

**An investigation of the maintenance and attrition of the
ba-construction
by native speakers of Chinese in the UK**

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Abstract

This thesis investigates first language (L1) attrition effects in unbalanced Mandarin bilingual speakers at their early stages of migration in the UK. These bilingual speakers had very short second language (L2) immersion experience (with length of residence (LoR) 0.5-6 years) and self-rated less proficient in L2. They reported using both Mandarin and English frequently for daily life. This thesis examines whether their L1 Mandarin undergoes any attrition effect at such early stages of migration.

The unbalanced Mandarin bilinguals were compared to native speakers of Mandarin from their homeland in the perception of different properties of a Mandarin-specific linguistic structure. Results showed the bilingual speakers exhibited more uncertainty in selecting contextually felicitous construction and less accepting of the more marked condition of *ba* as differential object marker (DOM) as well as the more marked construction of expressions of displacement.

These findings suggest that attrition effects can be detected in unbalanced bilingual speakers who are less proficient in L2 and immersed in the L2 environment fairly for just a very short period. In terms of the potential triggers for their norm-divergent performance, results from this thesis indicate a process of simplification of a linguistic phenomenon rather than cross-linguistic influence (language transfer) from English.

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List of Abbreviations

A	Animate
AJT	Acceptability judgement task
AoA	Age of arrival
ATH	Activation Threshold Hypothesis
B	ba
CLI	cross-linguistic influence
DOM	Differential object marker/marking
ERP	Event-related potential
FRH	Feature Reassembly Hypothesis
GJT	Grammatical judgement task
I	Inanimate
IH	Interface Hypothesis
L1	First language
L2	Second language
LoR	Length of residence
M	Mean
MDCT	Multiple-choice discourse completion task
N	number
NP	Noun phrase
O	Object
P	Place
RT	Response/reaction time
S	Subject
SAV	Subject-Object (animate)-Verb
SBAV	Subject-ba-Object (animate)-Verb
SBIV	Subject-ba-Object (Inanimate)-Verb
SBOVP	Subject-ba-Object-Verb- Place
SD	Standard Deviation
SE	Standard errors
SIV	Subject-Object (inanimate)-Verb
SOV	Subject-Object-Verb
SVO	Subject-Verb-Object
SVOP	Subject-Verb-Object-Place
V	Verb
VR	Virtual reality

Chapter 1. Introduction

A growing number of studies have been carried out in the field of first language (L1) attrition in the past decades, investigating changes that may occur in bilingual speakers' native language as a consequence of migration into the second language (L2) environment (see reviews in Schmid & Köpke, 2017). Among all these studies in L1 attrition, research focusing on bilingual speakers' performance at early stages of migration remains limited. The less focus on the time window of the first few years after migration can be attributed to the widely spread assumption that L1 attrition is a gradual and slow process, which may take decades for attrition effects to come into play eventually (Schmid, 2019). Following this notion, the "typical" L1 attriters are expected to be those with decades' L2 immersion experience and near-native level of L2 proficiency. In this case, unbalanced bilingual speakers who are still at their early stages of migration and less proficient in their L2 are easily excluded as the target bilingual participants.

Relatively few studies looking at the early years of the immersion period seem to suggest that the first years after migration are the period during which the process of attrition is relatively productive and dynamic (see the overview in Schmid, 2019). In other words, attrition effects are not restricted to speakers who have been preponderantly exposed to the L2 for many years and possibly occur in those at first few years after migration. In terms of L1 attrition phenomena at the early years of immersion, regular potential triggers such as reduced accessibility due to long-term disuse of L1 (Schmid, 2011) are not suitable for explaining the underlying mechanism in this case. Instead, problems related to language switching and inhibition control of two language systems seem more likely to account for L1 attrition at the

early years of immersion. It has been suggested that high levels of effort at acquiring an L2 reduce the cognitive resources available for maintaining the L1 (Herdina & Jessner, 2002). Another possible explanation is a sustained inhibition of the L1 under a mixed language context, presumably to facilitate L2 access (Peeters & Dijkstra, 2018). Both of these phenomena are likely to be more pronounced in the early stages of migration when speakers are in the process of quickly developing a second language and are struggling to assimilate into the L2 dominant environment.

A third account related to the processing problem is rooted in the Interface Hypothesis (IH) proposed by Sorace (2000), which hypothesizes that the processing difficulty is a side effect of the need to exercise inhibition control to suppress the language not in use. Given the linguistic background of bilingual speakers at the early stages of migration, the third account is unlikely to be considered the underlying mechanism. Based on the Inhibitory control model (Green, 1998), the amount of inhibition applied is proportional to the dominance of the language that needs to be suppressed. More inhibition is applied to the stronger and more dominant language. Following this, unbalanced bilingual speakers do not need to apply significant inhibition to suppress their weaker L2 when using their dominant L1, which is expected to incur fewer side effects on on-time sentence processing. Despite this, IH is the only generative model proposed to solve one of the critical puzzles in L1 attrition. If the mechanisms of the language faculty allow for attrition effects in mature L1 grammar, then why were only strikingly low levels of L1 attrition effects reported in most studies of morphosyntax beyond childhood (Hicks & Domínguez, 2019)? The cases of L1 attrition in morphosyntax beyond childhood remain relatively rare. Nevertheless, this does not mean a mature L1 grammar is entrenched and immune to any attrition effect, as research exists

reporting a restructuring in L1 morphosyntax (e.g., Iverson, 2012; Steinhauer & Kasparian, 2020).

Regarding selectivity in L1 attrition, IH proposes that grammar properties belonging to external interfacing structures (e.g., interfacing syntax and pragmatics) are most vulnerable to the attrition effect. By contrast, other internal (e.g., interfacing syntax and semantics) and narrow syntax are expected to be unaffected (see more discussion in Hicks & Domínguez, 2019). As for the mechanism underlying the vulnerability of external interfacing structures, as discussed earlier, a possible explanation is attributed to the reduced efficiency when integrating information from different domains as a result of processing difficulty as a side effect of exercising inhibition control to suppress the language not the in use (Chamorro, Sorace & Sturt, 2016). IH has been challenged by studies reporting restructured syntactic and morphosyntactic properties (e.g., Iverson, 2012; Domínguez, 2013). However, some other research also shows evidence supporting the vulnerability of the external interfacing structures as predicted by IH in the L1 attrition study (see overviews in Chamorro, Sturt & Sorace, 2015). It is beyond the scope of the current study to argue for or against the theoretical debates regarding IH. Instead, IH is quoted as it predicts a type of structure potentially vulnerable to attrition effects caused by processing difficulty, which can be a good testing battery for L1 attrition research focusing on the early stage of migration, as discussed earlier.

In addition to IH, two other hypotheses, Lardiere's Feature Reassembly Hypothesis (FRH) (2009, also see discussion in Hicks & Domínguez, 2019) and Paradis's Activation Threshold Hypothesis (ATH) (1993, also see discussion in Chamorro et al., 2016) in relation to cross-linguistic influence (CLI) are also taken into account as to target a proper structure for L1

attrition research at the early stage of migration. FRH assumes that a property shared in L1 and L2 but with features configured in a cross-linguistic different way is more prone to attrition effect under CLI. From the perspective of activation threshold, ATH predicts that L1 attrition will occur when the activation threshold of an element gets higher in the L1 as it is less used or disused, and the activation threshold of its corresponding “competing” element in the L2 gets lower as it is used more frequently. CLI is expected to be less likely to occur at the early stage of migration, as preponderance or predominance use/exposure in L2 is considered a critical factor that causes CLI to take place (See more discussion in Steinhauer & Kasparian, 2020). However, some research reports evidence favouring CLI as the potential trigger for norm-divergent changes found in their participants with short L2 immersion experience (e.g., Dussias, 2004).

Thus, a good testing linguistic battery for investigating L1 attrition effects at early stages of migration is expected to fulfil two conditions. Firstly, it is expected to be vulnerable to attrition effects, and secondly, it is expected to instantiate different patterns in response to attrition effects triggered by different causes. The language-specific phenomenon, *ba*-construction, is therefore a good testing battery. First, *ba*-construction exists at the intersection of a range of featured phenomena, when to use it, in some cases governed by word order, in some cases governed by semantic phenomena, in some cases governed by pragmatic phenomena. As a linguistic structure interfacing features across domains (syntax, semantics, and pragmatics), *ba*-construction is expected to incur processing difficulties for bilingual speakers. Meanwhile, it is also a structure open to CLI (see more discussion in Chapter 3). Second, processing difficulty and CLI manifest themselves in *ba*-construction differently. If attrition effects due to processing difficulty come into play, a simplification in the usage of *ba*-construction is expected, i.e., bilingual speakers are expected to exhibit more

uncertainty in selecting contextual felicitous construction (ba-construction vs. SVO) regardless of the given contexts and to be less accepting of the more marked condition of ba as DOM as well as the more marked construction of expressions of displacement compared with their monolingual counterparts. While if attrition effects due to CLI are expected, an encoding of English-like morphosyntactic features or word order is expected, i.e., bilingual speakers are expected to prefer SVO sentences regardless of the given contexts, and to be more accepting of the English-like construction (see more discussion and conclusion in Chapter 2 to 4).

To summarize, despite a growing number of studies in L1 attrition, the research with insights into bilingual speakers' performance at early stages of migration remains limited. When intensive effort goes into managing two language systems in tandem with limited cognitive resources, the early migration period is probably a relatively active phase when the L1 attrition is likely to occur. However, despite this supposition, much previous research is restricted to bilinguals who belong to the "typical attriters" group with L2 immersion for a considerable period and with advanced or near-native proficiency in their L2. The current study aims to contribute to a larger variety of studies attempting to investigate attrition effects on morphosyntactic/syntactic properties in late unbalanced adult bilinguals at the early stages of migration. The Mandarin-specific linguistic phenomenon, ba-construction, is employed as the testing battery as it is an overarching construction that exists at the intersection of different linguistic domains (syntax, semantics, and pragmatics).

1.1. First language attrition

Selectivity in L1 attrition

First language attrition, defined as “the non-pathological decrease in a language that had previously been acquired by an individual” (Köpke & Schmid, 2004, p.5), generally correlates to the consequences (great amount of L2 exposure together with a dramatic reduction of L1 input) of moving to the environment where speakers’ L2 is the societal majority language. In studies of attrition effects in adult bilingual speakers, norm-deviant changes have been observed in language contact situations as the consequences of a speaker becoming a sequential bilingual (see Domínguez, 2013; Schmid & Köpke 2017, 2019). A widely spread assumption is that L1 attrition is a gradual and slow deterioration of L1 skills or knowledge; in other words, signs of attrition effects are expected to be detected in the circumstances with extensive L2 immersion experience for decades and less opportunity for L1 use. Against this notion, increasing empirical evidence has revealed that attrition effects can take place at the very early stage after migration. For instance, slower non-cognate access was detected after one semester’s immersion in the L2 environment among a group of German-Spanish bilinguals (Baus, Costa & Carreiras 2013). Similar processes of attrition effects have also been found at the phonetic level. For example, assimilation to phonetic properties of Korean is reported among a group of English speakers enrolled in elementary Korean classes within six weeks (Chang, 2012).

On the other hand, the scope and timeline of attrition in the morphosyntactic domain remain less clear. Research focusing on morphological development has consistently reported restructurings in the grammars of heritage languages (e.g., see Polinsky 2006; Laleko 2010), indicating that L1 grammars are vulnerable to erosion if the attrition process comes into play

before puberty. However, the story becomes more complicated regarding L1 attrition in late bilinguals who have completely acquired their L1 and then moved to the L2 environment after puberty. The traditional generative approach to language development assumes a stable endstate for the L1 grammar once fully acquired. Evidence for this assumption is mainly from studies that report no findings on L1 attrition effects after decades' immersion in the L2 environment. For example, Schmid (2002) investigates a group of L1 German Holocaust survivors with a lack of L1 contact and use for over 50 years but finds no more than 5% error rates in terms of structural complexity and morphosyntactic accuracy. Similar findings are reported in Montrul, Bhatt & Girju (2015) that no signs of attrition effect on knowledge of DOM are detected in the Romanian and Hindi adult immigrants with LoR in the US over ten years.

Nevertheless, this assumption has been challenged by existing research on attrition, though limited, that reports changes found at grammatical level (also see discussion in Köpke & Schmid, 2017; Hicks & Domínguez, 2019). For instance, it is reported in Domínguez (2013) and Domínguez and Hicks (2016) that the use and knowledge of Spanish null and postverbal subjects have undergone attrition in a group of adult Spanish immigrants in the US.

Furthermore, recent neurocognitive research by Steinhauer and Kasparian (2020) reports qualitative and quantitative differences in bilingual speakers' responses compared with the native baseline speakers. These results are ascribed to CLI from participants' L2 English and indicated as the evidence supporting that the adult brain remains plastic for both L2 and L1. In other words, these neurocognitive findings can be interpreted as evidence that L1 is not fully entrenched, even after complete acquisition, and that it is still susceptible to change. Some other studies even provide evidence showing that attrition effects in L1 grammar can take place at the early stages of immersion. Dussias (2004) finds changes in relative clause

attachment preference among a group of Spanish speakers immersed in an English context for an average of around four years. A later study by Ribbert and Kuiken (2010) also reported that German-Dutch bilinguals tend to overgeneralize the appropriate context for using a certain German complementizer based on the L2 settings just after a relatively short immersion time. However, it cannot be denied that significant restructuring of L1 grammar beyond childhood is not widely attested (Hicks & Domínguez, 2019). As exemplified above, inconsistent results in the existing L1 attrition research make it difficult to predict and characterize attrition effects on the adult morphosyntax.

The impact of LoR in L1 attrition

Another controversial issue concerning attrition effects on mature L1 grammar is related to the impact of LoR on the degrees of attrition process. As mentioned above, a widespread assumption in studies of L1 grammar attrition is that language attrition is a very slow process and expected to take at least several decades. This view “has shifted to the current consensus that attrition is a processing which mainly takes place within the first ten years, after which the L1 will ‘stabilize’ again at whatever level of attrition has been reached during this time” (Schmid, 2019, p.291). This current assumption for LoR effect on L1 attrition is mainly rooted in the interesting pattern that research focusing on populations with LoR over ten years barely report any significant LoR effect on the degree of L1 erosion while studies looking into populations with minimum LoR smaller than ten years frequently find a significant LoR effect (see reviews in Schmid, 2011, 2019). For instance, as cited in Schmid (2019), an investigation of the same population of long-term Dutch migrants in Australia reported little change between two different testing times (de Bot & Clyne, 1994). In contrast, a significant LoR effect is reported in Kasparian & Steinhaurer (2017), which investigated

relative clauses in a group of Italian bilingual speakers with LoR ranging from one to twenty-six years and found that speakers with more years outside Italy were less native-like. A study by Beganović (2006) even found speakers with shorter period of immersion experience and lower proficiency in the L2 differed more from monolingual speakers than those with ten years or more¹. These results seem to suggest that attrition effect is most productive and dynamic in the first decades of migration, and may also be more pronounced at early stages of migration, presumably due to the need to spend a lot of effort on developing and acquiring the second language (Schmid, 2011, also see more discussion in Herdina & Jessner, 2002) and in response to the pressure of managing two languages in real time in tandem with limited cognitive resources (Mai, Kwan & Yip, 2018). Despite this interesting pattern in relation to LoR and L1 attrition, studies with insights into the earlier stages of immersion period remain limited (see overview in Schmid, 2019).

Theoretical models

Several accounts have been employed to explain the mechanism underlying L1 attrition in morphosyntax. Some researchers ascribe the changes in L1 attrition to Cross-linguistic influence (CLI) in language contact situation (e.g., see Silva-Corvalán, 1994a, 1994b; Pavlenko, 2000). CLI is a widely documented phenomenon in bilingualism research. It is noted here that although in a broader definition, the term “CLI” refers to different ways how

¹ It is worth noting that Beganović’s (2006) findings do not indicate that attrition effects will completely disappear after early years of L2 acquisition, but rather that the causes of attrition phenomena will change over time. Similar findings are reported and discussed in the current study (see Chapter 6 for more information), implying a dynamic picture of how the attrition effect affects bilingual speakers’ linguistic performance during the early stages of migration.

one language can affect another (Serratrice, 2013), in the current study, it is interchangeably used with the term “language transfer”, referring to “incorporation of a grammatical feature of a structure in one language into the corresponding structure in another” (Mai et al., 2018, p.605).

A framework that is frequently used to explain CLI on L1 attrition is Paradis’s (2007) Activation Threshold Hypothesis. ATH assumes a correlation between language use and language accessibility. Based on the two main components, inhibition and activation, ATH hypothesizes that the activation threshold - i.e., the amount of neural impulses needed to activate - of any linguistic information, depends to what extent this piece of information is frequently and recently used. The more frequently and recently an element is used, the lower level of threshold is required to activate it. In contrast, for elements that are not in use after a prolonged period, it will become relatively difficult to reactivate them (Paradis, 2007; see also Schmid, 2019). Given this prediction, ATH has frequently been used as a framework for explaining the mechanism underlying L1 attrition due to CLI as a result of preponderance exposure to L2 (e.g., Köpke, 2002; Gürel, 2004; Mai et al., 2018; Steinhauer & Kasparian, 2020). Following ATH, L1 attrition will occur when the activation threshold of a linguistic property in L1 increases due to disuse or less use while its corresponding competing property in L2 becomes easy to be activated with a lower threshold as a consequence of frequent and recent use. In this case, the L2 form will be more accessible than the L1 form (Chamorro et al., 2015; Mai et al., 2018).

