
	(Intercept)	GroupL2	(Intercept)	Group L2
B	-16.91	14.15	286.23	286.23
C	-17.48	13.45	0.42	0.62
D	-3.28	1.39	0.34	0.40
E	-5.03	1.09	1.01	1.30
F	-5.62	2.97	1.01	1.05
t value			P value	
	(Intercept)	Group L2	(Intercept)	Group L2
B	-0.06	0.05	0.929	0.961
C	-41.13	21.73	0.000	0.000
D	-9.63	3.52	0.000	0.000
E	-4.98	0.84	< .001	0.403
F	-5.56	2.83	< .001	< .004
Confidence intervals				
	(Intercept)		Group L2	
	2.5 %	97.5 %	2.5 %	97.5 %
B	-577.92	544.09	-546.86	575.16
C	-18.31	-16.64	12.24	14.67
D	-3.95	-2.61	0.62	2.17
E	-7.01	-3.05	-1.46	3.64
F	-7.60	-3.64	0.92	5.02

4.2.2.3 Generalized linear mixed model: Predominantly Chinese

The participant's response distribution was significantly affected by predominant language environments. Table 7.3 is a subset of Table 7, and it contains further analysis and interpretation. For speakers in Group CN, the chance of choosing patterns A, B, C, D, E, and F was a decreasing tendency. CN speakers in the predominantly Chinese environment, the log-odds value of choosing pattern B vs. pattern A will decrease by **20.44** (-16.91 (Intercept) -3.53 (Pred_Chinese)), the log-odds value of choosing pattern C vs. pattern A will decrease by **5.31** (-17.48 (Intercept)+ 12.17 (Pred_Chinese)), the log-odds value of choosing pattern D vs. pattern A will decrease **3.44** (-3.28 (Intercept)-0.16 (Pred_Chinese)), the log-odds value of choosing pattern E vs. pattern A will increase **10.03** (-5.03 (Intercept)+ 15.06 (Pred_Chinese)), and the log-odds value of choosing pattern F vs. pattern A will decrease **4.32** (-5.62 (Intercept)+ 1.39 (Pred_Chinese)). Therefore, speakers of the CN group, who live in the Pred_Chinese environment, have a lower frequency in pattern B (Table 7.3 below).

For HL speakers in the Pred Chinese environment, the log-odds value of choosing pattern B vs. pattern A will decrease by **6.94** (-16.91(Intercept)-3.53(Pred_Chinese)+13.50(HL)), the log-odds value of choosing pattern C vs. pattern A will increase by **8.8** (-17.48(Intercept)+12.17(Pred_Chinese)+14.11(HL)), the log-odds value of choosing pattern D vs. pattern A will fall by **2.32** (-3.28(Intercept)-0.16 (Pred_Chinese)+1.12(HL)), the log-odds value of choosing pattern E vs. pattern A will increase by **12.06** (-5.03(Intercept)+15.06 (Pred_Chinese)+2.03(HL)), and the log-odds value of choosing pattern F vs. pattern A will fall by **1.09** (-5.26(Intercept)+1.39 (Pred_Chinese)+2.78(HL)). HL speakers have a higher frequency in pattern E compared with CN and L2 group, but HL has a lower frequency in pattern C than CN and L2 group (see Table 7.3 below).

For L2 speakers in the Pred Chinese environment, the log-odds value of choosing pattern B vs. pattern A will increase by **0.74** (-16.91(Intercept)+3.53(Pred_Chinese)+14.15(L2)), the log-odds value of choosing pattern C vs. pattern A will increase by **8.14** (-17.48(Intercept)+12.17(Pred_Chinese)+13.45(L2)), the log-odds value of choosing pattern D vs. pattern A will fall by **2.05** (-3.28(Intercept)-0.16(Pred_Chinese)+1.39(L2)), the log-odds value of choosing pattern E vs. pattern A will increase by **11.12** (-5.03(Intercept)+15.06(Pred_Chinese)+1.09(L2)), and the log-odds value of choosing pattern F vs. pattern A will fall by **0.9** (-5.26(Intercept)+1.39(Pred_Chinese)+2.97(L2)) (see Table 7.3 below).

Table 7.3. Results of the generalized linear mixed model 2 on Pred_Chinese (Task 2)

Coefficients				
	(Intercept)	Group HL	GroupL2	Pred_Chinese
B	-16.91	13.50	14.15	-3.53
C	-17.48	14.11	13.45	12.17
D	-3.28	1.12	1.39	-0.16
E	-5.03	2.03	1.09	-15.06
F	-5.62	2.78	2.97	1.39
Std. Errors				
	(Intercept)	Group HL	GroupL2	Pred_Chinese
B	286.23	286.23	286.23	27.9
C	0.42	0.56	0.62	0.81
D	0.34	0.40	0.40	0.47
E	1.01	1.19	1.30	1.43e-06
F	1.01	1.05	1.05	1.12
t value				
	(Intercept)	Group HL	GroupL2	Pred_Chinese
B	-0.06	0.05	0.05	-0.13
C	-41.13	24.93	21.73	15.03
D	-9.63	2.79	3.52	-0.35
E	-4.98	1.71	0.84	-10527850
F	-5.56	2.65	2.83	1.24
P value				
	(Intercept)	Group HL	GroupL2	Pred_Chinese
B	0.929	0.962	0.961	0.899
C	0.000	0.000	0.000	0.000
D	0.000	< .005	0.000	0.727
E	< .001	0.087	0.403	0.000
F	< .001	< .008	< .004	0.215

Confidence intervals								
	(Intercept)		Group HL		GroupL2		Pred_Chinese	
	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %
B	-577.92	544.09	-547.51	574.50	-546.86	575.16	-58.25	51.18
C	-18.31	-16.64	13.00	15.22	12.24	14.67	10.58	13.76
D	-3.95	-2.61	0.33	1.91	0.62	2.17	-1.07	0.75
E	-7.01	-3.05	-0.30	4.36	-1.46	3.64	-15.06	-15.06
F	-7.60	-3.64	0.73	4.83	0.92	5.02	-0.81	3.59

The group CN and HL have the same trend in response distribution, but L2 has a small difference in choosing pattern B. L2 has a higher frequency in option B, comparing CN and L2(**0.74>-6.94>20.44**). L2 has a higher frequency in option D than HL and CN (-**0.9>-1.09>-4.32**).

4.2.2.4 Generalized mixed model: Predominantly English

The participants' response distribution was significantly affected by predominant language environments. Table 7.4 is a subset of Table 7, with additional insights and interpretation. For

speakers in Group CN, the chance of choosing patterns A, B, C, D, E, and F was decreased tendency. For CN speakers in the Pred English, the log-odds value of choosing pattern B vs. pattern A will decrease by **16.26** (-16.91(Intercept)+0.65(Pred_English)), the log-odds value of choosing pattern C vs. pattern A will decree se by **17.57** (-17.48(Intercept)+0.09(Pred_English)), and the log-odds value of choosing pattern D vs. pattern A will decrease **2.82** (-3.28(Intercept)+0.46(Pred_English)), and the log-odds value of choosing pattern E vs. pattern A will decrease **3.95** (-5.03(Intercept)+1.08 (Pred_English)), and the log-odds value of choosing pattern F vs. pattern A will decrease **4.39** (-5.62(Intercept)+1.23 (Pred_English)). Therefore, speakers of the CN group, who live in the pred_English environment, have a lower frequency in pattern C (see Table 7.4 below).

For HL speakers in the Pred English environment, the log-odds value of choosing pattern B vs. pattern A will decrease by **15.14** (-16.91(Intercept)+0.65(Pred_English)+13.50 (HL)), the log-odds value of choosing pattern C vs. pattern A will decrease by **3.28** (-17.48(Intercept)+0.09(Pred_English)+14.11(HL)), the log-odds value of choosing pattern D vs. pattern A will fall by **1.72** (-3.28(Intercept)+0.46 (Pred_English)+1.12(HL)), the log-odds value of choosing pattern E vs. pattern A will fall by **1.92** (-5.03(Intercept)+1.08 (Pred_English)+2.03(HL)), and the log-odds value of choosing pattern F vs. pattern A will fall by **1.61** (-5.62(Intercept)+1.23 (Pred_English)+2.78(HL)). HL speakers have a higher frequency in pattern F compared with CN and L2 group, but HL has a lower frequency in pattern Ethan CN and L2 (see Table 7.4 below).

For L2 speakers in the Pred English environment, the log-odds value of choosing pattern B vs. pattern A will decrease by **2.11** (-16.91(Intercept)+0.65(Pred_English)+ 14.15 (L2)), the log-odds value of choosing pattern C vs. pattern A will decrease by **3.94** (-17.48 (Intercept)+0.09(Pred_English)+13.45(L2)), and the log-odds value of choosing pattern D vs. pattern A will fall by **1.43** (-3.28(Intercept)+0.46(Pred_English)+1.39(L2)), the log-odds value of choosing pattern E vs. pattern A will fall by **2.86** (-5.03(Intercept)+1.08(Pred_English)+1.09(L2)), and the log-odds value of choosing pattern F vs. pattern A will fall by **1.42** (-5.62(Intercept)+1.23(Pred_English)+2.97(L2)) (see Table 7.4 below).

The group CN and HL have the same trend in response distribution, but CN has a small difference in choosing pattern B. L2 has a higher frequency in pattern B, comparing CN and L2(**-2.11>-15.14>-16.26**). L2 has a higher frequency in pattern F than HL and CN (**-1.42>-1.61>-4.39**).

Table 7.4. Results of the generalized linear mixed model 2 on Pred_English (Task 2)

Coefficients				
	(Intercept)	Group HL	GroupL2	Pred_English
B	-16.91	13.50	14.15	0.65
C	-17.48	14.11	13.45	0.09
D	-3.28	1.12	1.39	0.46
E	-5.03	2.03	1.09	1.08
F	-5.62	2.78	2.97	1.23
Std. Errors				
	(Intercept)	Group HL	GroupL2	Pred_English
B	286.23	286.23	286.23	0.42
C	0.42	0.56	0.62	0.83
D	0.34	0.40	0.40	0.25
E	1.01	1.19	1.30	0.84
F	1.01	1.05	1.05	0.34
t value				
	(Intercept)	Group HL	GroupL2	Pred_English
B	-0.06	0.05	0.05	1.55
C	-41.13	24.93	21.73	0.11
D	-9.63	2.79	3.52	1.81
E	-4.98	1.71	0.84	1.28
F	-5.56	2.65	2.83	3.65
P value				
	(Intercept)	Group HL	GroupL2	Pred_English
B	0.929	0.962	0.961	0.120
C	0.000	0.000	0.000	0.915
D	0.000	< .005	0.000	0.070
E	< .001	0.087	0.403	0.199
F	< .001	< .008	< .004	0.000

Confidence intervals								
	(Intercept)		Group HL		GroupL2		Pred_English	
	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %
B	-577.92	544.09	-547.51	574.50	-546.86	575.16	-0.16	1.46
C	-18.31	-16.64	13.00	15.22	12.24	14.67	-1.53	1.71
D	-3.95	-2.61	0.33	1.91	0.62	2.17	-0.04	0.95
E	-7.01	-3.05	-0.30	4.36	-1.46	3.64	-0.57	2.72
F	-7.60	-3.64	0.73	4.83	0.92	5.02	0.57	1.87

4.2.2.5 Generalized linear mixed model: Age Post (40-50)

Additionally, age has a substantial impact on response distribution. Table 7.5 is a subset of Table 7, which delves deeper into its interpretation. For Age_Post of CN speakers (see Table 6.5 below), the log-odds value of choosing pattern B vs. pattern A will decrease by **15.74** (-16.91(Intercept)+1.17(Age_Post)), the log-odds value of choosing pattern C vs. pattern A will decrease by **15.84** (-17.48(Intercept)+1.64(Age_Post)), and the log-odds value of choosing pattern D vs. pattern A will decrease by **3.12** (-3.28(Intercept)+0.16(Age_Post)), and the log-odds value of choosing pattern E vs. pattern A will decrease by **17.85** (-5.03(Intercept)-

12.82(Age_Post)), and the log-odds value of choosing pattern F vs. pattern A will decrease by **4.86** (-5.62(Intercept)+0.76 (Age_Post)) (see Table 7.5 below).