Another hypothesis that is rooted in inhibition control is Interface Hypothesis. A current version of IH suggests that the structures at the external interfaces (e.g., syntax-pragmatics interface) are more vulnerable to attrition effects than internal interface structure and narrow

structures. This hypothesis is based on the assumption that bilingual participants are expected to experience processing difficulty when computing external interface structures (Chamorro & Sorace, 2019). The mechanism underlying this processing difficulty is explained by “reduced efficiency when integrating information from different domains in real time and updating the mental discourse model when needed, as a side effect of the need to exercise inhibitory control to avoid interference from the language not in use” (Chamorro & Sorace, 2019, p. 34). Following this assumption, inhibitory control plays an important role in determining the degree of difficulty speakers may experience in the processing of interface structures. According to the Inhibitory Control Model (Green, 1998; also see discussion in Peeters & Dijkstra, 2018), the amount of cognitive effort applied for inhibitory control is proportional to the strength of the language that requires to be suppressed. This indicates attrition effect predicted by IH would be more likely to be detected in bilingual speakers with higher proficiency or more dominance in L2. The stronger the L2 is, more cognitive effort needs to be spent on exercising the inhibition control on suppressing the language not in use when using the L1. This is in line with the linguistic background of bilingual speakers in previous empirical studies that report supporting evidence for the prediction made by IH. They either belong to the group of heritage speakers who use L2 as the dominant language or to the group of near-native L2 learners (see reviews in Chamorro et al., 2015).

As mentioned earlier, IH is one of the frameworks that tries to accommodate the inconsistent findings in adult L1 attrition. According to IH, the selectivity exists because only structures at external interfaces are prone to attrition effects whilst the other internal interfacing structures or narrow structures are immune to L1 attrition. The difference in attrition effects on the two types of structures is ascribed to different cognitive costs: processing external interfacing structures will incur more processing difficulty than processing the internal interfaces or

narrow structure as the former processing needs the integration of information in context in real time whilst the type of integration involved in the latter processing is based on “proceduralized routines of access to grammatical elements” (Chamorro et al., 2015, p.6). In other words, IH predicts that attrition effect on mature L1 grammar is limited to the processing structures whereas the grammar itself remains stable. This prediction of IH has been challenged by the empirical evidence reporting restructured syntactic and morphosyntactic properties (e.g., Iverson, 2012; Domínguez, 2013), but its prediction on the vulnerability in external interfacing structures is borne out in many previous studies (e.g., Montrul, 2004; Tsimpli et al. 2004; Chamorro et al. 2016).

A more recent assumption which can be implicated in L1 attrition is also rooted in inhibition control. It is defined as “sustained and proactive inhibition of the L1 in mixed language contexts” (Peeters & Dijkstra, 2018, p.1036). This assumption is mainly based on a larger mixing cost for the L1 than the L2 in the cued language-switching paradigm found in studies employing psycholinguistic approaches in both language comprehension and production (e.g., Christoffels, Firk & Schiller, 2007; Declerck & Grainger, 2017). The mixing cost is calculated by comparing naming response times (RTs) in a mixed language contexts block to naming RTs in a single language context block. Larger mixing cost for L1 than L2 is interpreted as evidence for sustained and proactive inhibition applied to the L1 under mixed language contexts, presumably facilitating the access and performance in the weaker L2 (see Peeters & Dijkstra, 2018 for more discussion). It is noted here that the mixing cost is found in groups of unbalanced speakers who are less L2 proficient and living in their home country. This finding seems to indicate that the availability of the dominant L1 could be adjusted to a surprisingly lower level very quickly under exposure to mixed language contexts, presumably to promote better performance in the weaker L2. By incorporating VR (virtual reality)

technology into their experimental design, Peeters and Dijkstra (2018) replicate this laboratory finding in virtual environments. This result, according to Peeters and Dijkstra (2018), suggests that these findings related to bilingual language control in laboratory settings can potentially generalize to everyday bilingual experiences. Given the linguistic background of the target participants and settings of the mixed language contexts in Peeters and Dijkstra (2018), the notion of “sustained inhibition of L1” is suitable to be implicated in the process of attrition the current study aims to investigate. By being immersed in the L2 environment but frequently using both languages, the target bilingual participants in the current study could be considered under exposed to mixed language contexts in an everyday situation. Following this, it is predicted that these unbalanced bilingual speakers would undergo processing difficulty when processing their L1 as more effort is required to reactivate the target language as a result of sustained inhibition of L1 under mixed language contexts compared with their monolingual peers.

The last hypothesis to be introduced here is Lardiere’s Feature Reassembly Hypothesis. FRH is originally proposed to explain how the mechanism works under the developmental process of a new language under CLI. As briefly introduced earlier, FRH assumes that linguistic knowledge consists of a variety of features that are selected from an inventory provided by Universal Grammar and these features are encoded in the lexicon of a language. L2 learners start by looking for morphological equivalents that are associated with the feature bundles from their native language in the L2. If the L1 and L2 have the same feature configurations for a given property, it is expected that learners will acquire the target knowledge without difficulty (Lardiere, 2009). One piece of supporting evidence for this assumption comes from studies investigating L2 acquisition of Spanish DOM which reveal no particular difficulty by Romanian-speaking learners as Romanian also has a DOM system which is conditioned and

realized in the same way as in Spanish, but difficulty found by English speaking learners as English is a language without DOM (Montrul, 2019; Guijarro-Fuentes, 2012; also see more discussion in Chapter 4). It has been suggested that FRH can be implicated into heritage language development. During language development, heritage speakers are likely to reassemble L2 properties to corresponding L1 forms as consequences of the qualitative reduction in L1 input and output which may arise from slowly shifting from L1 input in the earliest stages of acquisition to L2 dominance (see Putnam & Sánchez, 2013; Hicks & Domínguez, 2019). In the field of the L1 attrition, it is also suggested that it is possible for the first language to be influenced in a similar way in contact situations under certain circumstances (Hicks & Domínguez, 2019), but the precise nature of FRH determines the predominance in L2 as the critical factor for L1 attrition to take place in the route predicted by FRH.

To summarize, four assumptions and hypotheses are introduced here as the potential frameworks for predicting and explaining the attrition effects investigated in the current study. ATH and FRH can be employed to predict attrition effects under CLI, while Sustained inhibition of L1 and IH can be used to predict attrition effects under processing difficulty as consequences of bilingualism. Given the linguistic background of the target participants in the current study, the processing difficulty approaches are expected to be the potential mechanisms for any attrition effect detected. This prediction is examined in three studies in Chapter 3, 4 and 5.

1. 2. ba-construction in Chinese Mandarin

The basic syntactic form of ba-construction

The ba-construction is a language-specific structure in Mandarin. Similar to English, the canonical word order in Mandarin is Subject-Verb-Object (SVO), with the subject going first, verb second, and the object third. In a ba-construction, the object is placed at the preverbal position and marked by the function word *ba*, forming a Subject- ba-Object -Verb structure. In addition to the non-canonical word order in syntax, the verb in ba-construction should be accompanied by an extra element. Thus, one of the most typical forms of ba-construction in Mandarin consists of a subject (S, optional), the function word *ba*, a noun phrase (NP) as the direct object, a verb (V), and an X element, as shown in 3.1. The X element can either be an aspect marker (e.g., Le, "complete"), a resultative complement (e.g., an adjective), or a locative prepositional phrase (Liu, 1997; Xu, 2012; Yang, 2020).

3.1.

Subject	+ba-Object	+Verb	+X
Ta	ba chuanghu	da	po le

(He hit and broke the window)

(Su, 2017)

The optional usage of ba-construction vs. SVO

As shown in 3.2, a ba-construction sentence can be optional and equivalent in meaning to its SVO counterpart. In the case of the optional variation of the two largely equivalent constructions, speakers' preference for ba-construction or SVO is mainly driven by semantic

and pragmatic constraints (see reviews in Xu, 2012): e.g., the semantic constraints such as Wang's (1947) "disposal account" and A.Li's "affectedness" account (2001); the pragmatic constraints such as to indicate instruction and declaration (Li & Wang, 2001) and to mark the topic (Tsao, 1987) (see more reviews in Chapter 5).

3.2.

a. [SVO sentence]

Ta chi le na-ge pingguo

He ate that apple

(He ate that apple.)

b..[ba sentence]

Ta ba na-ge pingguo chi le

He ba that apple ate

(He ate that apple.)

The obligatory usage of ba-construction vs. *SVO

In some cases, nevertheless, a ba-construction is claimed to be obligatorily used. Two main accounts have been put forward about obligatory conditions when a ba-construction is warranted: internal object constraint (Wang, 1987), and postverbal constraint (e.g., Huang, 1984; Li, 2001). According to internal object constraint, the element that follows the verb is referred as "internal object". The internal object fills the object position and forms a close semantic unit with the verb that does not allow the direct object to be inserted between. Thus, the direct object is forced to be placed postverbal. A similar notion is held by the postverbal

constraint account, which claims that the number of constituents that may occur at the postverbal position is restricted to at most one. Therefore, if another constituent exists after the verb, then the direct object is generally moved to the position before the verb. However, exceptions have been reported against the above arguments by the existence of sentences that allow two constituents of NPs placed after the verb (e.g. Li, 2011). This suggests that not all elements may take the postverbal position and kick away the direct verb. Among the X elements that can be placed in ba-construction, the complement of place seems to be the one that has been agreed most to form a close semantic unit with the verb and force the direct object to be preposed, creating an obligatory condition for the usage of ba-construction, as exemplified in 3.3. In this case, the ba-construction is warranted to express the displacement meaning while the corresponding SVO order is claimed ungrammatical (See more discussion in Chapter 5).

3.3

- a. 他把书 放 在桌上 [ba sentence]
 He ba book put on the desk.
 (He put the book on the desk.)
- b. *他 放 书 在桌上 . [*SVOP sentence]
 He put book on the desk
 (He put the book on the desk)

***ba* as a function of Differential object marker (DOM)**

The function word *ba* is treated as the differential object marker (DOM)² in Yang & van Bergen (2007) and de Swart (2007). Similar to DOM in other languages, e.g., the personal *a* in Spanish and the affix *-ko* in Hindi, the presence or absence of the lexical term *ba* in Mandarin is not random but constrained by a number of conditions. Similar to English, Mandarin SVO sentences check the accusative case through the syntactic position of direct objects rather than marking the direct object overtly with a particular lexical form. Thus, the presence of *ba* as a DOM is only allowed when the direct object is preposed to the preverbal position (Yang & van Bergen 2006), and native speakers of Mandarin consistently reject its use in SVO sentences (Xu, 2012). On the other hand, following Yang and van Bergen (2006), not all scrambled objects are obligatorily marked: DOM can be omitted in SOV sentences under some conditions, regulated by animacy and definiteness of the direct objects. Specifically, [-animate] and [+definite] direct objects are optionally marked, as shown in 3.4. In sum, *ba* in Mandarin can be treated as an instance of the marked accusative case. The lexical term *ba* is triggered by the sentence word order [+scrambled]. This is because Mandarin, in its canonical SVO word order, does not mark direct objects overtly, but checks the accusative case through the syntactic position. On the other hand, *ba* is not obligatory with all scrambled direct objects; it can be optionally omitted, primarily regulated by the semantic features (i.e., animacy and definiteness) of direct objects (see more discussion in Chapter 4).

3.4

² Although the function of *ba* is debatable, it makes no difference whether we consider *ba* as a function of DOM throughout the current thesis because the other two studies look at *ba*-construction as a whole, i.e., non-canonical word order.

他 (把) 那个 苹果 吃了 . [-animate, +definite]

He (*ba*) that apple ate

(He ate that apple.)

他 (把) 苹果 吃了. [-animate, +definite]

He (*ba*) apple ate

(He ate the apple.)

(van Bergen 2006)

他 *(把) 蛇 打死了. [+animate, +definite]

He *ba* snake hit.dead

(He killed the snake.)

The three properties of *ba*-construction, as introduced above, are examined in this thesis. Firstly, the optional usage of *ba*-construction vs. *SVO* is a good testing ground for L1 attrition on interfacing structures as the opt for a specific construction is constrained by contextual information. Previous studies have suggested poor control of conditions for felicitous usage of *ba*-construction by L2 learners (e.g., Xu, 2012; also see more reviews in Chapter 3). Thus it is interesting to see if this property will also undergo attrition effects in a group of unbalanced bilingual speakers. Secondly, the obligatory usage of *ba*-construction vs. **SVOP* seems to be a good testing battery for CLI as the ungrammatical *SVO* construction has a word-for-word translation equivalent in English. Following this, it is interesting to find out if CLI can be so strong to render ungrammatical construction in L1 acceptable as its equivalent in L2 is perfectly grammatical and acceptable. Finally, *ba* as a function of DOM can be a good testing ground to distinguish CLI from processing difficulty as it is expected to instantiate to opposite directions: if CLI is the potential trigger, bilingual speakers are

expected to accept the option with *ba* omitted as English does not have a DOM system; whereas if processing difficulty is the source of changes, bilingual speakers are expected to reject the omission of *ba* as it is bundled with a complex constraint system. In brief, different predictions of the processes of L1 attrition can all be examined based on this overarching construction.

1. 3. The current study and research questions

Two main research questions are examined in this thesis:

1. Do Mandarin unbalanced bilingual speakers in contact with English behave differently in *ba*-construction compared to their monolingual peers from their homeland?
2. What are the potential triggers underlying these divergent behaviours (if detected)?

These two questions are investigated in three studies. Each study looks at one property of *ba*-construction. The first study (Chapter 3) focused on the perception of the optional usage of *ba*-construction vs. *SVO*. Mandarin-English unbalanced bilingual speakers' performance on this property was investigated by using contextual acceptability task and multiple-discourse completion task. The research questions addressed in this chapter include:

3. Will these Mandarin-English unbalanced bilingual speakers show an attrition effect on the discourse-driven scrambling in Mandarin (*ba*-*SVO* alternation)?
4. If they do, is the cause of the attrition effect attributed to their processing difficulty?

The second study (Chapter 4) investigated the perception of *ba* as a function of DOM among Mandarin-English unbalanced bilingual speakers by using both timed and untimed grammaticality judgement tasks. The research questions addressed in this chapter include:

5. Do late Mandarin-English bilinguals show divergent performance on Mandarin DOM compared with their monolingual counterparts?
6. If they do, is the divergence restricted to the processing level under time pressure?
7. Which factors (i.e., CLI or processing difficulty) contribute to the changes observed?

The third study (Chapter 5) explored the bilingual speakers' awareness of the obligatory usage of ba-construction vs. SVO by using a paired grammaticality judgement task. The research questions addressed in this chapter include:

8. Does the native baseline group of L1 Mandarin speakers perfectly reject all *SVOP sentences or exhibit variability in the acceptability of *SVOP sentences?
9. Does the late Mandarin-English bilingual group show divergence on the awareness of expressions of displacement (ba-construction vs. *SVOP construction) compared with the native baseline group?
10. What are the potential triggers if the divergence between groups exists?

Note that Chapter 4 *Attrition effects on ba as a function of DOM in Mandarin* has been submitted to the Journal of *Language Acquisition*, Chapter 3 *The optional usage of ba-construction vs. SVO in adult bilingual speakers under L1 attrition* is currently being prepared for submission to the Journal of *Linguistic Approaches to Bilingualism* and Chapter 5 *Perception of ba-construction as obligatory word order in late adult bilingual speakers* is

currently being prepared for submission to the Journal of *International Journal of Bilingualism*.

Chapter 2. Methodology

2.1. Participants

Bilingual speakers of Mandarin as their L1

A total of three different groups of bilingual participants were selected from the native speakers of Mandarin residents in the UK, but all with a similar profile:

- a. All participants were between 20 and 30 years old (with the exception of one participant in Group 1, who was 36).
- b. They had all been at least 16 years old when they arrived in the UK to avoid incomplete acquisition of their L1.
- c. As the current study focused on L1 attrition in the early stages of migration, bilingual participants' lengths of residence were no longer than six years, with group means around two years.

In addition, proficiency and frequency of use in both L1 and L2 by participants from Group 1 and 3 were also assessed via self-assessment instruments. Participants from the two groups reported similar frequency of use of both languages but saw themselves as being more proficient in their L1³. Based on the above demographic and linguistic background, the

³ Although proficiency and frequency of use in two languages were not assessed in Group 2, we would still expect that participants in Group 2 are likely to resemble the performance in Group 1 and 3 as the three groups

bilingual participants recruited in the current study can be categorized as a cohort of late bilinguals whose L2 is consecutively learned and used after the complete acquisition of L1, and also as a cohort of unbalanced bilinguals who speak two languages but is more proficient in their L1 than L2.