Moreover, for Age_Post of HL speakers, the log-odds value of choosing pattern B vs. pattern A will decrease by **2.24** log-odd (-16.91(Intercept)+1.17(Age_Post)+13.50(HL)), the log-odds value of choosing pattern C vs. pattern A will decrease by **1.73** log-odd (-17.48(Intercept)+1.64(Age_Post)+14.11(HL)), the log-odds value of choosing pattern D vs. pattern A will fall by **1.55** (-3.28(Intercept)+0.61(Age_Post)+1.12(HL)), the log-odds value of choosing pattern E vs. pattern A will fall by **15.82** (-5.03(Intercept)-12.82(Age_Post)+2.03(HL)), and the log-odds value of choosing pattern F vs. pattern A will fall by **2.08** (-5.62(Intercept)+0.76 (Age_Post)+2.78(HL)) (see Table 7.5 below).

For Age_Post of L2 speakers, the log-odds value of choosing pattern B vs. pattern A will decrease by **1.59** (-16.91(Intercept)+1.17(Age_Post)+14.15(L2)), the log-odds value of choosing pattern C vs. pattern A will decrease by **2.57** (-17.48(Intercept)+1.46(Age_Post)+13.45 (L2)), the log-odds value of choosing pattern D vs. pattern A will decrease by **1.28** log-odd (-3.28(Intercept)+0.61(Age_Post)+ 1.39 (L2)), the log-odds value of choosing pattern E vs. pattern A will increase by **8.88** log-odd (-5.03(Intercept)+12.82(Age_Post)+ 1.09 (L2)), the log-odds value of choosing pattern F vs. pattern A will decrease by **1.89** log-odd (-5.62(Intercept)+0.76(Age_Post)+ 2.97 (L2)) (see Table 6.5 below). HL and L2 have the same decreasing trend in pattern distribution, HL and L2 has a higher frequency in pattern D and E, and a lower frequency in pattern D. The CN group has an obvious decrease in response trend compared to the HL and the L2 group. Moreover, L2 has a higher frequency in pattern F (**-1.89>-2.08>-4.68**).

Table 7.5. Results of the generalized linear mixed model 2 on Age_Post (Task 2)

Coefficients				
	(Intercept)	Group HL	GroupL2	Pred_English
B	-16.91	13.50	14.15	0.65
C	-17.48	14.11	13.45	0.09
D	-3.28	1.12	1.39	0.46
E	-5.03	2.03	1.09	1.08
F	-5.62	2.78	2.97	1.23
Std. Errors				
	(Intercept)	Group HL	GroupL2	Pred_English
B	286.23	286.23	286.23	0.42
C	0.42	0.56	0.62	0.83
D	0.34	0.40	0.40	0.25
E	1.01	1.19	1.30	0.84
F	1.01	1.05	1.05	0.34
t value				
	(Intercept)	Group HL	GroupL2	Pred_English
B	-0.06	0.05	0.05	1.55
C	-41.13	24.93	21.73	0.11
D	-9.63	2.79	3.52	1.81
E	-4.98	1.71	0.84	1.28
F	-5.56	2.65	2.83	3.65
P value				
	(Intercept)	Group HL	GroupL2	Pred_English
B	0.929	0.962	0.961	0.120
C	0.000	0.000	0.000	0.915
D	0.000	< .005	0.000	0.070
E	< .001	0.087	0.403	0.199
F	< .001	< .008	< .004	0.000

Confidence intervals								
	(Intercept)		Group HL		GroupL2		Pred_English	
	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %
B	-577.92	544.09	-547.51	574.50	-546.86	575.16	-0.16	1.46
C	-18.31	-16.64	13.00	15.22	12.24	14.67	-1.53	1.71
D	-3.95	-2.61	0.33	1.91	0.62	2.17	-0.04	0.95
E	-7.01	-3.05	-0.30	4.36	-1.46	3.64	-0.57	2.72
F	-7.60	-3.64	0.73	4.83	0.92	5.02	0.57	1.87

4.2.2.6 Generalized linear mixed model: age of second language acquisition before 11

The findings also revealed that the response distribution was affected by the age of acquisition for the L2. Table 7.6 is a condensed version of Table 7, with additional insights and interpretation. Learning a second language before the age of 11, for the CN group (see Table 6.6 below), the log-odds value of choosing pattern B vs. pattern A will decrease by **17.8** (-16.91(Intercept)-0.89(Age_L2Bef11)), the log-odds value of choosing pattern C vs. pattern A will decrease by **19.27** (-17.48(Intercept)-1.79(Age_L2Bef11)), and the log-odds value of choosing pattern D vs. pattern A will decrease by **3.56** (-3.28(Intercept)-

0.82(Age_L2Bef11)), the log-odds value of choosing pattern E vs. pattern A will decrease by **-7.81** (-5.03(Intercept)-2.78(Age_L2Bef11)), and the log-odds value of choosing pattern F vs. pattern A will decrease by **6.5** (-5.62(Intercept)-0.88(Age_L2Bef11)). It showed that the chance of choosing patterns B, C, D, E, and F was an increasing trend in the CN group (see Table 7.6 below).

For HL, the log-odds value of choosing pattern B vs. pattern A will decrease by **4.3** (-16.91(Intercept)-0.89(Age_L2Bef11)+13.50(HL)), the log-odds value of choosing pattern C vs. pattern A will decrease by **5.16** (-17.48(Intercept)-1.79(Age_L2Bef11)+14.11(HL)), the log-odds value of choosing pattern D vs. pattern A will decrease by **2.98** (-3.28(Intercept)-0.82(Age_L2Bef11)+1.12(HL)), the log-odds value of choosing pattern E vs. pattern A will increase by **3.59** (-4.34(Intercept)-2.78(Age_L2Bef11)+2.03(HL), and the log-odds value of choosing pattern F vs. pattern A will decrease by **3.72** (-5.62(Intercept)-0.88(Age_L2Bef11)+2.78(HL)) (see Table 7.6 below).

For L2 speakers, the log-odds value of choosing pattern B vs. pattern A will decrease by **3.65** log-odd (-16.91(Intercept)-0.89(Age_L2Bef11)+14.15(L2)), the log-odds value of choosing pattern C vs. pattern A will decrease by **5.82** (-17.48 (Intercept)-1.79(Age_L2Bef11)+13.45(L2)), the log-odds value of choosing pattern D vs. pattern A will fall by **2.71** (-3.28(Intercept)-0.82(Age_L2Bef11)+1.39(L2)), the log-odds value of choosing pattern E vs. pattern A will fall by **6.72** (-5.03(Intercept)-2.78(Age_L2Bef11)+1.09(L2)), and the log-odds value of choosing pattern F vs. pattern A will fall by **3.53** (-5.62(Intercept)-0.88(Age_L2Bef11)+2.97(L2)) (see Table 6.6 below). Three groups have the same trend in response distribution. L2 has a higher frequency in choosing pattern F compared to the CN and HL groups (**-3.53>-3.72>-6.5**).

Table 7.6. Results of the generalized linear mixed model 2 on Age_L2Bef11 (Task 2)

Coefficients				
	(Intercept)	Group HL	GroupL2	Age_L2Bef11
B	-16.91	13.50	14.15	-0.89
C	-17.48	14.11	13.45	-1.79
D	-3.28	1.12	1.39	-0.82
E	-5.03	2.03	1.09	-2.78
F	-5.62	2.78	2.97	-0.88
Std. Errors				
	(Intercept)	Group HL	GroupL2	Age_L2Bef11
B	286.23	286.23	286.23	0.37
C	0.42	0.56	0.62	0.79
D	0.34	0.40	0.40	0.23
E	1.01	1.19	1.30	0.87
F	1.01	1.05	1.05	0.28
t value				
	(Intercept)	Group HL	GroupL2	Age_L2Bef11
B	-0.06	0.05	0.05	-2.41
C	-41.13	24.93	21.73	-2.25
D	-9.63	2.79	3.52	-3.6
E	-4.98	1.71	0.84	-3.21
F	-5.56	2.65	2.83	-3.17
P value				
	(Intercept)	Group HL	GroupL2	Age_L2Bef11
B	0.929	0.962	0.961	0.015
C	0.000	0.000	0.000	0.024
D	0.000	< .005	0.000	0.000
E	< .001	0.087	0.403	< .001
F	< .001	< .008	< .004	< .002

Confidence intervals								
	(Intercept)		Group HL		GroupL2		Age_L2Bef11	
	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %
B	-577.92	544.09	-547.51	574.50	-546.86	575.16	-1.62	-0.17
C	-18.31	-16.64	13.00	15.22	12.24	14.67	-3.34	-1.27
D	-3.95	-2.61	0.33	1.91	0.62	2.17	-1.27	-0.37
E	-7.01	-3.05	-0.30	4.36	-1.46	3.64	-4.48	-1.08
F	-7.60	-3.64	0.73	4.83	0.92	5.02	-1.42	-0.33

4.3 Test on task 3 multiple choice task (word order)

4.3.1 Descriptive summary

Task 3 examines what kind of word order errors HL or L2 speakers exhibit with *ba* sentences, compared to the CN group. A total of 19 sentences are provided in this task. The participants are given five options to choose from. A, B, C, D, and E in (33) were the suggested phrases, and then different orders were suggested, F was NOT SURE.

33. A. 他	B.那只鸡	C. 残忍地	D. 把	E.杀了
A ta	B. na zhi ji	C.canrende	D. *ba*	E. sha le (SFP)
A He	B. that chicken	C. cruelly	D. *ba*	E. killed.

'He cruelly killed the chicken.'

A. A B C D E A. He that chicken cruelly *ba* killed.
B. A D B E C B. He *ba* that chicken killed cruelly.
C. A D B C E C. He *ba* that chicken cruelly killed.
D. A E D B C D. He killed *ba* that chicken cruelly.
E. A E B C D E. He killed that chicken cruelly *ba*.
F. 不确定 (NOT SURE)

According to all participant's answers, their answers divided into four patterns.

Pattern A. Right word order,

Pattern B. Wrong word order,

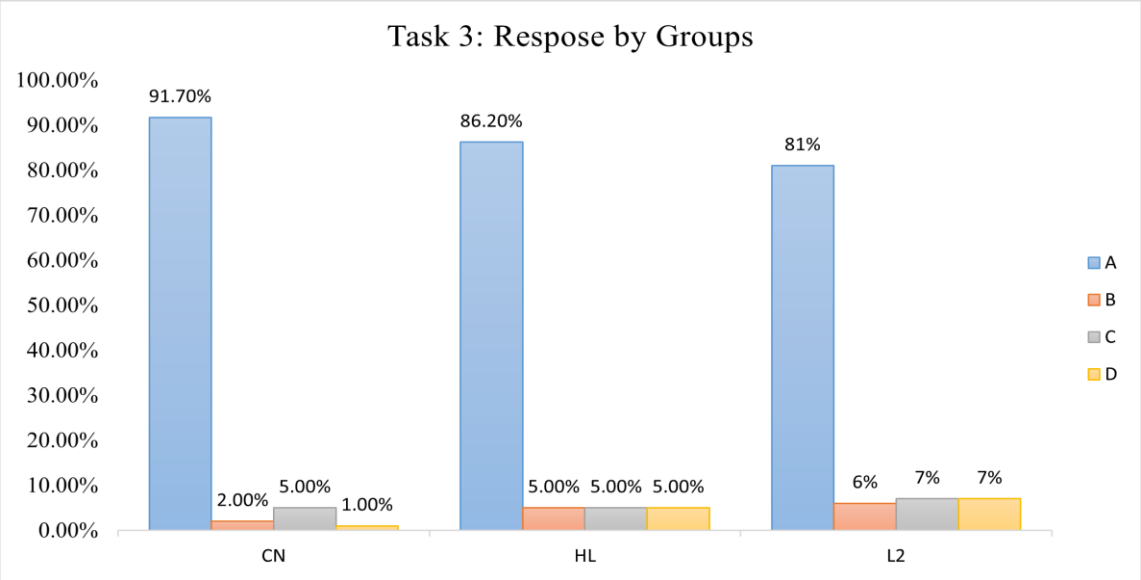
Pattern C. Right word order, but there are other problems,

Pattern D. Not sure.