To be specific, participants of Group 1 were chosen from Chinese students at the University of Essex. It included 22 Mandarin native speakers who arrived in the UK between the ages of 16 and 36 ($M = 22.91$, $SD = 3.91$) and stayed for an average of 2.45 years ($SD = 1.91$, range = 0.5-6), with an average age of 25.45 years ($SD = 3.78$). Participants were asked to fill out a questionnaire, which included self-rating their language skills in Mandarin and English using the ALTE CanDo Scales used by Keijzer (2007), as well as providing some basic background information. The CanDo Scales used in this study ask participants to self-rate their language skills on a 5-point scale (from 1 = I cannot do this to 5 = I can do this without any difficulty at all). CanDo Scale scores were computed, and the results show that bilingual participants self-rated their L1 ($M = 4.78$, $SD = 0.23$) significantly higher than their L2 ($M = 3.33$, $SD = 0.56$) ($p < .001$). All participants reported using the L1 with their native Chinese friends and family on a daily basis. Participants of Group 2 comprised 54 Chinese students from the University of Essex, who were recruited through a participant recruitment advertisement spread on Wechat Chinese student in the UK groups and department email lists, with a similar profile in age ($M = 23.44$, $SD = 2.77$), AoA ($M = 21.98$, $SD = 2.80$) as well as LoR ($M = 1.64$; $SD = 1.46$) to participants of Group 1. Participants of Group 3 were recruited via recruitment ads emailed to Chinese students at the University of Essex and ads posted on a British Chinese community website. Group 3 consisted of 38 Mandarin native

are similar in other demographic information like AoA, LoR, and age of testing.

speakers studying and working in the UK, with a mean age of 23.89 years (SD=3.38, range = 20-30) at the time of testing. They came to the UK between the ages of 16 and 29 (SD=2.96, M=22.21) and had been here for an average of 19.01 months (SD=19.41, range= 5-77). All participants in this group were asked to answer demographic questions and rate their language proficiency and frequency of use for both languages on a 10-point scale. A Kruskal Wallis test shows that bilingual participants self-rated their L1 Mandarin significantly higher than their L2 English ($H(1) = 42.83, p < .001$). In terms of frequency of language use, bilingual participants of Group 3 also stated that they used Mandarin on a daily basis.

“Monolingual” speakers of Mandarin

Matched with bilingual participants, three different groups of “monolingual” controls were selected from native speakers of Mandarin in China. It is noted here that, since English is a mandatory subject across primary and secondary schools in mainland China, all of these participants likely had approximately eight years of English training experience. They may not have done much with their English, but may retain some underlying knowledge. In this case, it is necessary to clarify that all these “monolingual” participants recruited in the current study are referred to as “functional monolinguals” who use and produce their L1 only in the course of their normal daily activities⁴. Consistently, monolingual controls of Group 1 and 3 reported no usage of English in their daily life. Although participants of Group 2 were not

⁴ The description of functional monolingualism is adapted from the definition of functional bilingualism: functional bilingualism is one's ability to use and produce both languages across “an encyclopaedia of everyday events” (Baker, 1993, p.13).

assessed in terms of everyday usage and production of English, they reported no contact with any foreign language in their work or study⁵

Specifically, 28 Chinese native speakers were recruited in the Chinese controls group as the counterparts to bilingual participants in Group 1. They were chosen from first- and second-year students at Wenzhou Vocational & Technical College in China. All of the participants had been born and raised in China, with little international experience and majors unrelated to foreign language studies. At the time of testing, the control group's average age was 20.29 years ($SD = 0.98$, range = 18-22). In terms of the monolingual group matched with Group 2, a total of 78 monolingual participants were recruited through a participant recruitment advertisement post on one of the biggest social media platforms in China. At the time of testing, their average age was 21.46 years ($SD = 2.49$). The Mandarin control group, which was matched with Group 3, was made up of 35 native Mandarin speakers from China. They were recruited through participant recruitment ads on mainland China's Weibo (social media platform) and Wenjuanxing (online survey platform). All of the participants had little or no overseas experience (less than one month), and they said they did not use English at work, school, or in their daily lives. At the time of testing, the control group's mean age was 25.46 years ($SD = 3.53$, range = 20-30).

More details about both bilingual and monolingual groups are described in Chapter 3 to 5.

⁵ As pointed out by the examiners, in the light of the fact that these monolinguals are expected to have had some English knowledge, in future studies it might be worth controlling for their level by also asking them to fill out both a can-do assessment for their English and Mandarin levels.

2.2. Materials and procedure

A list of tasks employed in this thesis and their relevant chapters are summarized below:

ALTE CanDo Scales (Chapter 3 & 4);

Timed and untimed grammaticality judgement tasks (Chapter 4);

Timed and untimed contextual acceptability tasks (Chapter 3);

The multiple-choice discourse completion task (Chapter 3);

The paired grammaticality judgement task (Chapter 5).

Details of the above tasks can be found in the relevant chapters. Nevertheless, it is worth noting here that the contextual acceptability tasks, the multiple-choice discourse completion task, and the paired grammaticality judgement task were adapted from tasks used in Xu's study (2012). Xu (2012) systematically examined the acquisition of various linguistic properties of the ba-construction by English-speaking learners of Chinese by using three tasks, namely, grammaticality judgement task, the paired grammaticality judgement task and the contextual acceptability preference task.

The paired grammaticality judgement task in the current study borrowed the stimuli (pairs of ba sentences vs. SVO sentences) from that in Xu's study. It then combined them with a Likert Scale and a list of demographic questions. This task is employed to assess participants' perception of the obligatory usage of ba-construction to express displacement. The contextual acceptability task and the multiple-choice discourse completion task borrowed the stimuli (contexts and sentences) from the contextual acceptability preference task. As all stimuli

should also be presented to monolingual Chinese controls, the contextual paragraphs were all translated into Chinese.

Bilingual participants in Group 1 and their monolingual controls were asked to complete CanDo Scales, the grammaticality judgement tasks and the contextual acceptability tasks. Data from the grammaticality judgement tasks were collected to investigate participants' perception of ba as a function of DOM, as discussed in Chapter 4, while data from the contextual acceptability tasks were used to explore participants' perception of the optional usage of ba-construction, as discussed in Chapter 3.

Bilingual participants in Group 2 and their monolingual controls were asked to complete the multiple-choice discourse completion task (MDCT). The MDCT is designed and used as a complementary test battery to contextual acceptability tasks. Data from this task were also analysed and discussed in Chapter 3.

Bilingual participants in Group 3 and their monolingual controls were asked to complete the paired grammaticality judgement task. Data from this task were collected to investigate participants' perception of the obligatory usage of ba-construction to express displacement, as discussed in Chapter 5.

Chapter 3. Perception of optional usage of ba-construction vs. SVO in adult bilingual speakers under L1 attrition

3. 1. Introduction

It is often assumed that L1 attrition is a gradual, more or less linear deterioration of L1 skills or knowledge; in other words, speakers with a longer period of residence and less opportunity to use their L1 will be the ones with more attrition phenomena. However, increasing empirical evidence has revealed that signs of attrition effects can be detected fairly quickly after migration. For instance, it has been reported that slower lexical access and decreased production of non-cognate words was found after one semester's immersion in an L2 environment among a group of German-Spanish bilinguals (Baus, Costa, & Carreiras, 2013). Similar processes of transfer have often been described at the phonetic level. For example, assimilation to phonetic properties of Korean has been detected among a group of English speakers enrolled in elementary Korean classes within six weeks (Chang, 2012).

Chapter 1 above

In terms of syntax, the story becomes more complicated. Although the traditional generative approach to language development assumes a stable endstate for a language once fully acquired (particularly for L1 acquisition), this assumption has been challenged by a variety of existing research on L1 attrition that does report grammatical changes (also see discussion in Schmid & Köpke, 2017; Hicks & Domínguez, 2020). For instance, it is reported in Dussias (2004) that relative clause attachment preference change was revealed among a group of Spanish speakers immersed in an English environment for an average of around four years. A

later study by (Ribbert & Kuiken, 2020) also found that German-Dutch bilinguals tended to overgeneralize the appropriate context for the use of a certain German complementizer based on the L2 settings after a relatively short period of time. However, significant restructuring of grammar beyond childhood is not widely attested (Hicks & Domínguez, 2020). Even in extreme cases of prolonged immersion experience in an L2 environment with very little L1 contact, the use of morphosyntactic structures is still highly accurate (error rates < 5%) and complexity is not strongly compromised, as revealed by a study of L1 German of Holocaust survivors in Schmid (2012, reported in Karayayla & Schmid, 2019).

The Interface Hypothesis (IH)⁶ is one of the generative models seeking to accommodate the selectively attested attrition effects on L1 mature grammars. A current version of IH suggests that the structures at the syntax-pragmatics interface are relatively vulnerable to attrition effects as bilingual participants are expected to experience processing difficulty when computing these interface structures (Chamorro & Sorace, 2019). The mechanism underlying

⁶ Hicks and Domínguez (2020) claim that any approach seeking to account for the attested grammatical attrition should also resolve the paradox that if a mature L1 grammar is allowed to be restructured, then why is significant grammatical attrition rarely detected? They point out that the Interface Hypothesis is not a model that can resolve the attrition paradox because it assumes there is no paradox, since only the ability to process structures at syntax-pragmatics interface is affected while the grammar itself remains stable. The IH has been challenged by the empirical evidence reporting restructured syntactic and morphosyntactic properties (e.g., Iverson, 2012; Domínguez, 2013). However, it is beyond the scope of the present study to argue for or against these theoretical debates. The IH is quoted just as a theoretical background for why *ba*-construction is selected as the target property and investigated (as a structure highly prone to attrition effects).

this hypothesis is explained by “reduced efficiency when integrating information from different domains in real time and updating the mental discourse model when needed, as a side effect of the need to exercise inhibitory control to avoid interference from the language not in use” (Chamorro & Sorace, 2019, p. 34). Following this, inhibitory control seems to play an important role in the processing of interface structures under L1 attrition. A straightforward view of inhibition cost argues that the amount of cognitive effort applied for inhibitory control is proportional to the strength of the language that needs to be suppressed (Green, 1998). This indicates attrition effect predicted by IH would be more possibly detected in bilingual speakers with higher proficiency or more dominance in L2. Indeed, previous studies that report supporting evidence for the prediction made by IH on interface structures mainly focus on bilingual groups of either L2 dominant heritage speakers or near-native L2 speakers (e.g., Montrul, 2004; Tsimpli et al. 2004; Chamorro et al. 2016). However, it is unclear if bilingual speakers with less L2 proficiency and more dominance in L1 should undergo less or no attrition effect on interface structures predicted by IH. Research in relation to this issue remains scarce.

On the other hand, some studies observed a larger mixing cost for the L1 than the L2 the cued language-switching paradigm among unbalanced bilingual speakers (who are less L2 proficient and living in their home country) in both language comprehension and production (e.g., Christoffels, Firk & Schiller, 2007; Declerck & Grainger, 2017). The mixing cost is calculated by comparing naming RTs in a mixed language contexts block to naming RTs in a single language context block. Based on this, larger mixing cost for L1 than L2 is interpreted as evidence for sustained inhibition applied to the L1 in mixed-language contexts, presumably for attaining more efficient naming in the weaker L2 (see Peeters & Dijkstra, 2018 for more discussion). This finding seems to indicate that the availability of the dominant

L1 could be adjusted to a surprisingly lower level so quickly under exposure to mixed-language contexts, presumably to facilitate access to the weaker L2. By employing VR technology, Peeters and Dijkstra (2018) replicate this laboratory finding in virtual environments and then claim that these findings related to bilingual language control can potentially generalize to everyday bilingual experiences. If this is the case, we expect a similar sustained inhibition effect of L1 on unbalanced bilingual speakers immersed in the L2 environment but with frequent use in both languages. These bilinguals could be considered under exposure to mixed-language contexts in an everyday situation. Following this, it is predicted that despite being less proficient in L2, these unbalanced bilingual speakers should also possibly undergo processing difficulty when computing interface structures as they are faced with less efficiency in L1 access as a result of sustained inhibition of their L1 compared with their monolingual peers.

To sum up, the early migration period - where intensive effort goes into L2 acquisition and proficiency is, as yet, likely to be lower - is probably a relatively active phase of L1 attrition. However, despite this supposition, much previous research on L1 attrition is limited to bilinguals who have been living abroad for a considerable period of time and speak their L2 at highly advanced levels. This paper aims to contribute to a larger variety of studies attempting to explore attrition effects (especially on syntactic properties) in late unbalanced adult bilinguals during their early period of migration. The present study targeted a group of Chinese students studying in the UK. This group of speakers has limited immersion experience in the L2 environment (with a minimum length of residence (LoR) of six months and an average of LoR of two years in the UK), thus providing interesting ground for research on native attrition effects during early period of migration. The discourse-driven object-scrambling in Mandarin (ba-SVO alternation), which has been reported to be

problematically performed by both heritage Mandarin speakers and L2 learners of Mandarin (see below, Section 2), is investigated here since this property interfaces word order and contextual information, and can thus be expected to be vulnerable to attrition effects according to the IH.

3.2. Discourse-driven object-scrambling in Mandarin

While the basic word order of Mandarin Chinese is SVO (as in English), word order in Mandarin is more flexible than in English. This study is in particular interested in the scrambling of verb and object, resulting in SOV word order. In such cases, the marker *ba* is often used to mark the preposed and pre-verbal object, as exemplified in 5.1.

5.1.	Subject	+ba-Object	+Verb
	他	把 窗户	打破 了
	He	ba window	hit broke

(He hit and broke the window)

(Su, 2017)

Scrambled *ba*-object construction is claimed to be obligatorily used in some cases. The most agreed condition in which *ba*-construction is accepted as the obligatory form should be when the complement of place follows the verb closely to express displacement meanings. Under this circumstance, the corresponding SVO word order construction is claimed to be ungrammatical and unacceptable (see Chapter 5 for more discussion), as exemplified in 5.2.

5.2 a. 他 把 书 放 在 桌 上 . [ba-sentence]

He ba book put on the desk

(He put the book on the desk)

b. *他 放 书 在 桌 上 . [*SVO sentence]

He put book on the desk

(He put the book on the desk)

(Xu, 2012)

In other cases, ba-construction sentences are optional and equivalent in meaning to the SVO word order construction, as shown in 5.3.

5.3 a. [SVO sentence]

他 吃 了 那 个 苹 果

He ate that apple

(He ate that apple.)

b. [ba-sentence]

他 把 那 个 苹 果 吃 了

He ba that apple ate

(He ate that apple.)

In the case of the optional variation of these two largely equivalent constructions, it is important to understand under what conditions speakers opt for S-ba + O – V rather than

SVO. Related to this, numerous studies have been dedicated to exploring the specific functions of the ba-construction. One of the earliest and most influential approaches to this question is Wang's (1947) "disposal account", which claims that ba-construction is used to state, "how a person is handled, manipulated, or dealt with; how something is disposed of; or how an affair is conducted" (translation by Li, 1974, p200-201). This account is further extended to the idea of "affectedness" (A.Li, 2001, cited in Xu, 2012) which emphasizes how the ba-Object is affected or changed by the action denoted by the verb phrase. As exemplified in 5.4, sentences 5.4a and 5.4b denote the same meaning, "last night the wind blew down the billboard". Nevertheless, 5.4b narrates the event in a neutral way while 5.4a places special emphasis on the state of the billboard, in other words, how the billboard was manipulated or affected as a result of the action (blown down). It is the change exerted on the object as a result of the action encoded in the verb which is at the heart of this particular function of the ba-construction.

5.4 a. 昨晚上 大风 把 这块 广告牌 吹倒了

last night the wind ba this billboard blew down

(Last night the wind blew down the billboard)

b. 昨晚上 大风 吹倒了 这块 广告牌

last night the wind blew down this billboard

(Last night the wind blew down the billboard)

Jing-Schmidt (2005) further claims that the function of ba-construction is not restricted to a syntactic or semantic relationship (such as "disposal" or "affectedness") between

constituents in the sentence but extends to the level of discourse pragmatics (also see Su, 2017 for more discussion).

To date, there is limited research exploring the pragmatic function of the ba-construction, but even so a variety of notions have been proposed, e.g. that it is employed to indicate instruction and declaration (Li & Wang, 2001), or to mark the topic (Tsao, 1987). The latter function appears to be among the least controversial and most commonly accepted ones (see Xu, 2012 for more review), and it is the one that will be investigated here. As suggested in Tsao (1987), in a ba-construction, the initial NP (Subject) is a regular topic while the ba-NP (ba-Object) is marked as a special topic; the transitivity relation between the regular topic and the ba topic is clarified through ba-construction and the focus is brought into the results as expressed by the verb phrase. Although the analysis of the ba-Object is not completely agreed upon, this proposition is consistent with the assumption that is widely talked about word order in Mandarin. In a Mandarin sentence, the word order is to the largest extent determined by information flow. Specifically, it is widely assumed that in Mandarin sentences, the given, topic information tends to occur near the beginning of the sentence in the preverbal domain and the new, focus information tends to occur near the end of the sentence in the postverbal domain (LaPolla, 1990).

3.3. Previous studies in the optional usage of ba-construction

In terms of L2 acquisition, findings show that L2 learners are able to organize grammatical ba-sentences and reject ungrammatical ba-sentences at intermediate levels, but they are likely to find the semantic and pragmatic properties of the ba-construction more challenging to acquire (e.g., Zhang, 2002; Du, 2004; Xu, 2012, Paul, 2014). For example, Xu (2012)

investigated the acquisition of the ba-construction among both low and high proficient learners of Mandarin by means of a grammaticality judgement task and a contextual acceptability preference task. According to the results, native speakers of Mandarin consistently achieved high accuracy in most properties of the ba-construction, whereas variability was detected in the usage of ba-construction vs. SVO under given contexts. This variability is more pronounced in L2 learners that they exhibited much lower accuracy when it comes to rejecting ba-structures that were semantically anomalous or selecting pragmatically felicitous construction according to a given context, indicating their poor command of semantic and pragmatic constraints for a ba-construction. On the other hand, these L2 learners were able to exhibit native-like sensitivity to structures that violate syntactic constraints: they perfectly accepted structures with ba-NP at the preverbal position as the basic syntactic structure of a ba-construction (i.e. S-ba-NP-V), and correctly rejected structures with ba-NP at postverbal position (i.e., *S-V-ba-NP).

In terms of L1 attrition on ba-construction, to my knowledge, no empirical research has directly looked into such attrition effects in late adult bilinguals so far, and only a few studies investigated this construction in heritage Mandarin. Polinsky and colleagues (2010) investigated the usage of the ba-construction to describe the object of spatial displacement by a group of heritage speakers of Mandarin through a production task. They found that heritage speakers had no problem with the canonical SVO word order but did not employ the scrambled ba-construction in the same way as native children did: they avoided using the ba-construction and showed a preference for canonical SVO order. Similar results were found in Mai et al. (2018), who compared the frequency of the zoeng-construction (S-zoeng-O-V)⁷ in

⁷ In terms of syntactic structure, it is interchangeable with the ba-construction in Cantonese.

displacement contexts in Cantonese via an elicited oral production task by a group of heritage Cantonese speakers with native speakers of Cantonese in Hong Kong. Again, heritage participants made greater use of canonical and topicalization structures, which have equivalents in English, while showing a lower use of the *zoeng*-construction compared with control counterparts. Researchers of both studies partially attribute the underuse of the non-canonical word orders to CLI from English: since there are no *zoeng/ba*-like constructions in English, it is more likely that English, the dominant language of the heritage speakers, influences Mandarin/Cantonese, the weaker language, by reinforcing the mental representation of the word orders that have equivalents in English and keeping them more accessible than the Mandarin/Cantonese-specific non-canonical constructions in on-line production tasks.

The above two studies focus more on the usage of *ba/zoeng*-construction to express displacement meanings, which has been claimed as the obligatory/perfectly natural condition for using *ba/zoeng*-construction, rather than looking into the optional usage of *ba*-construction vs. *SVO* constrained by contextual information. Nevertheless, the two studies still provide informative findings of *ba*-construction in bilingualism.

To summarize, studies in Mandarin as the L2 and heritage language, as reviewed above, provide supporting evidence for both linguistic complexity and vulnerability of the usage of *ba*-construction vs. *SVO*. On the one hand, this linguistic phenomenon seems relatively difficult for L2 learners to acquire as regulated by a relatively complex constraint system across syntactic and pragmatic domains. On the other hand, this phenomenon tends to be vulnerable to CLI from English in heritage language as *SVO* construction has equivalent in English, but *ba*-construction does not. Regarding L1 attrition, as research investigating *ba*-

construction in late adult bilingual speakers remains non-existent, it is unknown if this property would be vulnerable to attrition effect as a result of processing limitation as predicted by IH or as a result of CLI from English.

It is worth noting here that the study (Polinsky et al., 2010) looking into *ba*-construction vs. *SVO* in heritage children cannot clearly tease apart the causes (performance limitation vs. cross-linguistic influence) underlying the norm-divergent performances by heritage speakers. This is because changes in linguistic performance as the result of processing difficulty steers towards the same direction to that caused by CLI in the case of the elicited production task used in that study. In their production task, participants were expected to describe the object of spatial displacement with complex relative clauses and verb compounds. This setting is likely to incur ambiguity in interpreting the performance by heritage speakers. As reviewed earlier, these heritage speakers exhibited underuse of *ba*-construction and adhering to multiple short *SVO* utterances. This could be attributed to CLI from English, but it could also be indicated as having problems with embedding and more complex utterances as a result of processing limitation.

Considering potential disadvantages of experimental design limitation on interpreting results, both timed and untimed experiments are employed in the current study to distinguish potential divergence as a result of processing limitation from other causes such as direct cross-linguistic influence from English. The rationale is that if the attrition effect is due to bilingual speakers' processing difficulty, we would expect to detect participants' divergent performance in the timed task only as the untimed grammatical judgement task is expected to reflect underlying syntactic competence (Chamorro et al., 2016).

3. 4. Research questions

The current study focuses on a group of unbalanced bilingual speakers who use Mandarin as the dominant language but are immersed in the environment with English as the societal majority language. Given the linguistic background of the target bilingual speakers in the current study, it is predicted that if norm-divergent performance is detected in this bilingual group, it is likely to be triggered by bilingual participants' processing difficulty, presumably as a result of sustained inhibition of L1 as exposure to mixed language contexts. Following this prediction, it is also expected that bilingual participants will undergo attrition effect (if there is) in the timed task only as their divergent performance is caused by processing limitation rather than restructuring in the grammatical knowledge representations.

To address the two predictions above, two main research questions are investigated in the current study:

- 1) Will these Mandarin-English unbalanced bilingual speakers show an attrition effect on the discourse-driven scrambling in Mandarin (ba-SVO alternation)?
- 2) If they do, is the cause of the attrition effect attributed to their processing difficulty?

3. 5. The empirical studies

This study first discusses contextual acceptability judgement data from a group of L1 Mandarin unbalanced bilingual speakers in the UK to explore the attrition effect on the discourse driven usage of ba-construction vs SVO. It also presents comprehension data of a multiple-choice discourse completion task from another group of Mandarin-English speakers in the UK, matched with the first group for age, LoR and age of arrival (AoA).

The contextual acceptability judgement task

Method

Participants

Chinese “monolinguals” (n=28): L1 Chinese

The Chinese controls were 28 Chinese native speakers. They were recruited among first-year and second-year students from Wenzhou vocational & Technical College in Mainland China. All participants had been living in China since birth with little overseas experience, and their majors were not related to foreign language studies. The mean age of the control group at the time of testing was 20.29 years (SD =0.98, range =18-22). The participants were asked to complete an adapted Chinese version of the ALTE CanDo Scales used by Keijzer (2007). The CanDo Scales used in this study ask participants to self-rate their language skills on a 5-point scale (from 1= I cannot do this to 5= I can do this without any difficulty at all). Scores from the CanDo Scales were calculated, as shown in Table 5.1.

Chinese “bilinguals” (n=22): L1 Chinese, L2 English

This group was selected from Chinese students at the University of Essex. It comprises 22 Chinese native speakers who arrived in the UK between the ages of 16 and 36 years (M= 25.45, SD= 3.78) and had lived in the UK for an average of 2.45 years (SD= 1.91, range =0.5-6). All participants reported everyday use of the L1 with their Chinese friends and family. The participants were asked to complete a questionnaire, including self-rating their

language skills in both Chinese and English via CanDo Scales and answering some basic background information questions. Scores from the CanDo Scales were calculated.

As Table 5.1 shows, the bilingual group rated their Mandarin proficiency at an average of 4.78 (SD=.23) while the monolinguals at an average of 3.91 (SD=.69), a difference which achieves significance ($Z=91$, $p<.001$). Interestingly, we can see that monolinguals self-rated their proficiency in Mandarin lower than the bilinguals. This might be because “in such self-evaluations, speakers may not assess their own proficiency against an abstract model of nativeness but within the frame of reference of their own cohort” (Schmid, 2014, p6). Similar results are also reported in Schmid (2014): German monolingual controls outperformed the bilinguals on all formal proficiency tasks, such as C-Test and verbal fluency, but their self-rated scores were significantly lower than bilinguals. Additionally, Schmid finds a strong correlation between self-ratings and C-Test scores in the bilingual populations but not in monolingual controls. Taken together, what is relevant for the current study is that although for monolingual populations, self-evaluation tasks such as CanDo Scales may not be as reliable as other formal tasks, self-ratings do provide a good measure of proficiency in the bilingual population. As Table 5.1 shows, the bilingual participants in the current study self-rated their L1 ($M = 4.78$, $SD = 0.23$) significantly higher than their L2 ($M = 3.33$, $SD = 0.56$) ($p<.001$) via CanDo Scales, indicating higher proficiency in L1 Mandarin than L2 English among these bilingual speakers.

Group	n	Age of testing	Age of arrival	Length of residence	CanDo Scales scores for Mandarin	CanDo Scales scores for English
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Monolinguals	28	20.29 (0.98)	/	/	3.91 (0.69)	/
Bilinguals	22	25.45 (3.78)	22.91 (3.91)	2.45 (1.91)	4.78 (0.23)	3.33 (0.56)

Table 3.1 Demographic data of bilingual and monolingual groups.

Materials

This study examines how accurately the monolingual group and the bilingual group distinguish contexts that call for ba-sentences from those who do not. The stimuli used in the current study are borrowed and adapted from a previous study on the L2 acquisition of ba-construction (Xu, 2012), including eight contexts and eight corresponding sentences.

In each trial of the tasks, a context was presented to set the discourse prompt before the target sentence. There were two conditions for each context, one with the ba-sentence following and the other with the SVO sentence, as shown in 5.5 and 5.6. These context-sentence pairs were divided into two blocks, and each block contained four ba-preferred contexts and four SVO-preferred contexts as well as eight distracting pairs in a pseudorandom order (filler-ba preferred context-filler-SVO preferred context). Both timed and untimed tasks shared the same stimuli.

5.5 ba-preferred context (expected answer: a)

Context:

昨晚刮了一夜的大风。早上小红看到地上有快广告牌，她就问丽丽：这广告牌什么情况？丽丽回答道：

It was windy last night. This morning, Xiaohong found there was a billboard on the ground. She asked Lili: What happened to that billboard? Lili answered:

a. condition BA:BA (ba-preferred context |ba sentence)

Sentence:

昨晚上大风把这块广告牌吹倒了。(ba sentence)

Last night the wind BA-the billboard blew down.

b. condition BA: SVO (ba-preferred context |SVO sentence)

Sentence:

昨晚上大风吹倒了这块广告牌。(SVO sentence)

Last night the wind blew down the billboard.

5.6 SVO-preferred context (expected answer: b)

Context:

小红在和邻居抱怨她的猫，丁丁。丁丁老爱往外跑。小红总要在饭点的时候到处去找丁丁。今天早上也不例外。小红找了十五分钟才把丁丁找回来吃饭。现在丁丁又跑不见了。小红抱怨道：

Xiaohong is complaining to her neighbour about her cat, Dingding, who likes going out all the time. Xiaohong always has to look around for her cat during meal times. This morning is no exception. It took her 15 minutes to get Xiaohong back for lunch. Now she is out again:

a. condition SVO:BA (SVO-preferred context |ba sentence)

Sentence:

你看，她一把饭吃完就又出去了。(ba sentence)

Look, she just had lunch and then is out again.

b. condition SVO: SVO (SVO-preferred context |SVO sentence)

Sentence:

你看，她吃完饭就又出去了。(SVO sentence)

Look, she just had lunch and then is out again.

Procedure

Participants were asked to do the timed task first, and after a short break, continue to do the untimed task. On the timed task, participants were asked to respond as soon as possible. In

each trial, a context was first presented at the screen centre, and meanwhile, the recording was played. Participants pressed a button on the keyboard to proceed to the next slide when they felt ready. A target sentence then was presented automatically visually and audibly. The screen would automatically skip to the judgement slide once the sound ended. On the judgement slide, a green rectangle with word "acceptable" and a red rectangle with "unacceptable" popped out at the left screen and the right screen respectively as a signal for making acceptability judgements. Responses were collected with Chronos multifunctional response and stimulus device. The left button on the Chronos device referred to "I accept this sentence under this context", and the right button referred to "I reject this sentence under this context". Participants had to respond within 3000 milliseconds; otherwise, the screen would automatically skip to the next trial, and their response would not be collected for that trial.

On the untimed task, the contextual information was again first presented at the centre of the screen visually and audibly. Once participants pressed the button to proceed to the next slide when they felt ready, the target sentences were presented visually and audibly with a five-point acceptability scale underneath. Participants were asked to rate each sentence against the contextual information on the scale from 1 "completely unacceptable under this context" to 5 "completely acceptable under this context" via Chronos response device. The screen with the sentence and scale presented would not skip to the next trial until the participant gave a response. Participants were told to read and rate sentences without caring about the time.

Data Analysis

For the timed task, 389 responses were collected from 28 monolingual and 22 bilingual participants, excluding seven missed judgements by the bilingual group and four missed by

the monolingual controls. The time between the appearance of the judgement slide and the response to the “acceptability” question was measured in milliseconds as participants’ response time (RT) to make the judgement⁸. The RT data were log-transformed in order to achieve normal distribution. Data of responses with two standard scores above the mean log-transformed RT and two standard scores below the mean were removed as outliers. This eliminated 1.5% of the aggregated data, including responses with shorter RTs below around 130 milliseconds and longer RTs above around 2970 milliseconds. Log-transformed RTs from the trimmed data (skewness = 0.16) were submitted to linear mixed-effect regression for statistical analysis. Additionally, judgement results from the trimmed data were transformed into binary data of 1 referring to “acceptable” and 0 referring to “unacceptable”, and then submitted to mixed logit regressions for further analysis.

For the untimed task, 392 responses were collected from 28 monolingual and 21 bilingual participants (one bilingual participant withdrew from the untimed task). The time between the appearance of the target sentence and the response to the acceptability scale was also measured. In order to remove responses with too short or too long response times, the RT data were log-transformed first, and responses with two standard scores above the mean log-transformed RT and two standard scores below the mean were removed as outliers. This affected 5.6% of the aggregated data, including responses with shorter RTs below around 466 milliseconds and longer RTs above around 9500 milliseconds. Judgement results from the trimmed data were used for further statistical analysis.

⁸ It is worth noting here that the target stimulus is either one sentence with ba (ba-construction) or one without ba (SVO construction). This setting has changed the number of words in these two different types of sentences, but in a very controlled sense.

Results

Timed grammaticality judgement task

On this task, all participants were asked to respond as soon as possible once the judgement slide popped out; otherwise, their response would not be collected into the system. This instruction was expected to add extra time pressure on participants' online processing of the context-sentence pair. Although the interval for judgement slide was set to 3 seconds, around 75 percent of responses were carried out within 1000 milliseconds, with a mean RT of about 800 milliseconds. Studies on simple/ two-choice reaction time to visual stimuli have reported that the mean fastest figure reaction times are about 200-300 milliseconds (e.g., Jose & Gideon Praveen, 2010.; Ng & Chan, 2012). Compared with these fastest RTs, participants in the current study seem to take a bit longer time to give a response. This is probably related with the experiment settings in this study, in which participants are required to read a given context at one slide and then judge the acceptability of sentences at another slide. The purpose of this design aims to add an extra cognitive load in that participants have to recall the context first and then make a judgement on the acceptability of a given sentence. In this respect, participants in the current study are still assumed to respond as fast as possible after they were instructed to do so on the timed task.

Judgement results

Figure 5.1 shows a general picture of participants's mean acceptance rates for each condition on the timed task. In ba preferred contexts, both groups revealed average higher acceptance rates for ba sentences than SVO sentences; similarly, in SVO preferred contexts, both groups

revealed numerically higher acceptance rates for SVO sentences than ba sentences. A mixed logit regression with the factors condition and group was run on the probability of acceptance for each condition. A likelihood ratio chi-square ANOVA was conducted to estimate the model. The results revealed no effect of group ($p=.75$) or interaction effect of group*condition ($p=.16$), which seems to indicate that there are no significant differences in the acceptancy between groups. On the other hand, there was a significant main effect of condition ($\chi^2(3) = 8.22, p=.04$), which indicates that the interaction of contexts and sentences presented in the experiment had a significant effect on participants' acceptancy.

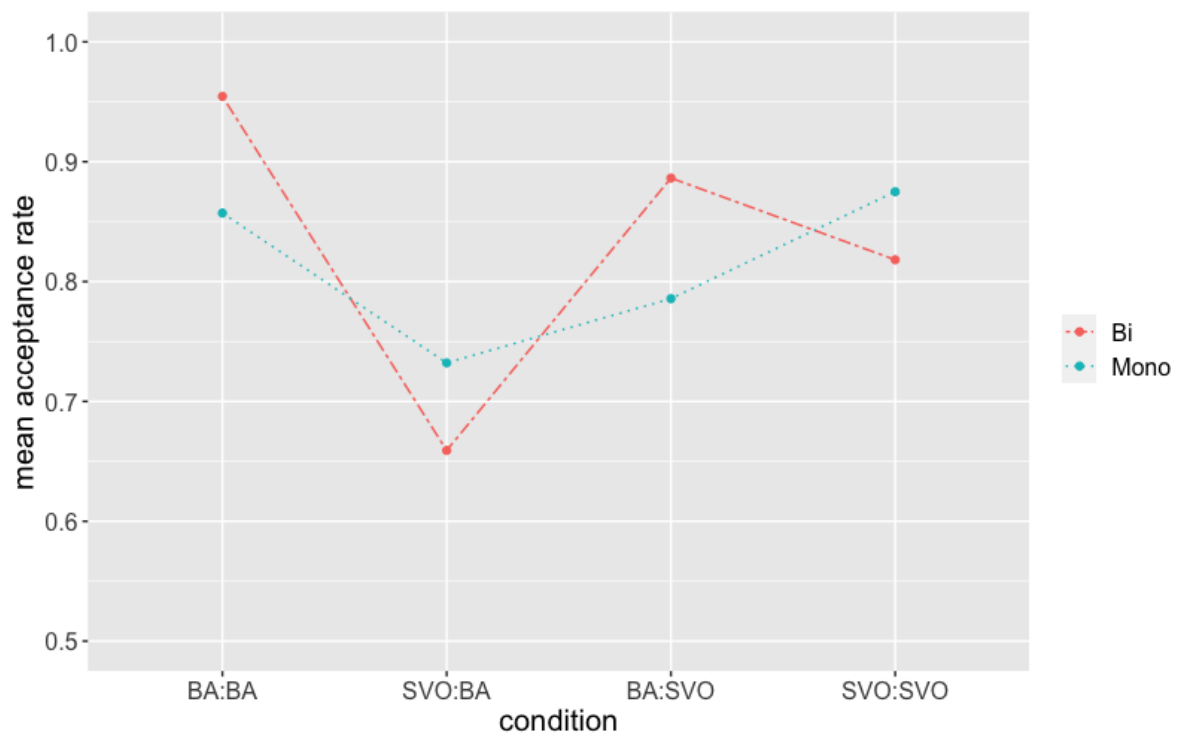


Figure 3.1 Line plot of mean acceptance rates across conditions between groups in the timed task

Further regressions were carried out to assess the different acceptancy for each context type as well as each sentence type. The results show that participants were more likely to accept

the ba sentences in the ba preferred context than in the SVO preferred context ($b=1.49$, $SE=0.63$, $z=2.36$, $p=.02$); on the other hand, no significant differences were revealed in the acceptance tendency of the SVO sentences between two contexts ($p=.89$). These results seem to suggest that the contextual information played an important role in participants' acceptancy of the ba sentences but not of the SVO sentences. In other words, this result seems to suggest that overall, ba sentences tend to be more sensitive to the contextual information than the SVO sentences.