Figure 11 below shows the distribution of the participants' answer patterns. Overall, the answer pattern distributions of the HL and L2 groups were consistent with the CN answer distribution (see Figure 11 below). In the CN group, pattern A was over **90%**. Pattern D was only **1%**. The patterns of B and C were 2% and 5%, respectively.

In the HL group, pattern A was chosen the most, **86.20%**. The other three answer patterns B, C, and D were the same, and all were 5%. Compared with the CN group, the answer D has increased by almost five. Moreover, the L2 group had 7% of answer D, which was almost seven times higher than the D answers of the CN group. The rest of the patterns, A, B, and C were **81%**, 6%, and 7%, respectively. Among them, answer A was the most, and answer E was the least.

Figure 11. Overall responses by participant groups (Task3)



4.3.2 Statistical analysis summary

For Task 3, there were six options for each sentence: A to E were suggested word orders for the *ba sentence*s, and option F was NOT SURE. The participants' answers were divided into four patterns (pattern A to D). Model 3 featured more than two outcome variables, much like Model 2. The Multinomial Model (Venables & Ripley, 2013), which is a regression model, was employed in Model 3. Model 3 was built in the same way as Model 2. In Model 3, the independent variables were the groups, predominate language, age, and age of learning second languages (age of acquisition), the dependent variable was answering patterns (pattern A, B, C, and D). The answers were coded as numerals, with 1 representing "A" (pattern A), 2 representing "B" (pattern B), 3 representing "C" (pattern C), and 4 representing "D" (pattern D). Therefore, the model treated "A" as the default outcome. The statistical result was table 8 (see below). Table 8 (see below) will be broken down into several smaller tables based on independent variables.

Table 8. Summary of the generalized linear mixed model 3 (Task 3)

Coefficients						
	(Intercept)	Group HL	GroupL2	Pred_English	Age_Post	Age_L2Bef11
B	-2.96	1.94	1.69	-0.95	0.85	-1.83
C	-2.21	0.43	0.45	-0.27	0.51	-1.15
D	-4.19	2.01	2.09	-0.35	1.54	-0.51
Std. Errors						
	(Intercept)	Group HL	GroupL2	Pred_English	Age_Post	Age_L2Bef11
B	0.28	0.39	0.40	0.35	0.69	0.30
C	0.20	0.34	0.34	0.32	0.67	0.24
D	0.42	0.48	0.48	0.32	0.50	0.32
t value						
	(Intercept)	Group HL	GroupL2	Pred_English	Age_Post	Age_L2Bef11
B	-10.38	4.94	4.18	-2.76	1.24	-5.98
C	-11.07	1.27	1.29	-0.85	0.76	-4.70
D	-9.97	4.17	4.35	-1.13	3.06	-1.60
P value						
	(Intercept)	Group HL	GroupL2	Pred_English	Age_Post	Age_L2Bef11
B	0	< .001	< .001	< .006	0.216	< .001
C	0	0.204	0.196	0.394	0.450	< .001
D	0	< .001	< .001	0.259	< .002	0.109

Confidence intervals												
	(Intercept)		Group HL		GroupL2		Pred_English		Age_Post		Age_L2Bef11	
	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %
B	-3.51	-2.40	1.17	2.71	0.90	2.46	-1.62	-0.28	-0.50	2.20	-2.42	-1.23
C	-2.61	-1.82	-0.24	1.11	-0.23	1.12	-0.89	0.35	-0.80	1.81	-1.63	-0.67
D	-5.02	-3.37	1.07	2.95	1.15	3.03	-0.98	0.26	0.55	1.81	-1.12	0.11

As the following sections will show, the participants' answers are influenced by their group, predominant English, age post, and age of second language acquisition. Additionally, it indicates how participants' answers are influenced by English language environment, age post, and age of second language acquisition.

4.3.2.1 Generalized linear mixed model: Group HL

Results from model 3 suggested that the participant group plays a significant role. The following table 8.1 is a subset of table 8 and that will go into more interpretation. As a baseline, the intercept represented the response pattern A for the CN group. The intercept column showed that the chance of selecting options was a declining trend in response distribution, and the log-odds value of selecting pattern B vs. pattern A will reduce by **2.96** [β=-2.96, SE=0.28, t=-10.38, p=0, CI95=-3.51:-2.40]; the log-odds value of choosing pattern C vs. pattern A will reduce by **2.21** [β=-2.21, SE=0.20, t=-11.07, p=0, CI95= -2.61:-1.82]; and the log-odds value of choosing pattern D vs. pattern A will decrease by **4.19** [β=-4.19, SE=0.42, t=-

9.97, p=0, CI95=-5.02: -3.37]. CN selects pattern A first, followed by pattern C, then B, and lastly, D (See Table 8.1 below).

Table 8.1. Results of the generalized linear mixed model 3 on Group HL (Task3)

Coefficients			Std. Errors	
	(Intercept)	Group HL	(Intercept)	Group HL
B	-2.96	1.94	0.28	0.39
C	-2.21	0.43	0.20	0.34
D	-4.19	2.01	0.42	0.48
t value			P value	
	(Intercept)	Group HL	(Intercept)	Group HL
B	-10.38	4.94	0	< .001
C	-11.07	1.27	0	0.204
D	-9.97	4.17	0	< .001
Confidence intervals				
	(Intercept)		Group HL	
	2.5 %	97.5 %	2.5 %	97.5 %
B	-3.51	-2.40	1.17	2.71
C	-2.61	-1.82	-0.24	1.11
D	-5.02	-3.37	1.07	2.95

For Speakers in Group HL, the chance of choosing patterns A, B, C, and D has a small decreased tendency in pattern distribution. For HL, the log-odds value of choosing pattern B vs. pattern A will decrease by **1.02** (-2.96(Intercept)+1.94(HL)); the log-odds value of choosing pattern C vs. pattern A decreased by **1.78** (-2.21(Intercept)+0.43(HL)), and the log-odds value of choosing pattern D vs. pattern A decreased by **-2,18** (-4.19(Intercept)+2.01(HL)) (See Table 8.1 above).

4.3.2.2 Generalized linear mixed model: Group L2

For Speakers in the L2 Group, the chance of choosing patterns A, B, C, and D was also a small decreased tendency in response distribution. The following table 8.2 is a subset of table 8 provides additional interpretation. Same as the HL group, the log-odds value of choosing pattern B vs. pattern A will decrease by **1.27** (-2.96(Intercept)+1.69 (L2)); the log-odds value of choosing pattern C vs. pattern A will decrease by **1.76** (-2.21 (Intercept)+0.45 (L2)); and the log-odds value of choosing pattern D vs. pattern A will decrease by **2.1** (-4.19 (Intercept)+ 2.09 (L2)) (see Table 8.2 below). The response trend of the HL and L2 groups were consistent with the CN group. HL and L2 generally were closer. The L2 group is higher for pattern D, which is more than group CN and HL (**-2.1>-2.18>-4.19**).

Table 8.2. Results of the generalized linear mixed model 3 on L2 group (Task3)

Coefficients			Std. Errors	
	(Intercept)	Group L2	(Intercept)	Group L2
B	-2.96	1.69	0.28	0.40
C	-2.21	0.45	0.20	0.34
D	-4.19	2.09	0.42	0.48
t value			P value	
	(Intercept)	Group L2	(Intercept)	Group L2
B	-10.38	4.18	0	< .001
C	-11.07	1.29	0	0.196
D	-9.97	4.35	0	< .001
Confidence intervals				
	(Intercept)		Group L2	
	2.5 %	97.5 %	2.5 %	97.5 %
B	-3.51	-2.40	0.90	2.46
C	-2.61	-1.82	-0.23	1.12
D	-5.02	-3.37	1.15	3.03

4.3.2.3 Generalized mixed model: Predominantly English

Predominant language has an impact on response distribution. The following table 8.3 is a subset of table 8 and that will go into more interpretation. For the Pred_English CN group, the chance of choosing type A, B, C, and D, in answer pattern distribution, and the log-odds value of selecting pattern B vs. pattern A will reduce by **3.91** (-2.96 (Intercept)-0.95 (Pred_English)); the log-odds value of choosing pattern C vs. pattern A will reduce by **2.48** (-2.21(Intercept)-0.27(Pred_English)); the log-odds value of choosing pattern D vs. pattern A will decrease by **4.54** (-4.19(Intercept)-0.35(Pred_English)). Clearly, CN selects A first, followed by C, then B, and lastly, D (see Table 8.3 below).

Pred_English HL had a decreased tendency in response distribution. For HL, the log-odds value of choosing pattern B vs. pattern A will decrease by **1.97** (-2.96(Intercept)+1.94 (HL) -0.95 (Pred_English)), the log-odds value of choosing pattern C vs. pattern A will decrease by **2.05** log-odd (-2.21(Intercept)+0.43(HL) – 0.27 (Pred_English)), the log-odds value of choosing pattern D vs. pattern A will decrease by **2.53** log-odd (-4.19(Intercept)+2.01(HL)-0.35 (Pred_English)) (see Table 8.3 below).

For Pred_English Group L2, the chance of choosing patterns A, B, C, and D also had a decreasing trend in option distribution, like the HL group. For L2, the log-odds value of choosing pattern B vs. pattern A will decrease by **2.22** log odd (-2.96 (Intercept)+1.69 (L2) -0.95 (Pred_English)), the log-odds value of choosing pattern C vs. pattern A will decrease by **2.03** (-2.21(Intercept)+0.45(L2) -0.27(Pred_English)), the log-odds value of choosing pattern

D vs. pattern A will decrease by **2.45** log-odd(-4.19 (Intercept)+2.09(L2) -0.35 (Pred_English (see Table 8.3 below). CN, HL, and L2 have the same response distribution trend. HL has a higher frequency in producing pattern D, and CN has a lower frequency in choosing pattern D (**-2.45>-2.53>-4.54**).

Table 8.3. Results of the generalized linear mixed model 3 on Pred_English (Task3)

Coefficients								
	(Intercept)		Group HL		GroupL2		Pred_English	
B	-2.96		1.94		1.69		-0.95	
C	-2.21		0.43		0.45		-0.27	
D	-4.19		2.01		2.09		-0.35	
Std. Errors								
	(Intercept)		Group HL		GroupL2		Pred_English	
B	0.28		0.39		0.40		0.35	
C	0.20		0.34		0.34		0.32	
D	0.42		0.48		0.48		0.32	
t value								
	(Intercept)		Group HL		GroupL2		Pred_English	
B	-10.38		4.94		4.18		-2.76	
C	-11.07		1.27		1.29		-0.85	
D	-9.97		4.17		4.35		-1.13	
P value								
	(Intercept)		Group HL		GroupL2		Pred_English	
B	0		< .001		< .001		< .006	
C	0		0.204		0.196		0.394	
D	0		< .001		< .001		0.259	
Confidence intervals								
	(Intercept)		Group HL		GroupL2		Pred_English	
	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %
B	-3.51	-2.40	1.17	2.71	0.90	2.46	-1.62	-0.28
C	-2.61	-1.82	-0.24	1.11	-0.23	1.12	-0.89	0.35
D	-5.02	-3.37	1.07	2.95	1.15	3.03	-0.98	0.26

4.3.2.4 Generalized linear mixed model: Age Post (40-50)

Age played a vital role in producing *ba* sentences. In particular, the results showed that Age_Post (40-50 years) affected the response distribution. The following table 8.4 is a subset of table 8 provides more detailed analysis and interpretation.