The next results concern the performance at the group level. Mixed logit regressions with the factors sentence and context were run for each group on the probability of acceptancy. A likelihood ratio chi-square ANOVA was conducted to estimate the models. Results reveal that the interaction of sentence and context significantly affected the monolinguals' acceptancy tendency ($\chi^2(1) = 3.89$, $p=.049$), and marginally affected the bilingual group ($\chi^2(1) = 3.53$, $p=.06$). These results seem to indicate that both groups of participants were sensitive to the manipulation of contexts and sentences, as displayed in Figure 5.2.

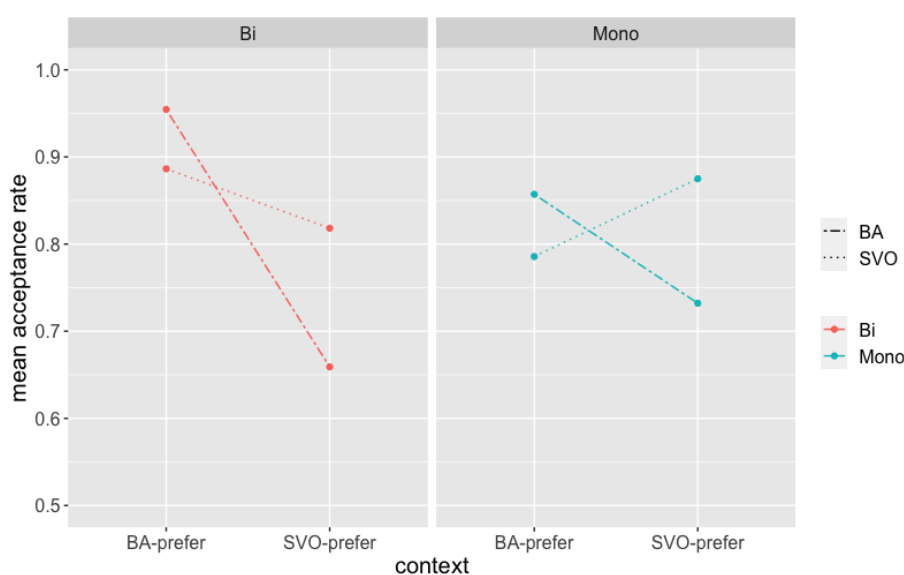


Figure 3.2 interaction of plots of context and sentence for monolingual and bilingual groups

Specifically, for the monolingual group, interestingly, results reveal no significant differences in the acceptancy of SVO or ba sentences between contexts (SVO sentences: $p=.54$; ba sentences: $p=.16$). Considering the interaction relationship illustrated in the interaction plot in Figure 1 as well as the significant interaction effect of context*sentence reported earlier in the monolingual group, the lack of statistical significance revealed at the sentence level may be related to the limited number of trials used in the stimuli, which might reduce the statistical power of the differences.

On the other hand, for the bilingual group, no statistical difference was found in the acceptance of SVO sentences between contexts ($p=.54$), but a significant difference was found in the acceptancy of ba sentences between contexts ($b= 2.85$, $SE=1.20$, $z= 2.38$, $p=.02$), indicating they were more likely to accept ba sentences in the ba preferred context than in the SVO preferred context. These results seem to suggest that the contexts played an important role in bilingual participants' acceptancy of the ba sentences but not of the SVO sentences.

Reaction times

The time between the appearance of the judgement page and the participants' response to the acceptable/unacceptable questions was measured as participants' reaction time (RT, millisecond). Figure 5.3 shows the mean RTs for correct responses (accept or reject the target sentence properly in a given context) by bilingual and monolingual groups. Linear mixed-effects regression with the factors group, context and sentence was run on the log-transformed RTs from correct responses, considering participant and experiment trial as

random effects to control for variability. The likelihood ratio chi-square ANOVA test was conducted to estimate the model.

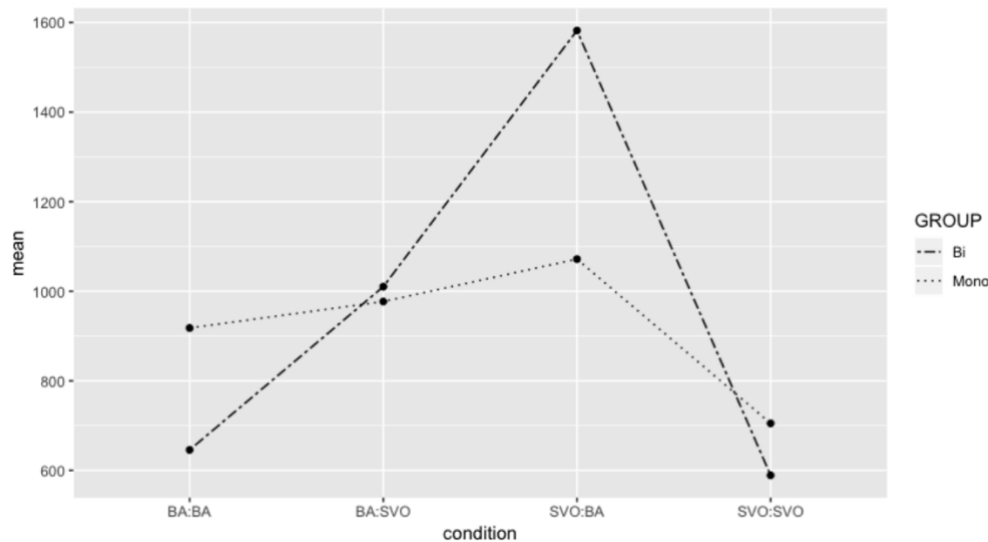


Figure 3.3 mean Acceptability judgement RTs (only correct responses) for bilingual and monolingual groups

The results revealed a significant interaction effect of sentence*context ($\chi^2(1) = 17.70$, $p < .001$), indicating that overall, the interaction of context and sentence has an important influence on the reaction times used for accepting or rejecting sentences in a given context.

As the interaction effect plot of context*sentence shows in Figure 5.4, it seems that participants took longer to judge the sentences in the mismatched condition than in the matched condition. Further mixed linear regression was run at the sentence level. Results indicate that participants took significantly longer to accurately judge ba sentences in the SVO preferred context than in the ba preferred context ($b = 0.54$, $SE = .23$, $z = 2.39$, $p = .05$), but non-significantly longer to properly reject SVO sentences than accept them ($p = .21$). These results seem to chime with the inference discussed in the judgement results that participants

tend to be more sensitive to the contextual background when processing ba sentences than SVO sentences.

Regarding the group difference, although no significant effect of group was found ($p=.84$), a significant interaction effect of group and context was revealed ($\chi^2(1)=4.48, p=.03$), as shown in Figure 5.5. The interaction plot seems to indicate that compared with the monolingual group, bilingual participants took longer to make judgements in the SVO preferred context, whereas they took less time to respond in the ba preferred context. These results might reveal that the bilingual group adopted different strategies when making acceptability judgement tasks.

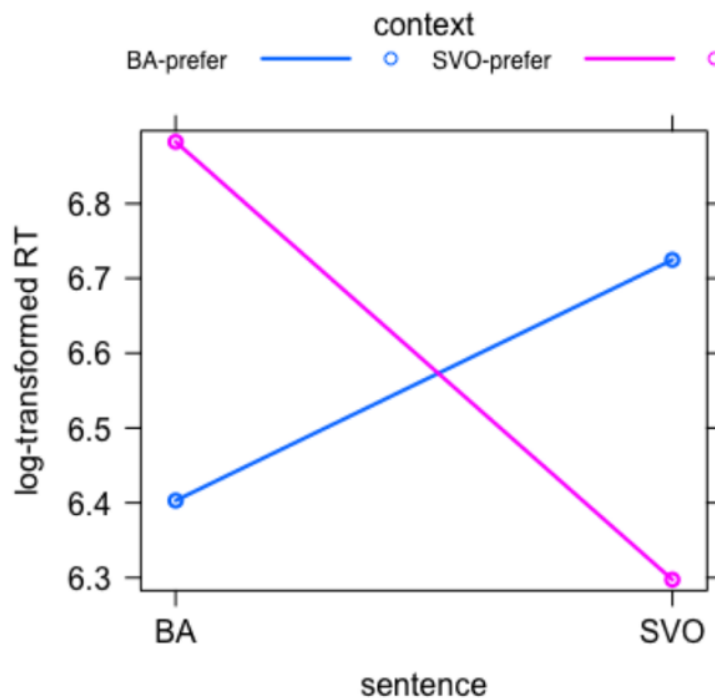


Figure 3.4 interaction effect plot of sentence*context on RTs (correct responses only) on the timed task

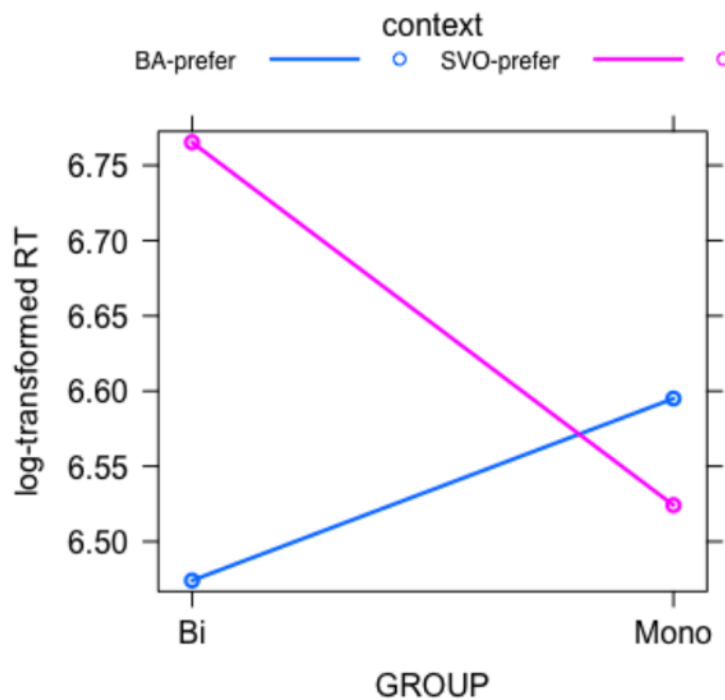


Figure 3.5 interaction effect plot of group*context on RTs (correct responses only) on the timed task

Further analyses were carried out within each group to get a clear picture of the interaction effect of context and sentence on participants' RTs (log-transformed). Mixed linear regressions with the factor context*sentence as fixed effect were conducted for each group, with participant and trial as random effects. Likelihood ratio chi-square ANOVA tests were conducted to estimate the models. Results reveal a significant interaction effect of context*sentence for both groups: Bilinguals ($\chi^2(1) = 26.02, p < .001$) and Monolinguals ($\chi^2(1) = 4.99, p = .03$). These results indicate that the interaction of context and sentence settings has an important effect on judgement times by participants from both monolingual and bilingual groups. As Figure 5.6 displays, both bilinguals and monolinguals were likely to take longer when judging sentences in the incompatible contexts. Mixed regression was then run

at sentence level for each group. Results show that although both groups showed numerically longer time to reject sentences than accept them properly, the significance was only achieved by the bilingual group for the judgements of ba sentences.

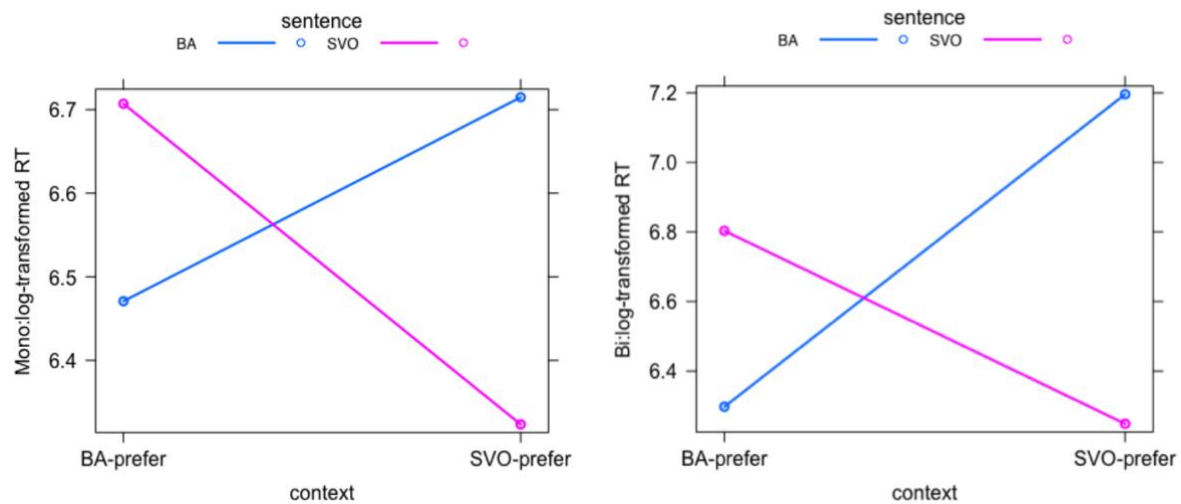


Figure 3.6 Interaction effect plots of context*sentence on RTs (correct responses only)

Untimed contextual acceptability judgement task

Judgement results

In this task, participants were asked to rate the acceptability of sentences on a five-point Likert scale. The average Likert Scale scores are presented in Figure 5.7. The monolingual group showed numerically higher mean acceptability scores on ba sentences in the matching context than in the mismatching context, but similar scores on SVO sentences between contexts. These results seem consistent with the findings reported on the timed task that participants tend to be more sensitive to the contextual information when processing ba sentences. On the other hand, this tendency is not revealed in the bilingual group. They showed similar acceptance of both ba and SVO sentences in either context.

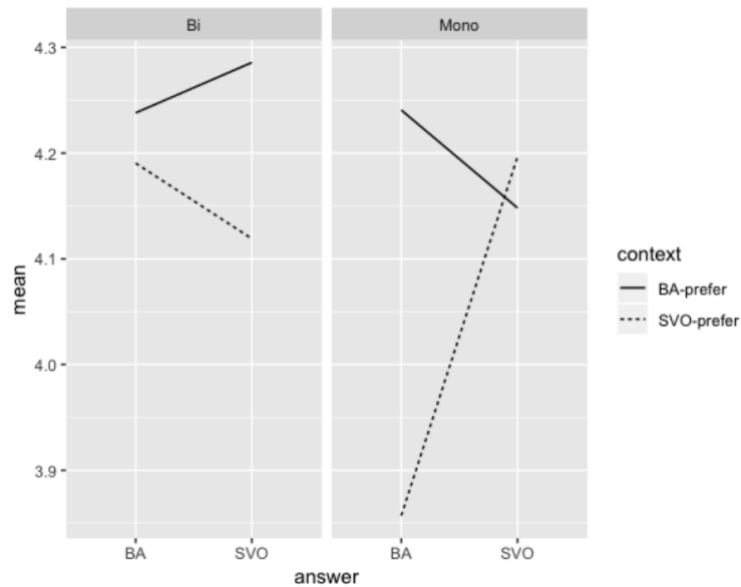


Figure 3.7 mean acceptability scores for each group by context and sentence on the untimed task

Statistical analysis was further run on the mean scores to verify whether the numerical difference mentioned above achieves significance. Linear mixed-effects regression was run on the Likert scale scores, with the factors group, context, and sentence as the fixed effects and considering participant and trial as random effects. The regression model confirmed no significant effects of all the independent factors involved on participants' acceptability ratings in the untimed task. This statistical result seems to suggest that the two groups did not differ from each other in how they judged these sentences. There also was no interaction of context and sentence. The lack of statistical power of context or sentence effect is contrary to the expectation. Recall that the stimuli used in the current study are borrowed from Xu's study (2012) which verified their reliability. Thus, the failure to detect any differences between conditions in the current study might be down to aspects of the design (e.g., the participant sample size, the trial number, or the procedure). Therefore, no further analysis

was carried out. Instead, a multiple-choice discourse completion task was conducted as a complementary method to assess participants' offline performance.