Table 8.4. Results of the generalized linear mixed model 3 on Age_Post (Task3)

Coefficients				
	(Intercept)	Group HL	GroupL2	Age_Post
B	-2.96	1.94	1.69	0.85
C	-2.21	0.43	0.45	0.51
D	-4.19	2.01	2.09	1.54
Std. Errors				
	(Intercept)	Group HL	GroupL2	Age_Post
B	0.28	0.39	0.40	0.69
C	0.20	0.34	0.34	0.67
D	0.42	0.48	0.48	0.50
t value				
	(Intercept)	Group HL	GroupL2	Age_Post
B	-10.38	4.94	4.18	1.24
C	-11.07	1.27	1.29	0.76
D	-9.97	4.17	4.35	3.06
P value				
	(Intercept)	Group HL	GroupL2	Age_Post
B	0	< .001	< .001	0.216
C	0	0.204	0.196	0.450
D	0	< .001	< .001	< .002

Confidence intervals								
	(Intercept)		Group HL		GroupL2		Age_Post	
	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %
B	-3.51	-2.40	1.17	2.71	0.90	2.46	-0.50	2.20
C	-2.61	-1.82	-0.24	1.11	-0.23	1.12	-0.80	1.81
D	-5.02	-3.37	1.07	2.95	1.15	3.03	0.55	1.81

In the level of age Age_Post for the CN group, the chance of choosing patterns A, B, C, and D showed a declining trend in response distribution. The log-odds value of selecting pattern B vs. pattern A will reduce by **2.11**(-2.96(Intercept)+0.85(Age_Post)); the log-odds value of choosing pattern C vs. pattern A will reduce by **1.7** (-2.21 (Intercept)+0.51(Age_Post)); the log-odds value of choosing pattern D vs. pattern A will decrease by **2.65**(-4.19(Intercept)+1.54(Age_Post)). CN has a lower frequency pattern D (see Table 8.4 above).

For group HL, the chance of choosing patterns A, B, C, and D was a decreased tendency in patterns. For HL, the log-odds value of choosing pattern B vs. pattern A will decrease by **0.17** (-2.96(Intercept)+1.94(HL) +0.85(Age_Post)), the log-odds value of choosing pattern C vs. pattern A will decrease by **-1.27** (-2.21(Intercept)+0.43(HL) +0.51(Age_Post)), the log-odds value of choosing pattern D vs. pattern A will decrease by **0.64** (-4.19(Intercept)+2.01(HL) +1.54(Age_Post)) (see Table 8.4 above).

For Group L2, the chance of choosing patterns A, B, C, and D also was a declining trend in response distribution. For L2, the log-odds value of choosing pattern B vs. pattern A will decrease by **0.42** (-2.96(Intercept)+1.69(L2) +0.85(Age_Post)), the log-odds value of

choosing pattern C vs. pattern A will decrease by **1.25** (-2.21(Intercept)+0.45(L2) +0.51(Age_Post)), the log-odds value of choosing pattern D vs. pattern A will decrease by **0.56** (-4.19(Intercept)+2.09(L2) +1.54(Age_Post)) (see Table 7.4 above). HL choose pattern B with higher frequency than group CN and L2(**-0.17>-0.43>-2.11**). L2 has a higher frequency in pattern D, and CN has a lower frequency (**-0.56>-0.64>-2.65**).

4.3.2.5 Generalized linear mixed model: age of second language acquisition before 11

The data also demonstrated that the age of acquisition of the L2 affected the distribution of response patterns. Table 8.5 is a subset of Table 8 and with more in-depth analysis and interpretation. Learning the second language before 11 showed the chance of choosing patterns A, B, C, and D also was a declining trend in response distribution. For CN, the log-odds value of selecting pattern B vs. pattern A will reduce by **4.79** (-2.96(Intercept)-1.83(Age_L2Bef11)); the log-odds value of choosing pattern C vs. pattern A will reduce by **3.36** (-2.21(Intercept)-1.15(Age_L2Bef11)); the log-odds value of choosing pattern D vs. pattern A will decrease by **4.34** (-4.19(Intercept)-0.15(Age_L2Bef11)). CN has the higher frequency in pattern C, followed by D, and lastly, B (see Table 8.5 below).

For HL, the chance of choosing patterns A, B, C, and D also declined in response distribution. The log-odds value of choosing pattern B vs. pattern A will decrease by **2.85** (-2.96(Intercept)+1.94(HL) -1.83 (Age_L2Bef11)), the log-odds value of choosing pattern C vs. pattern A will decrease by **2.93**(-2.21 (Intercept)+0.43(HL) -1.15(Age_L2Bef11)), the log-odds value of choosing pattern D vs. pattern A will decrease by **1.67** (-4.19 (Intercept)+2.01(HL) +0.51(Age_L2Bef11)) (see Table 8.5 below).

For Group L2, the log-odds value of choosing pattern B vs. pattern A will decrease by **3.1**(-2.96(Intercept)+1.69(L2) -1.83(Age_L2Bef11)). The log-odds value of choosing pattern C vs. pattern A will decrease by **2.91** (-2.21(Intercept)+0.45(L2) -1.15 (Age_L2Bef11)), the log-odds value of choosing pattern D vs. pattern A will decrease by **2.61**(-4.19(Intercept)+2.09(L2) -0.51(Age_L2Bef11)) (see Table 7.5 below). Therefore, HL and L2 have the same trend in response distribution. CN has a higher frequency in pattern C. HL has a higher frequency in pattern D, comparing CN and HL (**-1.67>-2.61>-4.34**).

Table 8.5. Results of the generalized linear mixed model 3 on Age_L2Bef11 (Task 3)

Coefficients								
	(Intercept)		Group HL		GroupL2		Age_L2Bef11	
B	-2.96		1.94		1.69		-1.83	
C	-2.21		0.43		0.45		-1.15	
D	-4.19		2.01		2.09		-0.51	
Std. Errors								
	(Intercept)		Group HL		GroupL2		Age_L2Bef11	
B	0.28		0.39		0.40		0.30	
C	0.20		0.34		0.34		0.24	
D	0.42		0.48		0.48		0.32	
t value								
	(Intercept)		Group HL		GroupL2		Age_L2Bef11	
B	-10.38		4.94		4.18		-5.98	
C	-11.07		1.27		1.29		-4.70	
D	-9.97		4.17		4.35		-1.60	
P value								
	(Intercept)		Group HL		GroupL2		Age_L2Bef11	
B	0		< .001		< .001		< .001	
C	0		0.204		0.196		< .001	
D	0		< .001		< .001		0.109	
Confidence intervals								
	(Intercept)		Group HL		GroupL2		Age_L2Bef11	
	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %	2.5 %	97.5 %
B	-3.51	-2.40	1.17	2.71	0.90	2.46	-2.42	-1.23
C	-2.61	-1.82	-0.24	1.11	-0.23	1.12	-1.63	-0.67
D	-5.02	-3.37	1.07	2.95	1.15	3.03	-1.12	0.11

4.4 Summary

In task 1, the participants were evaluated on their grammatical knowledge of *ba* sentences. Model 1 demonstrates that L2 speakers who use *ba* sentences do not do this the same way as CN speakers. However, HL speakers **judge** sentences similarly to the CN group. Thus, HL speakers' pattern with CN speakers in judgment but with L2 speakers in usage. However, the hypothesis predicted that HL speakers would pattern with L2 speakers throughout.

Task 2 consisted of multiple-choice questions that tested the participants' ability to use complements appropriately in *ba s*entences. The results in Model 2 demonstrate that L2 and HL users made much greater use of simple complements than native speakers. In addition, HL and L2 speakers show differences in their use of various complements, and HL and L2 used simple complements significantly more often than native speakers did.

In addition, task 3 constructed a new *ba* sentence to test the participants' word order production in *ba* sentences. Model 3 illustrates that both HL and L2 speakers utilize the word order incorrectly, and there were instances of SVO order with the *ba* sentences.

Thus, overall HL and L2 speakers generally **used** *ba sentence*s differently compared to CN speakers while the L2 speakers differ from the CN and HL speakers when judging *ba* sentences. Since HL and L2 have the same dominant language English, the predominant language is predictive of use but not necessarily of underlying knowledge. Age of acquisition often corresponds to speaker group and thus also predicts similar responses. The speaker's age alone is not an important factor in differentiating speaker groups since there might be many more factors to consider.

CHAPTER 5 DISCUSSION

The goal of the investigation was to see whether and how the use of *ba* constructions differs between native speakers, HL, and L2 speaker groups. The hypothesis was that HL speakers would pattern with native speakers more often since both groups acquire Chinese as an L1.

The impact of multiple variables on the use and knowledge of *ba* constructions in the three speaker groups was tested, such as speaker group, predominant language, age, and age of acquisition.

The experimental findings revealed that HL and L2 differ from CN in tasks 2 and 3 in the use of complements and word order changes. Thus, the predominantly English language environment for HL and L2 plays a role in distinguishing the speaker groups for production. Compared to the other age groups, the post-age of all speaker groups also affects HL and L2 choices, such as in task 3, the post-age HL group chose pattern B[3] more frequently than group CN, and L2 did.

Age of acquisition of the second language (Chinese for L2 and English for HL speakers) also impacts the use of *ba* sentences distinguishing L2 from HL and CN speaker groups. The type of tasks also affected the performance. In judgment tasks (task 1), HL and CN patterned more closely, while L2 and HL patterned more closely in production tasks.

5.1 Speaker Group

The group type as a variable influenced the three groups in the aspects of acceptability judgments, complement use, and choice of order.

5.1.1 Acceptability judgments

In the acceptability judgment task, the participants were asked to judge the acceptability of word order in *ba* sentences. HL judged *ba* constructions similarly to CN, while L2 differed from CN and HL. The experimental results were still somewhat different from what was expected. The initial hypothesis was that HL and L2 would differ from each other for each of the types of *ba* sentences in the judgment task.

The experimental data showed that the acceptance rate and distribution of L2 responses differed greatly from those of the CN and HL groups. On the whole, HL and CN

[3] Pattern A. Right word order,
Pattern B. Wrong word order,
Pattern C. Right word order, but there are other problems,
Pattern D. Not sure.

have a similar distribution of answer patterns in acceptability judgments, supporting the initial hypothesis.

Grammatical judgment tasks test the knowledge of participants, not usage. HL and L2 speakers use Chinese less than CN speakers since they live in a predominantly English environment. On the other hand, HL speakers have acquired Chinese as a first language, which means that their unconscious grammatical competence is acquired similarly to CN speakers. These results explain why HL speaker's patterns are closer to CN than L2 speakers.

This pattern can also be explained due to the strong influence of English word order on these two speaker groups. L2 speakers judge a grammatical negated sentence such as (34a) as ungrammatical, possibly due to the very different word order of negation in English. Support comes from the high rate of judging ungrammatical negative sentences as grammatical (34b) due to the negation particle before the verb, as it would be in English.

34a. 我没有把房间弄乱。

wo	meiyou	*ba*	fangjian	nongluan.
I	not	*ba*	room	mess up.

'I didn't mess up the room.'

34b. *我把房间没有弄乱。

wo	*ba*	fangjian	meiyou	nongluan.
I	*ba*	room	not	mess up

'I didn't mess up the room.'

Since HL speakers speak Chinese as their first language and have been exposed to it since birth, their choice of syntactic judgments is more similar to CN speakers. The research of Chang & Zheng (2017) showed that for individuals whose first language is Chinese, *ba* sentences begin and progress at the age of one and become more complex at two years old. At that early age, HL speakers have a better understanding of the basic word order of *ba* sentences than L2 speakers, even if they do not produce as many.

5.1.2 Complements of *ba* sentences

According to the findings of this study, HL and L2 employed simple complements more than native speakers. There were five types of complements in task 2, result complement, quantity complement, preposition complement, direction complement, and *de* complement. Based on the answers of the three groups, their answers were divided into five types.

Type 1: Completed complement.

Type 2: Omission: Missing verb or missing complement.

Type 3: Incorrectly added: extra verbs or extra complements.

Type 4: Misused complements: Two complementary words with similar meanings are used incorrectly.

Type 5: Wrong order of complement: Incorrect order of words in the complements.

Type 6: Uncertain.

According to the overall trends, the choices of the HL and L2 for answer Type 1 were similar to the choices of the CN group for Type 1. However, types 2, 3, 4, 5, and 6 differed significantly from the CN group.

The *de* complement was more complex than other complements in *ba* sentences for L2 and HL. For example, sentence (35a), which misses *de* (type 2) was chosen more often by HL and L2 speakers.

35a. *他把教室打干干净净。
ta *ba* jiaoshi dasao ganganjingjing.
He *ba* classroom clean completely.
'He cleaned up the classroom.'

35b. 他把教室打扫得干干净净。
ta *ba* jiaoshi daso de ganganjingjing.
He *ba* classroom clean de ganganjingjign.
'He cleaned up the classroom.'

Sentence (36a), which represents adding words (type 3), was also chosen over the correct (36b), mostly by L2 and HL speakers.

36a. *我把衣服洗很干干净净了。
wo *ba* yifu xi henganganjingjing le
I *ba* clothes laundry cleaned SFP
'I got the laundry cleaned.'

36b. 我把衣服洗得很干净了。
wo *ba* yifu xi de hen ganjing le.
I *ba* clothes laundry de very cleaned SFP.
'I got the laundry cleaned.'

The same goes for (37a), which represents omission and misuse of complements (types 3 and 4).

37a. *这天气把人热很难受。
zhe Tianqi *ba* ren re hen nanshou.
This weather *ba* pepoel hot very uncomfortable.
'This is a hot day that makes people uncomfortable.'

37b. 这天气把人热得很难受。
zhe tianqi *ba* ren re de hen nanshou.
This weather *ba* people hot de very uncomfortable.
'This is a hot day that makes people uncomfortable.'

L2 and HL speakers also preferred (38a), which represents the wrong order (type 5). These results show that L2 and HL speakers choose the wrong *ba* sentences with respect to order, type, and complexity of complements compared to CN speakers.

38a. *他把家装修很俗里俗气得。
ta *ba* jia zhaungxiu hen sulisuqi de.
He *ba* house decorate very cheesy de.
'He decorated his home in a cheesy way.'

38b. 他把家装修得俗里俗气。
ta *ba* jia zhuangxiu de sulisuqi.
He *ba* house decorate de cheesy.
'He decorated his home in a cheesy way.'

These results show that while HL speakers can identify *ba* sentences, they use them differently from CN speakers. Not only do they have problems with the order of complements, but also with the types of complements to be used. These results also show that HL speakers pattern closer to L2 speakers regarding production. Since HL speakers and L2 speakers live and speak in a predominantly English-speaking environment, this is not surprising.

5.1.3 Basic word order

The last question was whether HL and L2 would choose the wrong SVO order with *ba* sentences instead of SOV due to the prevalent SVO order in English. It was found that HL and L2 showed differences concerning the required SOV word order in *ba* sentences. There were several types of sentences that participants could choose.

A. Correct word order,

B. Incorrect word order,

C. Correct word order, but there are other problems,

D. Not sure.

The results revealed that the HL and L2's choice of Type A is still quite like that of CN. The distribution of the four sentence types shows that Type A is preferred the most in the three groups, illustrating a basic knowledge of the word order in *ba* sentences. However, HL and L2 choose Types B and C quite distinctly from CN.

For instance, in the task, participants had to choose the correct order for a negated *ba* sentence from these given elements: A.信保存好, B.没, C.我, D. 把.

39a. *我把没信保存好。
wo *ba* mei xin baocun hao.
I *ba* not letter keep well.
'I didn't keep the letter well.'

39b. *没把信保存好我。
mei *ba* xin baocun hao wo.
Not *ba* letter keep well I.
'I didn't keep the letter well.'

39c. 我没把信保存好。
wo mei *ba* xin baocun hao.
I not *ba* letter keep well.
'I didn't keep the letter well.'

Sentence (39a) represents the wrong order for the negated *ba sentence* (type B). While the basic order is SOV, the negation is placed after *ba* instead of before. HL and L2 used this structure NP1+*ba*+not+NP2+Verb with negation before *ba* and the verb at the end, as one should expect for *ba* sentences. Sentence (39b) represents (type B). The sentence structure was not+*ba*+NP2+Verb+NP1 with the subject NP1 at the end of the sentence. The CN group used the correct word order for negated *ba* sentences, which was NP1+no/not+*ba*+NP2+V(39c). (39b) represents type B in that they chose the right *ba* sentence word order except for the subject position.

Compared with the first test, HL and L2 performance in task 2 and task 3 were not quite as similar as in the CN group. According to Li et al. (1990), Zhou & Wang, (2001) (2010), and Chang & Zheng (2017) the developmental period in L1 acquisition of *ba*-word sentences can be divided into several stages: Stage 1, from 2 to 2.5 years old, CN speakers use simple *ba* sentences with some auxiliary verbs, adverbs, and words indicating time, place, and tools before *ba*. In stage 2, 2.5 to 3.5 years old, CN children use *ba* sentences in which some adverbs indicating tone, manner, and frequency appear between *ba* and the verb; the verb is followed by the tense auxiliary, and the verb *shi 'was.'* Stage 3 is after age 4, and *ba*

sentences become sophisticated. The important change at this stage is that some complements indicate results, and the verbs appear after *ba*. The results of this study show that L2 and HL speakers are having some difficulties with the word order in different types of complex *ba* sentences compared to CN speakers.

Although HL may have acquired *ba* sentences at the same time CN did, as their second language usage grows, ba sentences are used less and mainly. While some HLs learn some Chinese, including how to use *ba* constructions, other HLs might not have gone through a formal *ba* sentence learning process. As a result, HL speakers use *ba* sentences differently and most likely less than CN speakers. Therefore, HL speakers use *ba* sentences differently and possibly less than CN speakers. Additionally, L2 speakers acquire *ba* sentences after HL and CN. The usage of complex *ba* sentences by L2 will differ from CN's since L2 learners learn *ba* sentences without much practice or production. The results in tasks 2 and 3 reflect these variations.

5.2 Predominant language environment

According to the results of this study, the linguistic environment did not affect HL and L2 in acceptability judgments. While English is the predominant language for both groups, it did not significantly affect their responses in task 1. The linguistic environment mainly affected HL and L2 in output sentences, i.e., task 2 and task 3. Not only are these speakers surrounded by English speakers, but they also speak English more often than Chinese. So, language dominance is reflected in their production and exposure to other speakers.

5.2.1 Complements of *ba* Sentences

Tasks 2 and 3 are controlled production tasks, requiring speakers to have knowledge but also practice in production. From the data Model, it was clear that the dominant language environment affected the use of *ba* sentences in HL and L2 compared to the Chinese dominant language environment for CN speakers.

L2 speakers mostly lack a Chinese language environment and thus practice and exposure to the Chinese language. Their first language thus influenced them more. The results in task 3 show a strong influence of English, especially when forming negated *ba* sentences. The preference of placing *mei 'not'* after *ba* indicates that *these speakers might erroneously treat ba as an auxiliary*. Thus, they form negated *ba* sentences by placing *mei 'not'* after the supposed auxiliary, similar to English negation. Cortés (2005) notes that language transfer appears when the learner notices that particular structures in the target language are very

different from those in their first language, and therefore, they will avoid using such structures. However, these speakers had no choice but to choose all elements in this simulated production task, so they appeared to choose the English word order for negation over the Chinese one.

For HL, on the other hand, although their dominant language is English, their language environment has been bilingual for most of their lives. Language transfer has primarily been studied in the context of L1 transferring to the L2. But for HL speakers as viewed here, the second language is the dominant language, and the L1 is the weak language since most of their interaction and use is in the L2, compared to the L1. While HL speakers may have an equal proficiency in both languages, the results of this study show a significant difference in proficiency to the CN speakers of Mandarin Chinese.

Thus, language transfer here appears to happen from the L2 to the L1, and the HL speakers' Chinese is influenced by their stronger and dominant English L2 environment and usage. Since the L1 is at a disadvantage in practice and production, and the L2 is used predominantly, the results for the production tasks show that the dominant L2 influences the L1 and word order patterns seem to be transferred from English to Chinese. This point is particularly evident in task 3 for negation.

5.2.2 Word Order

Adverb word order is fairly flexible in English. However, in specific cases, there are preferred orders in English. While (40a) would be preferred in English, with the adverb preceding the verb, in Chinese, (40b) is the preferred order. HL and L2 speakers, however, chose the “English” order in (40a) over (40b) with the adverb following the verb, which is not an option in Mandarin.

40a. *他把那只鸡杀了残忍地。

ta	*ba*	nazhi	ji	shale	canrende.
He	*ba*	that	chicken	killed	cruelly.

‘He cruelly killed the chicken.’

40b. 他把那只鸡残忍地杀了。

ta	*ba*	nashi	ji	canrende	shale.
He	*ba*	that	chicken	cruelly	killed.

‘He cruelly killed the chicken.’

Not only that, but in task 3, there was a sentence order issue. Many HL and L2 participants’ sentence orders also showed the dominant language's impact on the speaker groups.

For example, participants were given the following elements to form *ba* sentences.

Sentence 41. A.真相告诉他 B.把 C.为什么 D.不,

HL and L2 speakers chose the order in (41a) over the correct order of (41b). (41b) has the *wh*-word at the beginning, which would be like English. The two objects precede and follow the verb. That also is acceptable for at least one object in English. (41a) might be chosen by interpreting *weishnem bu 'why not'* as a separate sentence. Otherwise, it cannot be explained by transfer from English since the order overall is very different from English.

41a. *把真相告诉他为什么不?

ba	zhenxiang	gaosui	ta	weishenme	bu?
ba	truth	tell	him	why	not?

'Why not tell him the truth?'

41b. 为什么不把真相告诉他?

weishenme	bu	*ba*	zhenxiang	gaosui	ta?
Why	not	*ba*	truth	tell	him?

'Why not tell him the truth?'

Another example is sentence 42. HL and L2 choosing sentences like (42a) over (42b) might be due to the word order that mimics English reasonably closely. However, it seems the final *ba* was more or less ignored, which might indicate that *ba* is not very prominent in usage for these speakers. They put *ba* at the end because they might not know or care what to do with it. There is one possible auxiliary already *gaode 'made'*, so they leave *ba* at the end of the sentence.

42. A.游戏 B. 搞得 C.他的成绩 D.一落千丈 E.把

42a. *游戏搞得他的成绩一落千丈把。

youxi	gaode	tade	chengji	yiluoqianzhang	*ba*.
Game	made	his	grade	decline	*ba*.

'The game screwed up his grades.'

42b. 游戏把他的成绩搞得一落千丈。

youxi	*ba*	tade	chengji	gadoe	yiluoqianzhang.
Game	*ba*	his	grade	made	decline.