The multiple-choice discourse completion task

Method

The multiple-choice discourse completion task (MDCT) is used as a complementary test battery to acceptability judgement tasks. A new monolingual control group and a new bilingual group were recruited. Both groups were matched with the previous participant groups in age, AoA as well as LoR. Details for this task are presented below.

Participants

The monolingual group was recruited through a participant recruitment advertisement post on one of the biggest social media platforms in China. The bilingual group were also Chinese students from the University of Essex through a participant recruitment advertisement spread on Wechat Chinese student in the UK groups and department email lists, and all of them reported using Mandarin Chinese every day. Table 5.2 provides basic background information about the two groups.

	Age on testing	Age on arrival	Length of residence
Monolinguals (n=78)	21.46 (2.49)	/	/
Bilinguals (n=54)	23.44 (2.77)	21.98 (2.80)	1.64 (1.46)

Table 3.2 Summary of background variables for the monolingual and bilingual groups

Materials

In bilingualism research, the MDCTs have been used primarily as a cued-response measure to assess L2 learners' pragmatic ability (e.g., Setoguchi, 2008; Birjandi & Rezaei, 2010; Chen & Rau, 2013). The MDCT includes a series of multiple-choice questions, with each question comprising a context as the prompt for several response alternatives. In the current study, the task includes a total of 16 questions. In each question, a context was presented to set the discourse prompt before three response alternatives: a ba sentence, an SVO sentence and a "both" option ("Both are acceptable"). Both contexts and response choices are listed on the same page. Similar to the AJTs, the contexts and sentences used in the MDCTs are borrowed and adapted from Xu's study (2012), including 8 ba preferred contexts, 8 SVO preferred contexts, 16 SVO sentences and 16 ba sentences. Samples are as shown below.

5.6 ba-preferred context (expected answer: B)

Context:

昨晚刮了一夜的大风。早上小红看到地上有快广告牌，她就问丽丽：这广告牌什么情况？丽丽回答道：

It was windy last night. This morning, Xiaohong found there was a billboard on the ground. She asked Lili: What happened to that billboard? Lili answered:

Choices:

A) 昨晚上大风吹倒了这块广告牌。(SVO sentence)

Last night the wind blew down the billboard.

B) 昨晚上大风把这块广告牌吹倒了。(ba sentence)

Last night the wind BA-the billboard blew down.

C) 以上都可以。(Both are acceptable)

5.7 SVO-preferred context (expected answer: A)

Context:

小红在和邻居抱怨她的猫，丁丁。丁丁老爱往外跑。小红总要在饭点的时候到处去找丁丁。今天早上也不例外。小红找了十五分钟才把丁丁找回来吃饭。现在丁丁又跑不见了。小红抱怨道：

Xiaohong is complaining to her neighbour about her cat, Dingding, who likes going out all the time. Xiaohong always has to look around for her cat during meal times. This morning

is no exception. It took her 15 minutes to get Xiaohong back for lunch. Now she is out again. Xiaohong complained:

Choices:

A) 你看，她一吃完饭就又出去了。(SVO sentence)

Look, she just had lunch and then is out again.

B) 你看，她一把饭吃完就又出去了。(ba sentence)

Look, she just ba lunch had and then is out again.

C) 以上都可以。(Both are acceptable)

Procedure

Participants were asked to complete the task on a website which comprised basic background information questions in the first section and the multiple-choice questions in the second section. This online questionnaire was untimed, and participants had enough time to read and compare three choices under the context.

Data analysis

For the analyses of multiple-choice discourse completion tasks, a multinomial logit regression with the factor *context* was run on the multiple-response data (SVO sentence, ba sentence and “Both” option) by each group, in order to measure participants’ tendency for ba vs. SVO sentences in different context types. For comparing the difference between groups, multinomial regressions with the factor *group* (Monolingual vs. Bilingual) were conducted

on the multiple responses for each context type. A likelihood ratio chi-square ANOVA test was conducted to estimate all multinomial logit models.

Results

Table 5.3 shows the mean percentages of preference by each group for SVO sentences, ba sentences and “Both” option in both SVO preferred and ba preferred context types respectively. Overall, both groups showed a higher percentage of choosing the preferred sentences in the given context.

Condition	Monolingual (n=72)		Bilingual (n=48)	
	BA_prefer	SVO_prefer	BA_prefer	SVO_prefer
BA	60.26%	10.58%	43.52%	9.49%
SVO	11.22%	69.55%	16.90%	56.71%
BOTH	28.53%	19.87%	39.58%	33.80%

Table 3.3 Mean percentage of preference for each condition between groups on the MDCT

A multinomial regression with the factor *context* was run to assess the difference among participants' preference in different contexts. A likelihood ratio chi-square ANOVA was conducted to estimate the models. The results indicate a main effect of *context* by both monolingual control group ($\chi^2(2) = 542.34, p < .001$) and bilingual group ($\chi^2(2) = 202.41, p < .001$), as shown in Figure 5.8. Pairwise Tukey posthoc comparisons (with the SVO preferred context as reference) were run to assess the difference for each choice across contexts by each group. For the monolingual control group, the difference was found for all choices: ba ($b = 0.49, t(4) = 21.47, p < .001$), SVO ($b = -0.58, t(4) = -26.11, p < .001$) and Both

($b=0.09$, $t(4) = 3.59$, $p=0.02$). For the bilingual group, the difference was found for SVO and ba, but not for Both: ba ($b=0.34$, $t(4) = 12.28$, $p<.001$), SVO ($b=-0.40$, $t(4) = -13.32$, $p<.001$) and Both ($p=0.15$). These results indicate that the tendency to prefer SVO sentences increases in SVO preferred contexts and the tendency to prefer ba sentences increases in ba preferred contexts by both groups.

Moreover, the tendency to prefer “Both” can be interpreted as indicating that participants fail to reject the less preferred sentence. The monolingual group showed a lower tendency to prefer “Both” in SVO preferred context than ba preferred context, which reveals that they were more confident of rejecting ba sentences in SVO preferred context than rejecting SVO sentences in ba preferred context. This seems to be consistent with the results found in the AJTs that the monolinguals were more sensitive to contextual information when processing ba sentences compared with SVO sentences. On the other hand, although bilingual participants showed an overall lower percentage of preferring “Both” in the SVO preferred context than in the ba preferred context, a statistical test reveals no significant difference in their preference of “both” between contexts. This result seems to indicate that bilingual speakers did not show more sensitivity to contextual information when processing ba sentences compared with SVO sentences.

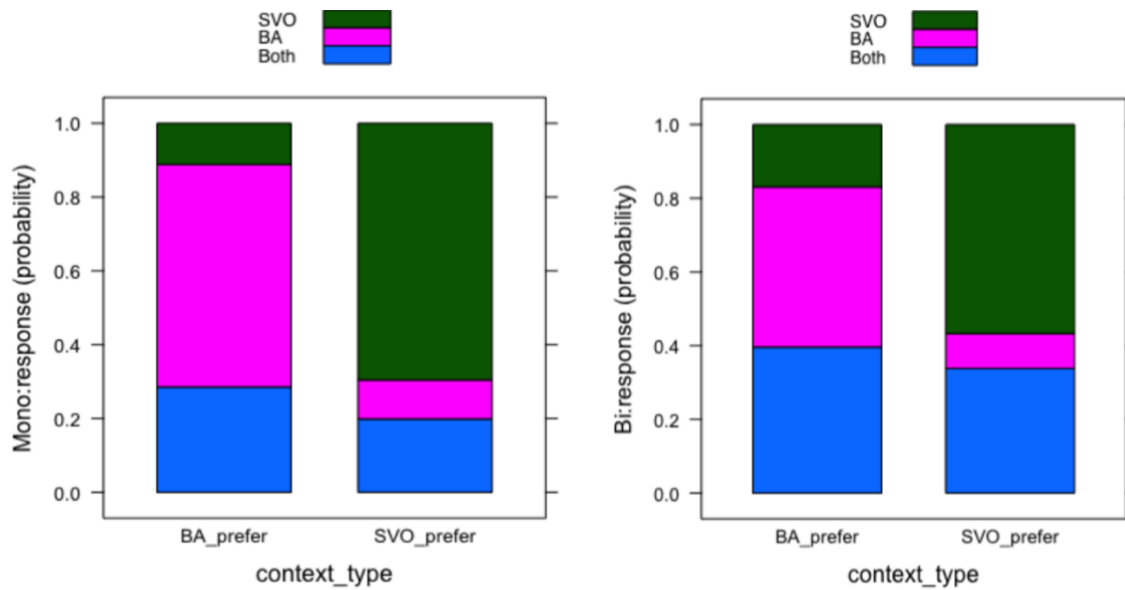


Figure 3.8 Effect plots of context for the Monolingual group and the Bilingual group

For the comparison between groups, a multinomial regression with the factor group was run for each context type, and the likelihood ratio chi-square ANOVA test was conducted to estimate the models. The results revealed a significant difference between groups in each context type: ba preferred context ($\chi^2(2) = 28.98, p < .001$) and SVO preferred context ($\chi^2(2) = 25.90, p < .001$), as shown in Figure 5.9. Pairwise Tukey post-hoc comparisons (with the monolingual group as reference) were run to assess the differences for each choice between groups in each context. With ba preferred context, a statistically significant group difference was found for ba and Both: ba ($b = -0.17, t(4) = -5.42, p = .006$) and Both ($b = 0.11, t(4) = 3.73, p = .02$) and a near-significant difference was found for SVO ($b = 0.06, t(4) = 2.58, p = .06$). With SVO preferred context, a statistical difference was found for SVO and Both: SVO ($b = -0.13, t(4) = -4.26, p = .01$) and Both ($b = 0.14, t(4) = 5.00, p = .007$), and no significance was found for Ba ($p = .59$). These results indicate that the control group is more confident of accepting preferred sentences and rejecting less preferred sentences in both contexts compared with the bilingual group.

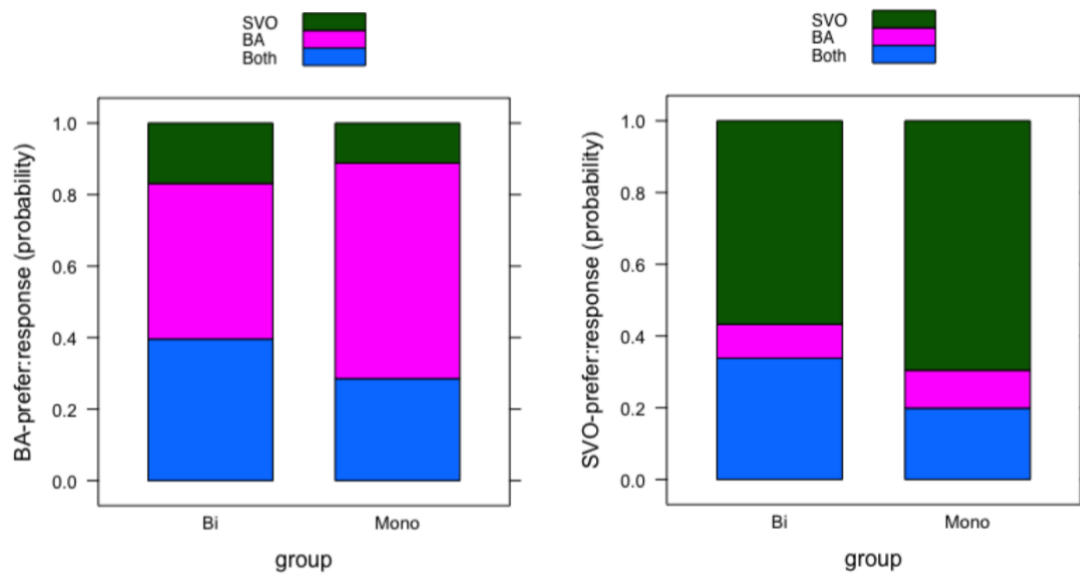


Figure 3.9 Effect plots of group for each context type

Further analysis was carried out to assess whether there was any correlation between bilinguals' performance in MDCT and their demographic background (i.e., AoA, age and LoR). Multinomial regressions were run for each context type within the bilingual group. A main effect of AoA was found for both context types: ba preferred context ($\chi^2(2) = 12.11$, $p < .001$) and SVO preferred context ($\chi^2(2) = 18.97$, $p < .001$). As Figure 5.10 shows, with the ba preferred context, an increase in the variable AoA is associated with a decrease in the log odds of choosing "Both" vs choosing ba sentences ($b = 0.16$, $SE = 0.04$, $p < .001$). Similarly, with the SVO preferred context, the multinomial model predicts that a one-year increase in AoA is associated with a decrease in the log odds of choosing "Both are acceptable" vs choosing SVO sentences in the amount of 0.20 ($SE = 0.06$, $p < .002$). These results indicate that the bilingual participants who arrived in the UK at an older age tend to be more confident of rejecting less preferred sentences in both context types than those who arrived at a younger age.

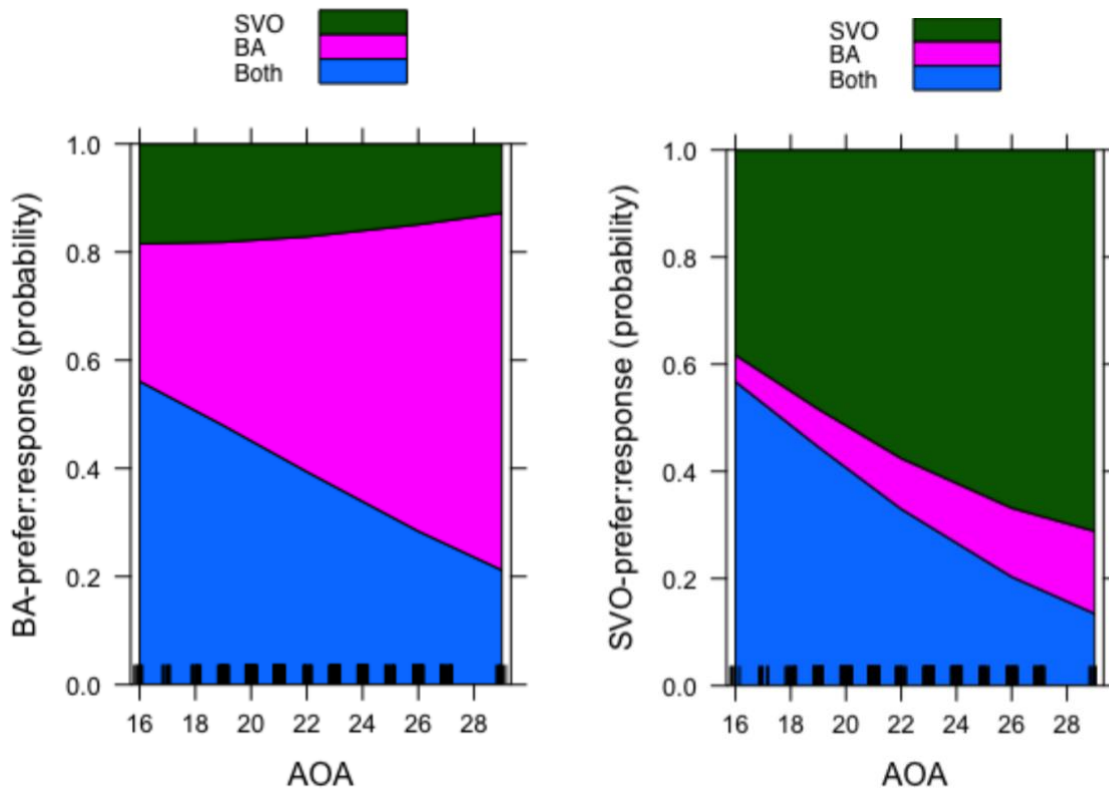


Figure 3.10 Effect plots of AoA for the ba preferred context and the SVO preferred context

As for the correlation between the length of residence and participants' preference, in the Ba preferred context, no significance was found with this factor for the overall performance ($\chi^2(2) = 4.31, p = .12$). Further analyses were run for each choice and found a possible trend ($b = 0.14, SE = 0.07, P = .047$) that the odds of participants' preference for Both vs ba increase as their LoR increases. However, this significance disappeared when including the factor AoA in the model: LoR ($\chi^2(2) = 1.06, p = .59$) and AoA ($\chi^2(2) = 13.87, p < .001$); Both vs ba by LoR ($p = .42$) and by AoA ($b = -0.15, SE = 0.04, p < .001$). Similar results were found for SVO preferred context that although the chi-square ANOVA test revealed a significance for the model with LoR as the only variable ($\chi^2(2) = 6.42, p = .04$), the significance disappeared when including AoA in this model: LoR ($\chi^2(2) = 2.81, p = .25$) and AoA ($\chi^2(2) = 15.37, p < .001$). This

result could relate to the correlation between the two factors. As the scatterplot in Figure 5.11 shows, a possible negative covariance exists between LoR and AoA in that participants with a greater length of residence are likely to be those who arrived in the UK at younger ages.