'The game screwed up his grades.'

The grammar of English clearly influences HL and L2 since they prefer the *ba* sentence as SVO*ba*. Language transfer can harm the process of foreign language learning. These

distinctions exist in most language systems, though only syntactic differences have been considered in this study.

5.3 Age

According to the results of this study, the age of the participants was one of the key criteria impacting the L2 and HL in utilizing *ba* sentences. The age range of the participants was 18–50 years, and they were divided into three groups: 18–30 was the age-pre group; 30–40 was the age-mid group, and 40–50 was the age-post group. One notable finding was that there was a significant difference in the use of *ba* sentences between HL and L2 age-post, compared to CN speakers of the same age.

In the syntactic judgment task, HL handled *ba* constructions similarly to CN, but L2 handled them differently in all age groups. The initial hypothesis was that HL and L2 would respond differently to each type of *ba* sentence when compared to CN. However, the experimental results revealed that whereas HL and CN had comparable distributions of answer patterns in syntactic judgments, L2 differed from the other two groups in all age groups. In the AGE POST group, the differences between L2 and the other two groups were even more pronounced in task 1.

Age_Post influenced the use of *ba* sentences in HL and L2 in task 2 and 3. The overall distribution of HL and L2 answer patterns is roughly similar in that age group, and HL and L2 choose patterns B, C, D, and F more often than CN. For example, Pattern B (extra verbs or extra complements) (43a and 43b) is the most obvious.

43a. *奶奶把裤子补ø。
nainai *ba* kuzi bu ø.
Grandma *ba* pants mend ø.
‘Grandma mended the pants.’

43b. *奶奶把裤子ø好了。
nainai *ba* kuzi ø hao le.
Grandma *ba* pants ø well SFP.
‘*Grandma ø pants well.’

43c. 奶奶把裤子补好了。
nainai *ba* kuzi bu hao le
Grandma *ba* pants mend well SFP.
‘Grandma mended the pants.’

The age effect is also reflected in task 3. Again, HL and L2 differed from CN in the output of *ba* sentences. The distributions of HL and L2 were generally closer, with HL and L2

choosing patterns B, C, and D more often than CN. For example, HL and L2 produce *ba*OVS(44a) not S*ba*OV(44b).

44a. *把你忘得一干二净这么重要的事。
ba ni wangde yiganerjing zheme zhongyaode shi.
ba you forgot completely so important thing.
'You forgot all about something so important.'

44b. 你把这么重要的事忘得一干二净。
ni *ba* zheme zhongyaode shi wangde yiganerjing.
You *ba* so important thing forgot completely.
'You forgot all about something so important.'

The three experimental results showed that age is one of the factors influencing HL and L2 usage of *ba* sentences, but age cannot be described as a factor in and of itself. Age should always be paired with other factors to completely explain the causes leading to these results. According to Kupisch (2012), age is not a crucial or fully determinative element for eventual attainment. The reason is that the questionnaire initially just inquired about their current age, with no questions about how long they had been acquiring or using Chinese, and there were no questions about how frequently they used Chinese daily. Only considering their age was not enough.

5.4 Age of acquisition of the second language

The findings of Tasks 2 and 3 showed that the age of SLA affects the production of *ba* sentences by HL and L2.

English is HL's second language and the first language for L2, and Chinese is the second language of the L2 group and the first language of the HL group. This brings up an important point: whereas HL and L2 both use *ba* sentences differently from the CN group, they require independent analysis since the L2 is different for them.

5.4.1 Second language learners

The entire experiment required that the participants were over the age of 18. If L2 acquired Chinese before the age of 11, and they are long-term learners, and they may use Chinese longer and therefore more than the second language Chinese learners after the age of 11, which leads to the difference between before the age of 11 acquisition of Chinese and after the age of 11 acquisition of Chinese in using *ba* sentences. According to Lightbown & Spada (1993), speakers exposed to language at an earlier age reliably outperform those exposed to language at an earlier age in both first and second languages, both written and spoken. The

research literature (Krashen et al., 1979) also shows that while younger people do better, older people acquire knowledge more quickly.

The experimental data also supported this point. According to the findings, second language learners who learned Chinese before the age of 11 were less likely to have the incorrect word order pattern. They produced correct word order sentences with fewer errors over time, which is related to long-term use. They have a lower tendency to choose patterns E (task 2) and B (task 3), which are patterns with wrong sentence structures. It was also revealed that participants who acquired the second language before age 11 produced the *ba* sentences differently from those who acquired the second language after age 11. For example, few Age_L2Bef11 of L2 chose sentence (45).

45. *书看完了我把。 (Task3)
shu kan wan le wo *ba.*
Book read RC PFV I *ba.*
'I have read the book.'

In task 3, syntactic structure is basic for L2 speakers using *ba* sentences. However, they use simple ba-sentences in different order when placing adverbs. Since the position of adverbs in the sentence is more flexible in English compared to Mandarin Chinese, the L2 speakers place adverbs in *ba* sentences differently from the CN group. For instance, the adverb in sentence (46a) should be before *ba* (like in 46b).

46a. *我把面包才吃完。
wo *ba* mianbao cai chiwan.
I *ba* bread just eat.
'I just finished eating the bread.'

46b. 我才把面包吃完。
wo cai *ba* mianbao chiwan.
I just *ba* bread eat.
'I just finished eating the mianbao.'

As mentioned above, those L2 who started acquiring Chinese before the age of 11 had fewer problems with basic sentence structure and complementary semantics than L2 learners after 11, such as in (47). However, they had problems with slightly more complex sentence structure and complementary semantics. In Task2, those who started acquiring Chinese before the age of 11 chose pattern D more often. Pattern D has a complement with two meanings, but the usage is inconsistent. They did not do very well in choosing this aspect, as shown for (47), and tended to pick (47a) over (47b).

47a. *请把手机放给我。
qing *ba* shouji fanggei wo.
Please *ba* phone put me.
'Please put the phone to me.'

47b. 请把手机递给我。
qing *ba* shouji digei wo.
Please *ba* phone hand me.
'Please hand me the phone.'

The two complements, *fanggei wo* '*put it to me'* (47a) and *digei wo* '*hand it to me'* (47b) seem to have similar meanings, but they have different usage. *fanggei wo* cannot be used in *ba* sentences, and the semantics does not make sense for use in a *ba* sentence. It has to be *digei wo*. These semantic contrasts are not transparent for many L2 learners. So, many L2 speakers would have problems with semantic collocations such as these. In general, the results suggest that younger learners, in the long run, tend to improve in using syntactic structures but are still behind in combining syntactic structures with complex and subtle semantic contrasts.

5.4.2 Heritage language speaker

For the HL group, English is the L2, while Chinese is the L1 (unlike for the L2 group). Therefore, the age of acquisition effect differs for HL since their L2 is the dominant language. While there might be a transfer effect from the L1 Chinese on the L2 English at a later age of acquisition, this was not the subject of this study.

The effect of age of acquisition of the L2 on the proficiency of the L2 is quite clear since adult speakers have had a longer time to learn. For HL speakers, however, the age of acquisition of the L2 tends to be earlier and thus should be stronger since it improves over time and with dominant exposure and use.

However, the effect of the age of acquisition of English on the L1 Chinese is indirect. While a younger age of acquisition for L2 speakers of Chinese is beneficial for their improvement of Chinese, a younger age of acquisition of English has the opposite effect on their Chinese proficiency, especially in production.

As a result, the age of language acquisition cannot be separated from the environment, especially in the case of HL, yet the environment alone cannot explain the patterns or responses. An earlier study by Wang (2014) looked at the language transfer of L2 to L1 Chinese. She examined how the English causal clause affects the Chinese causal clause and

demonstrated the existence of backward L2 → L1 transfer. Moreover, she pointed out that backward transfer relates to participants' language proficiency level.

The results in this study show that HL speakers select type D (two complementary words with similar meanings are used incorrectly) (Task2) more than L2 speakers. They also choose type B more than L2 speakers (wrong word order) (Task3).

In Task 2, HL speakers are not proficient in fixed collocations such as *spill fall* (48a). It looks similar to *spilled* literally, but there is no such collocation or expression.

48a. *宝宝把牛奶撒到了。
baobao *ba* niunai sa dao le.
Baby *ba* milk spilled on SFP.
'Baby knocked the milk over.'

48b. 宝宝把牛奶撒了。 (Task 2)
baobao *ba* niunia sa le.
Baby *ba* milk spilled SFP.
'The baby spilled milk.'

49a. *把你忘得一干二净这么重要的事。(Task3)
ba ni wangde yiganerjing zheme zhongyaode shi.
ba you forgot completely so important thing.
'You forgot all about something so important.'

49b. 你把这么重要的事忘得一干二净。
ni *ba* zheme zhongyaode shi wangde yiganerjing.
You *ba* so important thing forgot completely.
'You forgot all about something so important.'

In task 3, HL speakers have some problems with producing complex *ba* sentences. Just like sentence (49a), the sentence structure should be "S*ba*adjOVcomplements(49b)", but the structure output by HL is "*ba*SVcomplementadjO (49a)". They treat the sentence as the SVO structure instead of the structure of the Chinese *ba* sentence. One reason may be that they are influenced by the grammar of the second language (English), while another may be that their mastery of complex complement patterns is not advanced enough because English takes over earlier in their lives.

The impact of the L2 English on the L1 Chinese was substantial for HL, who began learning English before the age of 11. Therefore, language transfer may be a factor, which could be seen in the word order problems that were found for the HL speakers. Richards & Schmidt (1992), and Ellis & Ellis (1994) discussed language transfer from the L1 to the L2, whereas other studies discussed language transfer from the L2 to the L1 (Wang, 2004). The

effect of the L2 on the L1 accounts for the majority of language transfer for HL group. Since the native language is a minority language, the second language takes precedence and is related to the linguistic environment.

The dominant language environment is the second language for HL, and lengthy exposure to it causes them to use the dominant language more frequently and for a longer time than when using their native language.

HLs who learned English before the age of 11 may have been exposed to the second language while learning their original language; the native language is often reduced to only the home language. Therefore, HL speakers had a longer time to acquire the L2 than those who acquired an L2 after age 11.

Perhaps for L2, the age of SLA would be biased to consider the length of their learning and the frequency of their use. However, for HL to analyze the effect of the age of SLA on the use of *ba* sentences, it is necessary to analyze the dominant language and language environment together. Overall, the dominant language and environment have a greater impact on language use than the age and age of SLA.

In general, the experiment showed that the dominant language and dominant language environment strongly affected HL and L2 in *ba* sentence use, followed by the age of SLA. For dominant language environment in Task 2, both CN and HL exhibit a similar response distribution trend, with only a slight variation in CN's preference for pattern B. Comparing CN and L2, the latter shows a higher frequency for pattern B **(-2.11>-15.14>-16.26)**, whereas L2 also has a higher frequency for pattern F compared to HL and CN (**-1.42> -1.61>-4.39**). In task 3, CN, HL, and L2 have the same response distribution trend. HL has a higher frequency in producing pattern D, and CN has a lower frequency in choosing pattern D (**-2.45>-2.53>-4.54**).

Age was also one of the influencing factors, but not the most important. All factors must be combined and considered with each other and do not solely determine how HL and L2 differ from CN when using *ba* sentences.

CHAPTER 6 CONCLUSION

This study aimed to assess the difference between heritage and second language speakers using Chinese *ba* sentences. This study has shown that *ba* sentences are used differently by HL and L2 speakers than by native speakers. L2 speakers do not evaluate *ba* sentences structurally in the same manner as native Chinese speakers do. However, HL speakers produced judgments of sentences similar to those of the CN group. HL and L2 speakers also used different complements differently in sentences with *ba*. Simple complements were employed in *ba* sentences much more frequently in HL and L2 than in native speakers. Moreover, this study shows that SVO order with *ba* was present in both HL and L2 speakers who misused word order.