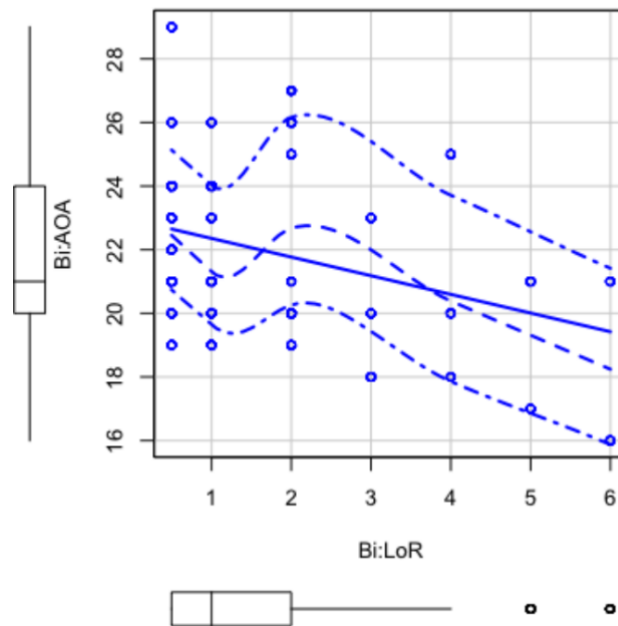


Figure 3.11 The scatter plot of LOR and AoA by the bilingual group

Finally, statistical analysis was carried out in the group difference between the monolingual group and a subset of bilinguals who had a LoR of one year or less ($N=33$). The results reveal a significant group effect for both contexts: ba preferred context ($\chi^2(2) = 14.60$, $p < .001$) and SVO preferred context ($\chi^2(2) = 19.82$, $p < .001$). Specifically, in the ba preferred context, a statistically significant difference was found on ba ($b=0.13$, $t(4)=3.75$, $p=.02$) and a marginally significant difference on SVO ($b=-0.06$, $t(4)=-2.21$, $p=.09$) and Both ($b=-0.08$, $t(4)=-2.26$, $p=.08$); in the SVO preferred context, a statistically significant difference was found on Both ($b=-0.13$, $t(4)=-3.96$, $p=.02$) and SVO ($b=0.15$, $t(4)=4.20$, $p=.01$) and no significance on ba ($p=.46$). These results reveal that even participants who had been in the

UK less than one year judged the sentences differently from their monolingual peers in that they were less likely to accept preferred sentences and were less confident of rejecting less preferred sentences in both context settings.

3. 6. Discussion

The goal of the present study was to investigate the attrition effects on discourse driven scrambling in Mandarin (ba-SVO alternation) in Chinese learners of English in the UK. Behavioural data were collected via a contextual acceptability judgement task (online and offline) from a group of unbalanced Chinese-English bilingual speakers and a multiple-choice discourse completion task from another group of Chinese-English bilinguals. Both groups are matched in age, AoA as well as LoR.

Overall, results suggest two main divergences related to their performance on the discourse driven scrambling in Mandarin (ba-SVO alternation) between the two experimental groups and their monolingual counterparts. In the online contextual acceptability judgement task, the general picture suggests both groups showed sensitivity to the manipulation of the context and sentence pairs. However, further investigation at the group level reveals divergent acceptancy patterns between groups. The control group performed categorically, as expected, showing a higher acceptance rate under the matching condition and lower rate under the mismatching condition. Interestingly, overall, the bilingual group tended to accept sentences under the ba-preferred context than under the SVO-preferred one. To understand possible causes underlying this tendency, it is worth looking into the difference between the two types of contexts given in the task. Ba-preferred context provides a contextual cue that leads the speaker to consider a certain noun (phrase) given in the context as the topic (object) in the

answer sentence following while this is not the case in SVO-preferred context. Under this setting, the objects in all answers in the ba-preferred condition belong to the old information presented earlier in the given context. In contrast, the objects in answers in the SVO-preferred condition normally belong to the new information that has not been mentioned before. Considering this difference between context settings, a possible explanation of the bilinguals' performance is that they might rely more on the information cue (new/old) instead of the contextual cue, the latter supposed to be more likely employed by the control group. If this is the case, it seems to suggest that bilinguals would be more efficient to judge during tasks by relying on the information cue than the contextual cue. This assumption seems consistent with the reaction time data that the bilinguals showed a shorter time to judge correctly under the ba-preferred context where they could rely on the information cue than under SVO preferred context.

The second main divergent performance is revealed in the multiple-choice completion task. The result reveals that bilinguals showed a lower percentage with targeted sentences in either context, i.e., ba-construction under ba-preferred context and SVO under the SVO-preferred context. On the other hand, they showed a higher percentage with the "both" option in either context. This result can be interpreted as showing that bilinguals showed more indeterminacy in selecting the contextually preferred construction compared with their monolingual counterparts. In addition, it is interesting to note here that the bilinguals did not show a tendency towards the SVO option regardless of the context, suggesting that the L2 (English) transfer would not be the potential cause accounting for the norm-deviant performance in the bilingual group in this task. Then what would be? A possible explanation is that the contextual constraint on this property is, to some extent, loosened among bilingual speakers. Since the completion task was presented via questionnaire with no time limitation to the

speakers, the divergent performance cannot be attributed to real-time processing difficulties integrating contextual and syntactic information among bilinguals only. On the contrary, this result seems to show that the contextual constraint on the scrambling property is eroded in a deeper way. Although this explanation challenges the IH that the attrition effects may not be restricted to the online performance, it makes sense that attrition effects can begin in the first instance as the transient processing difficulties and may eventually lead to permanent changes of knowledge. It is also interesting to note that even the subtracted group of bilingual speakers with LoR less than one year revealed significantly divergent performance compared with the control group in relation to the "both" option. This result could be interpreted as showing that attrition effects on properties at the grammar/discourse interface can begin at a very early stage.

I now offer an answer to the research questions in the current study:

1. Will these Chinese learners of English show any attrition effects on the interface property, such as the discourse-driven scrambling in Mandarin (ba-SVO alternation)?

The answer to this question appears to be 'yes.' The results of two tasks have shown that attrition effects on interface properties can begin at a very early stage of migration. Bilingual speakers seem to reveal more indeterminacy when processing the contextual constrained structures. They may employ a different strategy to complement their reduced efficiency in real-time processing of interface structures.

2. If they do, is the cause of the attrition effects attributed to processing difficulties or representational changes in their L1?

As discussed above, the divergent performance revealed in the multiple-choice discourse task cannot be attributed to the transient processing difficulties only, since it was provided via questionnaire for which the participants had enough time to judge and select their preferred option. In this case, the divergence is interpreted as showing that the contextual constraints on the scrambling property have been eroded to some extent. As for the norm-deviant performance revealed in the online contextual acceptability judgement task, a possible explanation is that the bilinguals employ a different strategy to complement their reduced efficiency in processing the interface structures. Nevertheless, this assumption is based on the current behavioural data only. Due to the limitation of the experiment settings in the current study, more research is required to assess this assumption before any conclusion is made.

3. 7. Conclusion

In sum, the current study's findings suggest that the attrition effect on interface structures can be attested at a very early stage of migration. It may not be restricted to online processing but also deep to the representational level. Nevertheless, these findings are based on a limited set of context and sentence pairs and behavioural data such as acceptancy and reaction times. For instance, although it is claimed in the current study that the bilinguals may employ a different strategy when judging in the online acceptability judgement task, it is nearly impossible to make any firm conclusion based on the current behavioural data collected. Future research, therefore, may include the Event-Related Potential data to have a more straightforward understanding of speakers' real-time brain activities when doing these contextual acceptability tasks. Besides, ERP data may also help attest the changes early even before the divergence manifests itself through behavioural data (see discussion in Bice & Kroll, 2015).

Chapter 4. Attrition effects on *ba* as a function of DOM in Mandarin

4. 1. Introduction

Research on first language (L1) attrition has reported norm-deviant changes observed in language contact situations as the consequences of a speaker becoming a sequential bilingual, e.g., cross-linguistic transfer, reduced use or disuse of L1 (see Domínguez, 2013; Schmid & Köpke, 2017, 2019). It appears that signs of attrition effects at the lexical level can be detected fairly quickly after emigration. For instance, it has been reported that slower L1 lexical access was found after one semester's immersion in the L2 environment among a group of German-Spanish bilinguals (Baus, Costa & Carreiras, 2013). On the other hand, the scope and timeline of attrition in the morphosyntactic domain is less clear. Studies examining morphological development among heritage speakers have consistently reported grammatical restructuring (e.g., see Polinsky, 2006; Laleko, 2010). These results seem to indicate that L1 grammars are vulnerable to erosion if the onset of the attrition process is before puberty. However, the characteristics of morphosyntactic attrition among late bilinguals whose onset of L2 contact and use is set after puberty are less clear. For example, Schmid (2002) investigates a group of L1 German Holocaust survivors with lack of L1 contact and use for over 50 years but finds no more than 5% error rates in terms of structural complexity and morphosyntactic accuracy. This and other similar findings (e.g. Montrul, 2008) seem to suggest that L1 grammars become relatively stable beyond childhood. However, there are studies which provide evidence for changes found in some aspects of mature grammars among late bilinguals. For instance, Domínguez (2013) and Domínguez and

Hicks (2016) report that the use and knowledge of Spanish null and postverbal subjects have undergone attrition in a group of adult Spanish immigrants in the US. Inconsistent results as exemplified above in the existing L1 attrition research make it difficult to predict and characterize attrition effects at the morphosyntactic level, particularly among late bilinguals.

One feature which has been shown to be susceptible to late L1 attrition is Differential object marking (DOM). DOM - the overt case-marking of some direct objects, but not others - is a common morphosyntactic property which has been observed in at least 300 languages:

Aissens (2003) proposes a general account for the DOM-pattern, considering definiteness and animacy as the two main factors influencing DOM: the higher in prominence a direct object is in terms of animacy and/or definiteness, the more likely it is to be overtly case marked.

In accordance with the general picture of morphosyntactic attrition in literature, DOM erosion, on the one hand, has been well documented in heritage language studies, presumably as the consequences of extensive contact with a dominant language that has no DOM system, e.g., English (see Montrul, 2004, Montrul & Bowles, 2009). On the other hand, only a few studies examine DOM attrition among late bilinguals. The findings are also inconclusive, with some studies finding evidence of DOM attrition while others find it unchanged in long-term attriters (e.g., see Grojean & Py, 1991, Montrul & Sánchez-Walker, 2013, Montrul, Bhatt & Girju, 2015, Chamorro, Sturt & Sorace, 2016).

The present study aims to contribute to a better understanding of morphosyntactic attrition in general and the principles guiding attrition of DOM in particular through an examination of the use and knowledge of DOM among a group of late Mandarin-English bilinguals in the UK.

4. 2. Potential triggers for morphosyntactic attrition

The influence of language contact

Some researchers ascribe the changes seen in L1 attrition to cross-linguistic influence (CLI) in a language contact situation (e.g., see Silva-Corvalán, 1994a, 1994b; Pavlenko, 2000). CLI has been extensively examined in L2 acquisition and is considered one of the crucial factors that guide and constrain the acquisition and development of the later learned language. How the mechanism works during the developmental process of a new language is one of the crucial questions in L2 acquisition research, and it gives rise to a variety of linguistic hypotheses and models. For example, Lardiere's Feature Reassembly Hypothesis (FRH) (2009; also see discussion in Hicks & Domínguez, 2019) assumes that linguistic knowledge consists of a set of features that are selected from an inventory provided by Universal Grammar and these features are encoded on the lexicon of a particular language. L2 learners start by looking for morphological equivalents associated with the feature bundles from their native language in the L2. If the L1 and L2 have the same feature configurations for a given property, learners are expected to acquire the target knowledge without difficulty (Lardiere, 2009). There is supporting evidence for this assumption in a recent study examining the acquisition of Spanish DOM by a group of Romanian-speaking learners (Montrul, 2019). Like Spanish, Romanian also has a DOM system, and it is conditioned and realized in the same way as in Spanish: in both languages, DOM is realized with a particular lexical form (*a* in Spanish and *pe* in Romanian) and constrained by the semantic features (animacy and specificity) of direct objects. As expected, results reveal no particular difficulty on the acquisition of Spanish DOM by Romanian-speaking learners, who exhibited native-like performance across tasks.

On the other hand, if the assemblies of features are different between the L1 and the L2, the learning task would then consist of appropriately reconfiguring features from the way represented in the L1 into those in the L2 lexicon and taking into consideration the language-specific conditions under which they may or may not be morphologically realized. This process, under the influence of the L1, may become problematic for learners. It is worth noting here that “the interpretational effects of some features may be associated with certain word orders rather than with particular distinct morphological items” (Lardiere, 2009, p.187).

For example, Guijarro-Fuentes (2012) examines the L2 acquisition of DOM in Spanish among a group of English-speaking learners of three different proficiency levels with a completion task and an acceptability judgement task. Adopting Torrego’s analysis (1998, 2002), Guijarro-Fuentes treats the preposition *a* in Spanish as an instance of the marked accusative case for direct objects, encoded in a functional category specific to Spanish. In contrast, English, a language without DOM, checks the accusative case through word order.

Recall that in Spanish, whether or not the accusative case is morphologicalized is regulated by semantic features (animacy and specificity). Although these features are also present in English, they are spread out differently. Since English has no mapping of these features to particular lexical materials as is the case through the DOM system in Spanish, in order to acquire Spanish DOM, learners have to tease apart these features from the way they are employed in English and reassemble them as required in Spanish. This redeployment, according to Guijarro-Fuentes (2012), may result in acquisitional problems for Spanish DOM by English-speaking learners. Consistent with this prediction, results reveal that English-speaking learners of all proficiency levels made more target-deviant DOM omissions in all tasks compared with native speakers of Spanish but do not oversupply it in inappropriate

contexts. These studies provide supporting evidence for the L1 influence on the L2 development of DOM system.

In the field of the L1 attrition, it is possible for the native language to be similarly influenced by the L2 in contact situations under certain conditions (Hicks & Domínguez, 2019). Similar to English-speaking learners of Spanish, Spanish native speakers in contact with English have also been shown to make target-deviant DOM omissions, particularly among heritage speakers who are raised in an environment where their second language, English, is socially dominant. It has been suggested that during language development, heritage speakers are likely to reassemble L2 properties to corresponding L1 forms as a consequence of the qualitative reduction in L1 processing that may arise from slowly shifting from L1 input in the earliest stages of acquisition to L2 dominance (see Putnam & Sánchez, 2013, Hicks & Domínguez, 2019).

Consistent with this assumption, Montrul (2004) found that, in contact with English, Spanish heritage speakers of intermediate to advanced proficiency displayed high rates of omission of *a* with animate specific direct objects from 6% in advanced proficiency speakers to 21.3% in intermediate proficiency speakers in an oral production task. Montrul and Bowles (2009) further explored the DOM omission phenomenon by including a group of low proficiency heritage speakers and a written acceptability judgement task (AJT). Heritage speakers were found to accept ungrammatical DOM-omitted sentences with mean ratings ranging from 3.08 in advanced proficiency speakers to 3.5 in low proficiency speakers on a 5-point scale (1 refers to totally ungrammatical, and 5 refers to perfectly grammatical). In contrast, the native speakers' mean rate was 1.2. Similar findings have been reported for other DOM-marked languages in contact with English, e.g., Hindi (Montrul, 2019); Romanian (Montrul et al., 2015), Korean (Kim, O'Grady & Schwartz, 2017) and Russian (Polinsky, 2006). These

findings, as mentioned earlier, seem to provide evidence for the influence of the L2 as the dominant language on speakers' native language among heritage speakers.

In the context of L1 attrition among late bilinguals, some studies also report changes in the use of DOM. Montrul and Sánchez-Walker (2013) compare the performance on an oral production task between first-generation adult immigrants and heritage speakers in the US. Results show that adult immigrants omitted about 12% of DOM 'a' on average in the oral production task, and heritage speakers about 20% and it is furthermore established that the descriptively better performance of the adult migrants does not reach statistical significance. Similar target-deviant performance on Spanish DOM is also found with different methods in Montrul (2014) and Montrul et al. (2015). The former study reports that both adult immigrants and heritage speakers displayed around 20% of omission of 'a' with animate direct objects in a written production task and around 20% of misinterpretation of marked direct objects in a picture-matching task. The latter study reports similar mean rates for DOM-omitted animate specific direct objects between Spanish heritage speakers (around 2.8) and adult immigrants (around 2.8) in a bimodal acceptability judgement task (1 refers to completely unacceptable, and 4 refers to perfectly acceptable). In contrast, the native speakers' mean rate was about 1.2.

The results exemplified above, based on different studies, methods and tasks in Montrul and her colleagues' research, seem to suggest that as in heritage speakers, Spanish DOM is also prone to attrition effects in late bilinguals under the influence of the societal language, English. Nevertheless, there is one exception that is contrary to these results. Chamorro, Sturt and Sorace (2016) found equal early sensitivity to DOM violation in an eye-tracking experiment and equal sensitivity in an offline acceptability judgement task (AJT) between Spanish monolinguals and Spanish adult immigrants in the UK. The finding seems to suggest

no attrition effects on the adult immigrants attested in that study. Comparing the linguistic background of the adult immigrant participants across studies, it emerges that, interestingly and somewhat counterintuitively, participants who exhibited no attrition effects on Spanish DOM are those who reported to be near-native speakers of English and use the L2 significantly more often than the L1; whereas participants who exhibited DOM erosion are those who self-rated themselves as intermediate speakers of English and reported high use of Spanish in daily life.