HL's performance was more similar to the CN group's performance on grammatical judgment tests. However, HL's performance was similar to L2's for production tasks like complement selection and sentence word order due to the influence of the age of SLA and the linguistic environment. Moreover, variations between HL and L2 in *ba* sentences were very likely driven by language transfer, because they showed more English-type word orders than the CN group. The forward language transfer from the first language to the second language has an impact on L2. On the other hand, the backward transfer of the second language to the native language impacts HL.

There are some limitations in the experimental design. The first sample size was small, and the second experimental question design was not sufficiently comprehensive. My sample size may be small when using questionnaires to gather study results, particularly for HL and L2 figures. These samples do not reflect the entire population. The sample (questionnaire responders) would next be asked to reply to the questionnaire's questions. However, the questions I created might not speak to the appropriate responses and the design questions are too narrow, like the age-related ones. With only their ages known, the data results can only show that L2, HL, and CN have some differences in their use of *ba*- sentences. Since it was an online experiment at the time to avoid participants getting bored from answering questions for an extended period. Some experimental designs, participants may perform in a free production task, such as sentence reading and storytelling, were eliminated. Nevertheless, what causes this difference, the length of learning or the frequency of use? This will have to be analysed in the context of other factors and was not considered in the initial design of the experiment. Additionally, a part for independent sentence completion could also be included in a future questionnaire task, maybe by having respondents produce a few sentences in the form of a sentence diagram to show more of their self-sentence creation. However, since this was

an online experiment, there were time restrictions. In future research, it would be worthwhile to forgo time restrictions, where participants are asked to generate language on their own, which allows them to demonstrate their ability to use language in a more natural and spontaneous way. In the future, I hope that trials will include a section where participants may freely finish the outputted sentence independently.

Several questions remain to be answered. Based on the language transfer theory, many new issues still need to be resolved, and this theory has to be improved in practical application. The following areas require further study.

1. The inner drive movements, dialect use, and other topics were not thoroughly explored in the thesis; only the language environment and the beginning age of SLA were considered. Only a few circumstances were taken into account. The demographic information sheet can be further developed to increase the completeness of the information in the test questions and influence other elements.

2. Since *ba* sentences are distinctive sentence patterns, language transfer is evidently affecting how HL and L2 users utilize *ba*. Future tests can confirm whether or not this impact would be reflected in the sentence patterns of typical SVO.

Lastly, this study bridges the gap between heritage speakers and L2 studies using Chinese *ba* sentences. Moreover, it demonstrates the role of language dominance and language environment in the direction and strength of language transfer in speech production.

REFERENCES

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. Journal of Statistical Software, 67(1), 1–48

Bardovi-Harlig, K., & Sprouse, R. A. (2017). Negative Versus Positive Transfer. *The TESOL Encyclopedia of English Language Teaching*. https://doi.org/10.1002/9781118784235.eelt0084

Belfihadj, D. (1999). Native language interference in learning a second language: Exploratory case studies of native language interference with target language usage. *International Education Journal*, *1*(1), 22–31.

Benati, A. G. (2013). He Input Processing Theory in second language acquisition. In *Contemporary Approaches to Second Language Acquisition* (pp. 93–110). https://doi.org/10.1075/aals.9.08ch5

Bialystok, E., Dulay, H. D., Burt, M. K. B., & Krashen, S. (1982). Language Two. *Modern Language Journal*, *67*(3), 273. https://doi.org/DOI: 10.2307/327086

Blake, R. (1983). MOOD SELECTION AMONG SPANISH-SPEAKING CHILDREN, AGES 4 TO 12. *Bilingual Review / La Revista Bilingüe*, *10*(1), 21–32.

Brinton, D. M., Kagan, O., & Bauckus, S. (2017). *Heritage Language Education: A New Field Emerging* (1st ed.). Routledge.

Campbell, R., & Peyton, J. K. (1998). Heritage language students: A valuable language resource. *Eric Review*, *6*(1).

Cao, M. (2016). The Effect of English Passive Voice Learning on the Use of "Bei" Structure: An Empirical Study. *International Journal of English Linguistics*, *6*(4), 197–206. https://doi.org/doi:10.5539/ijel.v6n4p197

Chang, H., & Zheng, L. (2017). The development of ba construction in mandarin-speaking child: A longitudinal study. *First Language*, *38*(3), 243–262. https://doi.org/Doi.org/10.1177/0142723717743363

Chinese Proficiency Test (HSK). (n.d.). http://english.hanban.org/node_8002.htm#no1

Cortés, N. C. (2005). Negative language transfer when learning Spanish as a foreign language. *Linguistics*.

Cummins, J. (2005). A Proposal for Action: Strategies for Recognizing Heritage Language Competence as a Learning Resource within the Mainstream Classroom. *Wiley on Behalf of the National Federation of Modern Language Teachers Associations*, *89*(4), 585–592.

Ellis, R., & Ellis, R. R. (1994). *The Study of Second Language Acquisition*. Oxford University Press.

Fishman, J. A. (2014). Three Hundred-Plus Years of Heritage Language Education in the United States. In *Handbook of Heritage, Community, and Native American Languages in the United States in the United States: Research, Policy, and Educational Practice* (1st ed., pp. 36–44). Routledge. https://doi.org/10.21832/9781853598999-004

Fu, R. (2013). *Foreign students' error analysis and teaching strategies in the acquisition of the complement of "ba" sentence* [Postgraduate Program, Central Chian Normal University]. http://gb.oversea.cnki.net/KCMS/detail/detailall.aspx?filename=1013278063.nh&dbcode=CMFD&dbname=CMFDREF

Granena, G., & Long, M. H. (2012). Age of onset, length of residence, language aptitude, and ultimate L2 attainment in three linguistic domains. *Second Language Research*, *29*(3), 311-343. https://doi.org/10.1177/0267658312461497

Hu, R. (2016). The Age Factor in Second Language Learning. *Theory and Practice in Language Studies*, *6*(11), 2164–2168. https://doi.org/DOI: http://dx.doi.org/10.17507/tpls.0611.13

Jin, H. (1993). Cong han yu "ba"zi ju kan yu yan fen lei gui lv zai di er yu yan xi de guo cheng zhong de zuo yong. *LANGUAGE TEACHING AND LINGUISTIC STUDIES*, *2*, 83–91.

Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2014). lmerTest: Tests for random and fixed effects for linear mixed effect models (R package version 2.0-11) [Computer software]. Cran.r Project.

Krashen, S. D., Long, M. A., & Scarcella, R. C. (1979). Age, Rate and Eventual Attainment in Second Language Acquisition. *TESOL Quarterly*, *13*(4), 573–582. https://doi.org/10.2307/3586451

Kupisch, T. (2012). Generic subjects in the Italian of early German-Italian bilinguals and German learners of Italian as a second language. Bilingualism (Cambridge, England).

Li, X., Zhou, G., & Kong, L. (1990). 2-5 sui er tong yun yong ba zi ju qing kuang de chu bu kao cha. *Linguistic Research*, *4*, 43–50.

Lightbown, P and N. Spada. (1993). *How Languages are learned.* Oxford: Oxford University Press.

Lightbown, P. M., & Spada, N. (2006). *How Languages Are Learned* (3th ed.). Oxford University Press.

Liu, P., & Zhao, J. (2005). Ba zi ju yu zhu dong bin ju de ju fa,yu yi he yu yong de cha yi. *Journal of Changsha University of Science & Technology (Social Science)*, *20*(3), 111–114.

Liu, P., & Zhao, J. (2006). BA zi ju dong ci de lei he zhi yue yin su. *J. CENT.SOUTH UNIV. (SOCIAL SCIENCE)*, *12*(1), 121–125.

Liu, X. (2020). Qian xi "le1" “le2”de yi yi ji yong fa. *Chinese National Expo*, 92–93.

Lv, S. (2009). Ba ziju yongfa de yanjiu. In *Lv Shuxiang ji* (pp. 158–178). Flower City Publishing House.

Lynch, A. (2003). The Relationship between Second and Heritage Language Acquisition: Notes on Research and Theory Building. *Heritage Language Journal*, *1*(1), 26–43. https://doi.org/doi: https://doi.org/10.46538/hlj.1.1.2

Mandell, P. B. (1999). On the reliability of grammaticality judgment tests in second language acquisition research. *Second Language Research*, *15*(1), 73–99. https://doi.org/10.1191/026765899667538959

McLaughlin, B. (1992). Myths and Misconceptions About Second Language Learning: What Every Teacher Needs to Ulearn. *UC Berkeley: Center for Research on Education, Diversity and Excellence.* https://escholarship.org/uc/item/1t55s0tc

Montrul, S. (2008). Review article: Second language acquisition welcomes the heritage language learner: Opportunities of a new field. *Second Language Research*, *24*(4), 487–506. https://doi.org/10.1177/0267658308095738

Montrul, S. (2010). Dominant language transfer in adult second language learners and heritage speakers. *Second Language Research*, *26*(3), 293–327. https://doi.org/10.1177/0267658310365768

Montrul, S. (2012). *Is the Heritage Language like a Second Language?* [University of Illinois at Urbana-Champaign]. doi: 10.1075/EUROSLA.12.03MON

Nygaard, P. (2019). Are Your Students Native Speakers or Heritage Speakers? *Heritage Spanish Class Curriculum*. https://profenygaard.com/2019/10/06/are-your-students-native-speakers-or-heritage-speakers/

Patkowski, M. S. (1980). The sensitive period for the acquisition of syntax in a second language. *Language Learning*, *30*(2), 449–468. https://doi.org/10.1111/j.1467-1770.1980.tb00328.x

Polinsky, M. (2018). *Heritage Languages and their Speakers* (Vol. 159). University of Maryland, College Park. https://doi.org/10.1017/9781107252349

Polinsky, M., & Kagan, O. (2007). Heritage languages: In the “wild” and in the classroom. *Language and Linguistics Compass*, *1*(5), 368–395. https://doi.org/10.1111/j.1749-818X.2007.00022.x

Polinsky, M., & Scontras, G. (2020). Understanding heritage languages. *Bilingualism: Language and Cognition*, *23*(1), 4–20. https://doi.org/doi:10.1017/S1366728919000245

Polinsky M., Zhang B., & Gallo CG. (2010). Heritage Chinese: A new view from production, in Fourth Heritage Language Institute. Manoa, HI: Nat'l Heritage Language Resource Center.

R Core Team. (2019). R: A language and environment for statistical computing [Computer software]. R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/

Richards, J. C., & Schmidt, R. (2010). *Longman dictionary of language teaching and applied linguistics* (4th ed.). Routledge.

Saville-Troike, M., & Barto, K. (2016). *Introducing Second Language Acquisition*. Cambridge University Press.

Snow, C. E., & Hoefnagel-Höhle, M. (1978). The Critical Period for Language Acquisition: Evidence from Second Language Learning. *Child Development*, *49*(4), 1114–1128. https://doi.org/10.2307/1128751

Venables, W. N., & Ripley, B. D. (2013). Modern applied statistics with S-PLUS. Springer Science & Business Media.

Wang, X. (2014). Effects of the second language on the first: A study of ESL students in China. *Theory and Practice in Language Studies*, *4*(4), 725–729. https://doi.org/doi:10.4304/tpls.4.4.725-729

Wen, X. (2012). A daunting task? The acquisition of the Chinese ba-construction by nonnative speakers of Chinese. *Journal of Chinese Linguistics*, *40*(1), 216–240.

Zheng, J. (2009). Yun yong qiao mu si ji yu fa li lun fen xi "Ba"zi ju de yan jiu yu si kao. *Renwen Congkan*, 55–63.

Zhou, G., & Wang, B. (2001). *Er tong ju shi fa zhan yan jiu he yu yan xi de li lun*. Beijing Language and Culture University Press.

Zhu, D. (1982). Ba. In *Yu fa jiang yi* (pp. 185–189). The Commercial Press Library.

APPENDIX

Biographic and Demographic

Please answer the following questions about your language use.

这是一份关于语言使用的调查问卷，请您作答。

1.You are____? 您是?

A. Heritage Chinese Speaker-- You speak Chinese Mandarin as your first language (born and live in an immigrant family，speaking Chinese Mandarin) and using English as your dominant language on a regular basis.

汉语继承语使用者-- 您以汉语普通话作为第一语言（您出生在讲汉语普通话的移民家庭中），但生活在讲英语的国家，英语为您的主流语言

B. Second language speaker of Chinese --You speak English as your first language and are learning/have learned Mandarin Chinese as a second language but use English as your dominant language.

第二语言汉语学习者--英语为您的第一语言，汉语普通话是您学习的第二语言。

C. Native Speakers-- You were born and live in a Mandarin Chinese speaking country and speak Mandarin Chinese every day as your first language.

汉语普通话母语者--您出生并居住在讲汉语的国家，每天都将汉语作为第一语言。

2.What is your first language? 您的母语是？

A．Mandarin Chinese 中文,

B．English 英文

3. What is your second language? 您的第二语言是？

A．Mandarin Chinese 中文,

B．English 英文,

C．I don't a speak second language 我不说第二语言。

4. At what age did you start learning your second language.

您从几岁开始学习第二语言。

2-5 years (岁），

5-8 years（岁），

8-11 years（岁）,

11-14 years（岁）,

14-17 years（岁）,

17-20 years（岁）,

20-25 years（岁）,

25-30 years（岁）,

30-35 years（岁）,

35-40 years（岁）,

40-45 years（岁）,

45-50 years（岁）,

Later 50 岁之后。

5. At what age did you feel comfortable speaking your second language? __.

您几岁开始觉得使用第二语言轻松自如？

2-5 years (岁）,

5-8 years（岁）,

8-11 years（岁）,

11-14 years（岁）,

14-17 years（岁）,

17-20 years（岁）,

20-25 years（岁）,

25-30 years（岁）,

30-35 years（岁）,

35-40 years（岁）,

40-45 years（岁）,

45-50 years（岁）,

Later 50 岁之后

6. Which language do you use predominantly? 您日常中使用最多的语言是？

A. Mandarin Chinese 中文,

B. English 英文,

C. Both 两者都是

7. How would you judge your proficiency and fluency in your first language?
您如何评判您母语的水平和流利程度？

A. Beginner 初级水平,

B. Medium 中级水平,

C. Advanced 高级水平,

D. Native-like 母语水平

8. How would you judge your proficiency and fluency in your second language?
您如何判断您第二语言的水平和流利程度？

A. Beginner 初级水平,

B. Medium 中级水平,

C. Advanced 高级水平,

D. Native-like 母语水平

9. How old are you_____您的年龄?

18-20 years（岁）,

20-25 years（岁）,

25-30 years（岁）,

30-35 years（岁）,

35-40 years（岁）,

40-45 years（岁）,

45-50 years（岁）,

Over 50 50 岁以上

Task 1. Determine which of the following sentences you find acceptable. Click on either ACCEPTABLE or NOT ACCEPTABLE. If you are not sure, select NOT SURE.
请您判断每个句子的说法, 您接受, 不接受或不确定。

练习

P1 她把酒喝完了。

A. 接受 (ACCEPTABLE) B. 不接受 (NOT ACCEPTABLE) C. 不确定 (NOT SURE)

P2 拿着把书你。

A. 接受 (ACCEPTABLE) B. 不接受 (NOT ACCEPTABLE) C. 不确定 (NOT SURE)

1. 他没穿鞋, 把脚走肿了。
2. 他把酒完了。
3. 把打开。
4. 把你这几天忙坏了。
5. 酒把他喝醉了。
6. 我昨天把西瓜吃完了。
7. 小偷把大家抓住了。
8. 我没有把房间弄乱。
9. 他把酒喝醉了。
10. 为什么不把消息告诉她？
11. 我们大家把这首歌唱起来。
12. 那天开始我把当朋友。
13. 大家把抓住了小偷。
14. 那天开始我把书当朋友。
15. 把书拿着。
16. 我把西瓜才吃完。
17. 把门打开。
18. 他把书看了一小时。
19. 大家把小偷抓住了。
20. 蛇把你吓成这样。
21. 他把脚走肿了昨天。
22. 这几天把你忙坏了 。
23. 我把房间没有弄乱。

24. 我把西瓜昨天吃完了。

25. 他把文章读了一小时。

26. 他把篮球喜欢了。

Task 2. Choose one of the options to complete the sentence. If you don't know, chose NOT SURE. 请选择恰当的一项, 使之成为完整的句子; 如果您不确定, 请选择不确定项。

练习

P1. 他很委屈, 于是把老师___。

A. 搬出来了　　B. 搬起来了　C. 搬下来了　D. 不确定

P2. 他是不是把他爸爸的车___?

A. 开了 B. 开走了 C. 走了　D. 不确定

1. 我把鸡____。

A. 抓住了　B. 抓好了 C. 抓　D. 不确定

2. 我把信____。

A. 烧　B. 烧毁了 C. 烧好了　D. 不确定

3. 我把盘子____。

A. 打碎了 B. 碎了 C. 打　D. 不确定

4. 奶奶把裤子___。

A. 补好了　B. 补 C. 好了 D. 不确定

5. 宝宝把牛奶___。

A. 撒了　B. 撒　C. 撒倒了 D. 不确定

6.把他___。

A. 送北京里了　B. 送了北京去　C. 送去北京了　D. 不确定

7. 奶奶把医生___。

A. 叫了里来　B. 叫了进来 C. 叫了外来 D. 不确定

8.他把朋友___。

A. 拉了上来　B. 拉了 C. 拉了左来 D. 不确定

9. 我把衣服___。

A. 挂下来了 B. 洗起来了 C. 挂起来了 D. 不确定

10. 请把手机___。

A. 递给我　B. 打给我　C. 放给我 D. 不确定

11. 他让食堂阿姨把粥___。

A. 盛在饭盒里 B. 撒在饭盒里 C. 盖在饭盒上 D. 不确定

12. 老师把书___。

A. 放桌子 B. 放在桌子上　C. 放在上桌子 D. 不确定

13. 他把秘密___。

A. 藏在心中　B. 藏上心中 C. 藏在心 D. 不确定

14. 他把照片___。

A. 贴了墙上 B. 贴在墙上 C. 贴上墙了 D. 不确定

15. 所有人把车停在___。

A．科技馆面　B. 科技馆中间　C. 科技馆后面 D. 不确定

16. 我已把书___。

A. 看了两遍　B. 看了两小时　C. 看 D. 不确定

17. 母亲因为他逃学把他___。

A. 训了一场 B. 训了一把　C. 训了一顿　D. 不确定

18. 他把课文___。

A. 背了一遍　B. 唱了一遍 C. 一遍 D. 不确定

19. 他的脱口秀把大家笑___。

A. 得合不拢嘴　B. 得拢嘴　C. 逗乐 D. 不确定

20. 他把教室打扫___。

A. 得干净 B. 得干干净净 C. 干干净净 D. 不确定

21. 我把衣服洗___。

A. 得很干净　B. 得很干干净净 C. 很干干净净了 D. 不确定

22. 他把家装修___。

A．得俗里俗气 B. 很俗里俗气　C. 很俗里俗气得 D. 不确定

23. 这天气把人热___。

A．得难受　B. 难受　C. 很难受 D. 不确定

Task 3. There are two or three phrases or words. Choose the best option that shows a new ***ba***-sentence in the correct order (STATEMENT NOT QUESTION). If you are not sure, please click NOT SURE. 请把乱序短语或词连成一句完整的把字句(陈述句), 选择您认为正确连贯的一项。如果您不确定, 请选择不确定项。

练习

P1 A. 把 B.门 C.我 D.锁好了

①. A B C D　②. C A B D　③. C D B A　④. A B D C　⑤. B A C D　⑥. 不确定

P2 A.我 B.把 C.门 D.锁好 E.没

①. A B C E D ②. A B C D E ③. A E B C D ④. A E D B C ⑤. B C E D A　⑥. E B C D A　⑦ . 不确定

1. A. 他 B.那只鸡 C. 残忍地 D. 把　E.杀了

①. A B C D E　②. A D B E C　③. A D B C E　④. A E D B C　⑤. A E B C D ⑥. 不确定

2. A.大街小巷 B. 转悠遍了 C. 我 D.把

①. C D A B　②. A B C D　③. D A B C　④. B C D A　⑤. C B D A　⑥. 不确定

3. A.我哥跟他 B.这个问题 C.商量好了 D.把

①. A B C D　②. A D B C ③. D B C A　④. A C D B　⑤. C D B A ⑥. 不确定

4. A.你 B.把 C. 扫一扫 D.这块地

①. A B D C　②. A C B D　③. C D A B　④. B D C A　⑤. C A B D ⑥. 不确定

5. A. 他们 B.当作孩子 C.把他 D.总是

①. A B C D　②. A C B D　③. A C D B　④. A D C B　⑤. D C B A　⑥. 不确定

6. A.我们 B. 房间 C.打扫一下吧 D.把

①. A D B C　②. A B C D　③. D B C A　④. C D B A　⑤. C A D B　⑥. 不确定

7. A.把 B. 纸 C. 订成 D. 一个个本子 E.她

①. E A B C D　②. B C D E A　③. A B C D E　④. C D E A B　⑤. E A D C B ⑥. 不确定

8. A.我 B.把 C.衣服 D.没有 E.弄脏

①. A B C D E ②. A D E B C ③. A D B C E ④. B C D E A ⑤. D B C E A ⑥. 不确定

9. A.真相告诉他 B.把 C.为什么 D.不

①. C D B A ②. B A C D ③. D B A C ④. B A C D ⑤. B A D C ⑥. 不确定

10. A.我 B.把 C.面包 D.才 E. 吃完

①. A B C D E ②. A D B C E ③. D E B C A ④. A B C E D ⑤. E C A D B ⑥. 不确定

11. A.信保存好 B.没 C.我 D. 把

①. B D A C ②. D A B C ③. A B C D ④. C B D A ⑤. C D B A ⑥. 不确定

12. A.我 B.书看完了 C.把

①. A B C ②. A C B ③. C B A ④. C A B ⑤. B A C ⑥. 不确定

14. A.乌云 B.太阳 C.把 D.遮住了

①. A C B D ②. A B C D ③. B C A D ④. C B D A ⑤. D B A C ⑥. 不确定

15. A.游戏 B. 搞得 C.他的学习成绩 D.一落千丈 E.把

①. A E C B D ②. A B C D E ③. E C B D A ④. C D A B E ⑤. D C E A B ⑥. 不确定

16. A.她 B.把 C.擦了好几遍 D.那张桌子 E.用抹布

①. A B D E C ②. A B D C E ③. A E B D C ④. B D C A E ⑤. A B C D E ⑥. 不确定

17. A.把 B.你 C.孩子 D.送到学校去

①. A B C D ②. B A C D ③. D B A C ④. A C B D ⑤. C A B D ⑥. 不确定

18. A.把 B. 你 C.忘得一干二净 D.这么重要的事

①. B A D C ②. A D C B ③. A C D B ④. B C A D ⑤. A B C D ⑥. 不确定

19. A.没有 B.把 C.小寒 D.电脑修好

①. C A B D ②.C B D A ③. A B C D ④. D C A B ⑤. A B D C ⑥. 不确定