This finding goes against the assumption, often made in attrition studies, that a high level of L2 proficiency and frequent use of that language (in conjunction with a reduced use of the L1) should facilitate CLI and lead to more attrition than for lower-proficiency speakers with less exposure, due to lower levels of activation for L1 properties and a boost of accessibility for the L2. It has been shown by Schmid (2019) that there is little empirical support for the assumption that lower levels of contact and a longer period of residence will lead to higher levels of attrition. Findings such as those reported above further suggest that the mechanisms underlying attrition in late bilinguals and in heritage speakers may not be as similar as often suggested: among heritage speakers, L1 linguistic erosion is strongest where the onset of L2 contact is set before puberty (e.g., Bylund, 2019). In contrast, for late bilinguals, the length of time spent in the L2 environment seems not to correlate with the amount of attrition observed (see discussion in Domínguez, 2013, Schmid, 2019), indicating that late bilinguals may be more resistant to L2 influence than heritage speakers. This throws up interesting questions relating to the mechanisms that facilitate and constrain L2-to-L1 CLI in younger and older speakers.

Some researchers suggest that at least a partial answer to this question may be found in the role of exposure to modified L1 input (e.g., Domínguez, 2013, Hicks & Domínguez, 2019). Modified L1 input conditions refer to cases where speakers are extensively exposed to an L1 variety that exhibits different feature configurations for specific structures (Hick & Domínguez, 2019). Empirical studies investigating US-based Spanish speakers have reported attrition in the use and grammatical knowledge of Spanish null and postverbal due to the prolonged exposure to the dialectal variation in the Spanish-speaking community in the US (e.g., Otheguy & Zentella, 2012, Domínguez, 2013). This may also be the case in the findings of DOM attrition among US-based Spanish speakers reported in Montrul et al. (2015). They were reported to live in a wider Spanish-speaking community where they have more access to their native language than Spanish speakers in the UK, who are settled in a more isolated situation with limited access to the L1, and consequently interact more with speakers who may already have undergone attrition (Chamorro et al., 2016). This extralinguistic difference may also explain why after 20 years' residence in the US, the Spanish adult immigrants recruited in Montrul et al. (2015) still reported Spanish as their dominant language and self-rated their English at intermediate proficiency level; whereas the group in Chamorro et al. (2016) exhibited near-native English performance and reported more use of the L2 than the L1 with only an average of seven years' residence in the UK.

The Spanish-speaking communities in the US where these investigations took place are composed of both adult immigrants and heritage speakers, the latter of whom will likely already possess a system that is markedly different from the variety spoken in the country of origin. Under prolonged exposure to this attrited DOM input from within their social environment, adult immigrants may eventually reassemble properties of the attrited Spanish, that is, adapt their language to the community variety. On the other hand, like UK-based

Spanish adult immigrants, US-based Romanian and Hindi adult immigrants, who were believed to have less access to their native language than the US-based Spanish group, exhibited no attrition effects on the DOM system in their L1 in Montrul et al. (2015).

These findings seem to suggest that the L1 attrition is more facilitated in a bidialectal (or L1 variety) context than in an L2 context among late bilinguals – in other words, change induced by cross-dialectal influence take hold more easily than those triggered by influence from another language, in particular a typologically more distant one. As Hicks and Domínguez (2019, p.17) propose, “the possibility of attrition should arise for grammatical phenomena which are ‘aligned’ in the L1 and L2, yet where slightly different properties obtain regarding how the feature bundles are assembled. This is taken for granted in the case of bidialectal contexts since all grammatical phenomena of the L1 and the L1 variety are likely to align, with many of them behaving identically, but possibly with a small number of minor divergences, which would constitute candidates for attrition”. They also emphasize that the requirements for alignment between languages are particularly significant for late bilinguals, while in younger speakers, CLI between less similar features may also lead to pronounced changes in the L1.

Structural complexity and cognitive capacity

In addition to the influence of the language contact and similarity, structural complexity is another likely factor contributing to non-target-like performance in the L1. For instance, Montrul (2019) investigates the use and knowledge of case marking in a group of Hindi heritage speakers in the US. In Hindi, the particle *-ko* appears with all indirect objects but its use with direct objects is contingent on animacy (+human) and specificity (+specific).

Following the feature reassembly hypothesis and contextual complexity hypothesis (Hawkins & Casillas, 2008), Montrul (2019, p.16) predicts that “markers that bundle more linguistic features will be more difficult to master and require more morphological computations than markers bundling fewer features”. Congruent with this prediction, heritage speakers accepted more omission errors with accusative *-ko* than with indirect objects *-ko*. Montrul also cites the evidence found in Laleko and Polinsky (2016) that Korean and Japanese heritage speakers found morphological case markers that involve semantic and discourse constraints more difficult than those governed by syntactic constraints only.

In the context of L1 attrition among late bilinguals, a similar idea is proposed within the framework of Interface Hypothesis (see Sorace, 2011; Chamorro, Sorace & Sturt, 2016). It assumes that online processing of structures at the interface of syntax and pragmatics is particularly vulnerable to attrition effects, due to bilingual speakers’ reduced computational efficiency in integrating information from different domains as a result of a trade-off effect from the increasing demand of suppressing and inhibiting the unwanted language. This seems to be verified by evidence found in studies focusing on structures situated at the interface of syntax and pragmatics, e.g., attrition found in the processing of contexts licensing overt subject pronouns in a group of late Spanish bilinguals (Chamorro et al., 2016).

On the other hand, the IH argues that structures at the internal interfaces (e.g., semantics) will not be affected by attrition effects because the integration of semantic features relies more on proceduralized mechanisms and is therefore cognitively less demanding. This is the explanation adopted to account for the absence of attrition effects observed in Spanish DOM among the UK-based L1 Spanish adult immigrants in Chamorro et al. (2016). However, there are results from other studies indicating that a lack of sufficient cognitive resources also

contributes to greater difficulty in integrating semantic information with syntactic processing. For instance, Liu and her colleagues (2019) compare the difference in the processing of Mandarin relative clauses between older adults and younger adults and find less sensitivity to animacy information exhibited by the older group. Following a resource-based account for sentence processing (Just & Carpenter, 1992), Liu and her colleagues conclude that subjects with high working memory capacity possess sufficient resources to integrate both syntactic information and non-syntactic information more efficiently than those with low working memory capacity. Therefore, old adults are likely to have greater difficulties in using animacy information as a result of reduced working memory capacity. Liu and her colleagues also cite evidence from an eye-tracking study by Just and Carpenter (1992) that shows subjects with high working memory capacity were more sensitive to animacy in the early stages of processing whereas those with low working memory capacity did not have sufficient resources to use animacy information. Taken together, the hypotheses and findings reviewed above suggest that structures that bundle with more features (e.g., features from semantic or pragmatic domains) will be particularly vulnerable to L1 attrition effects due to reduced cognitive resources available for the integration of semantic or pragmatic information with syntactic processing as a result of the added task demand of inhibiting the interference from the unwanted language among late bilinguals.

Linguistic complexity and cognitive resources may also contribute to some extent to explaining the difference in performance on DOM between the UK-based and US-based Spanish late bilinguals observed in the work by Montrul and colleagues vs. that by Sorace and colleagues: The UK-based study used only stimulus items which were [+specific], so that the presence of the differential object marker *a* was regulated by animacy only, whereas in the US-based case, stimuli varied with both specificity and animacy. Thus, the fact that the

DOM stimuli differed on fewer semantic features in the UK-based study may have made the task cognitively less demanding, and thereby more resistant to attrition effects as a result of reduced cognitive recourses.

In sum, DOM has been widely investigated in heritage speakers, but there is still a dearth of research exploring the attrition effects on DOM in adult immigrants. Congruent with the general picture of morphosyntactic attrition in literature, DOM erosion is consistently reported among heritage speakers, whereas in the context of late bilinguals, the findings are limited and inconclusive. It remains, to a certain extent, unclear what role external factors (e.g., L2/L1 variety influence) and internal factors (structural complexity and cognitive capacity) play in DOM attrition among late bilinguals and how these factors may interact in the attritional process. In order to contribute to a better understanding of this question, the present study examines Mandarin DOM system among a group of Mandarin-English bilinguals who came to the UK after puberty.

4.3. *ba* as DOM in Mandarin

The function of the lexical item *ba* in modern Chinese is widely discussed. As Bender (2000) notes, *ba* has been considered as a verb (Hashimoto, 1971), a preposition (Li & Thompson, 1981), or as a case marker (Huang, 1990). In the present discussion, I follow Yang and van Bergen (2007) and de Swart (2007) who treat *ba* as the differential object marker. Similar to DOM in other languages, e.g., the personal *a* in Spanish and the affix *-ko* in Hindi, the presence or absence of the lexical term *ba* in Mandarin is not random but constrained by a number of conditions.

Unlike in the languages discussed above, the use of *ba* is partly contingent on word order.

The canonical word order of Mandarin is SVO. Similar to English, Mandarin SVO sentences check the accusative case through the syntactic position of direct objects rather than marking the direct object overtly with a particular lexical form, as shown in 6.1.

6.1.

他 吃了 那个 苹果

He ate that apple

(He ate that apple.)

(van Bergen, 2006)

Under some conditions, the Mandarin language prefers the direct object to be scrambled to the preverbal position (Xu, 2012), as shown in 6.2. Sometimes it even obliges the direct object to move to a preverbal position, as triggered by the Postverbal Constraint which only allows one constituent to follow the verb (Huang 1998), as shown in 6.3. In these SOV sentences, the accusative case of direct objects is overtly marked with the lexical item *ba*.

6.2.

他 把 那个 苹果 吃了

He *ba* that apple ate

(He ate that apple.)

(van Bergen, 2006)

6.3.

他把那个苹果放在桌上了。

He *ba* that apple put on the table

(He put that apple on the table.)

As the examples above show, one of the conditions that regulate Mandarin DOM is the syntactic position of the direct object: the presence of *ba* is limited to SOV word order (Yang & van Bergen, 2006), and native speakers of Mandarin consistently reject its use in SVO sentences (Xu, 2012).

On the other hand, following Yang and van Bergen (2006), not all scrambled objects are obligatorily marked: DOM can be omitted in SOV sentences under some conditions, regulated by animacy and definiteness of the direct objects. Specifically, [-animate] and [+definite] direct objects are optionally marked, as shown in 6.4 and 6.5. It should be noted here that bare nouns placed in preverbal position as exemplified below, are interpreted as definite. This is due to the language-specific interpretational effect of definiteness in Mandarin, which has no definite article, but has the semantic feature [+definite] which can be realized either with demonstratives or object scrambling as a syntactic operation (see discussion in Lardiere, 2009). All remaining direct objects are obligatorily marked with *ba* in SOV word order, as exemplified in 6.6 – 6.8⁹

⁹ In addition to the demonstratives or syntactic operation of object scrambling, de Swart (2007) points out that direct objects can also get a definite interpretation by adding the predicate accomplishment *wan* “verb-finish” or a quantificational element *dou* “all”, see (i) and (ii). In the two examples, the inanimate direct object receives the feature of [+definite], therefore *ba* is not obligatorily present. Considering this complex picture about the definiteness in Mandarin, the stimuli used in the current study will be unified to [+definite]

6. 4.

他 (把) 那个 苹果 吃了. [-animate, +definite]

He (*ba*) that apple ate

(He ate that apple.)

(van Bergen, 2006)

6. 5.

他 (把) 苹果 吃了 [-animate, +definite]

He (*ba*) apple ate

(He ate the apple.)

by using bare nouns in SOV sentences, and the obligatory or optional presence of *ba* is regulated by the animacy of the direct objects only. This will be further exemplified later.

(i) 他 一个 苹果 吃 完了

He one apple eat-finish
(He ate up an apple.)

(ii) 他 一个 苹果 都 吃了

He one apple all eat
(He ate a whole apple.)
(van Bergen, 2006)

(van Bergen, 2006)

6. 6.

他 *(把) 蛇 打死了. [+animate, +definite]

He *ba* snake hit.dead

(He killed the snake.)

(van Bergen, 2006)

6. 7.

他 *(把) 一条 蛇 打死了. [+animate, -definite]

He *ba* one snake hit.dead

(He killed a snake.)

6. 8.

他 *(把) 一个 苹果 吃了. [-animate, -definite]

He *ba* one apple ate

(He ate an apple.)

(van Bergen, 2006)

In sum, as in other languages (e.g., Spanish, Romanian, and Hindi) exemplified earlier, *ba* in Mandarin can be treated as an instance of the marked accusative case. The lexical term *ba* is triggered by the sentence word order [+scrambled]. This is because Mandarin, in its canonical SVO word order, does not mark direct objects overtly, but checks the accusative case through the syntactic position. On the other hand, following Yang and van Bergen (2006), *ba* is not obligatory with all scrambled direct objects; it can be optionally omitted, primarily regulated by the semantic features (i.e., animacy and definiteness) of direct objects.

Although *ba* is a widely discussed topic in research on Chinese research, most of the discussion concentrates on what syntactic elements can enter this construction. In contrast, the sometimes obligatory and sometimes optional use of *ba* as differential object marker has received little attention (de Swart 2007). To the best of our knowledge, the current study is the first empirical study investigating the use of *ba* as a function of DOM in Mandarin in the context of L1 attrition within the framework of the constraints and conditions of its use established by Yang and van Bergen (2006).

4. 4. The current study

As a linguistic property that is extremely common cross-linguistically and instantiated in hundreds of languages, and with distributional properties that straddle morphosyntactic, semantic and pragmatic features, DOM can potentially allow further insights into the mechanisms underlying language attrition in late bilinguals. However, to date, few studies on

this phenomenon exist, and their findings are inconclusive. In order to contribute to a better understanding, the current study compares the knowledge and use of *ba* as a function of DOM with a Grammatical Judgement Task (GJT) between a group of late Mandarin-English bilinguals and their monolingual counterparts.

We argue that such a study can provide more insight into the linguistic aspects that contribute to or constrain language attrition since DOM in Mandarin is regulated by an interaction of syntactic position and semantic features: As discussed earlier, DOM in Mandarin is primarily triggered by the syntactic operation of direct object scrambling. Therefore, the lexical term *ba* is obligatory with scrambled direct objects in most cases and can only be optionally omitted only under certain conditions. The difference in conditions under which the accusative case can be lexicalized or not makes the zero-marked case (tied to more features) more complicated to process than the overtly-marked case in Mandarin SOV sentences.

This language-specific property of DOM makes it possible to distinguish L2-induced changes from internally-induced changes through an examination of the performance on various items in our GJT. Changes that are the outcome of CLI should manifest themselves in a similar pattern to that observed in previous L1 attrition studies, i.e., a norm-deviant preference for the zero-marked case in both obligatory and optional conditions. Internally induced change, on the other hand, is likely to be exhibited through the opposite pattern, where the late bilinguals will exhibit a lower acceptance rate of the zero-marked case than their monolingual counterparts due to their reduced computational resources. In order to gain a closer understanding of these mechanisms, we employ a GJT with both an online and an offline condition, in order to investigate whether any observed changes relate purely to matters of processing, or whether representational changes are also involved. If differences between

attractors and controls were restricted to the online condition, this would indicate that only the processing strategies of DOM are affected rather than the knowledge itself restructured.

Considering the complex picture of definiteness realization in Mandarin (see above), the definiteness of direct objects in all target sentences used in the current study is unified to [+definite] by using bare nouns, and only SOV sentences are employed as the stimuli.

Therefore, in the current study, whether or not *ba* can be optionally omitted should be straightforward. The presence of *ba* is assumed to be grammatical regardless of animacy, as triggered by the SOV word order. On the other hand, the absence of *ba* bundles with the animacy information. Adding time pressure in the online condition adds extra cognitive demand during sentence processing, thereby magnifying any resource-related difficulties when integrating the animacy information with syntactic processing.

Against the above linguistic analysis, the present study addresses the following research questions:

- 1) Do late Mandarin-English bilinguals show divergent performance on Mandarin DOM compared with their monolingual counterparts?
- 2) If they do, is the divergence restricted to the processing level under time pressure?
- 3) Which factors (i.e., CLI or processing difficulty) contribute to the changes observed?

4.5. Method

Participants

Mandarin “monolinguals” (n=28): L1 Mandarin

The Mandarin controls were 28 Mandarin native speakers. They were recruited among first-year and second-year students at Wenzhou Vocational & Technical College in mainland China. All participants had been living in China since birth with little or no overseas experience, and their majors were not related to foreign language studies. The mean age of the control group at the time of testing was 20.29 years ($SD = 0.98$, range = 18-22). The participants were asked to complete an adapted Mandarin version of the CanDo Scales, following Keijzer (2007) and Schmid (2011). The CanDo Scales used in this study asked participants to self-rate their language skills on a 5-point scale (from 1= I cannot do this to 5= I can do this without any difficulty at all) (for the full instrument, see Appendices). Scores from the CanDo Scales were calculated, as shown in Table 6.1.

Mandarin “bilinguals” (n=22): L1 Mandarin, L2 English

This group was selected from Chinese students at the University of Essex. It comprised 22 Mandarin native speakers who had arrived in the UK between the ages of 16 and 36 ($M = 22.91$, $SD = 3.91$) and had lived in the UK for an average of 2.45 years ($SD = 1.91$, range = 0.5-6). All participants reported everyday use of the L1 with their Mandarin friends and family. Participants were asked to complete a questionnaire, including self-rating their language skills in both Mandarin and English via the CanDo Scales and providing some basic background information. Scores from the CanDo Scales were calculated, and results illustrate that bilingual participants self-rated their L1 ($M = 4.78$, $SD = 0.23$) significantly higher than their L2 ($M = 3.33$, $SD = 0.56$) ($p < .001$). Additionally, bilinguals' overall self-rated scores in

Mandarin and English also positively correlate with their length of residence (Mandarin: $r=0.50$, $p=.02$; English: $r=0.43$, $p=.046$), as Figure 6.1 and Figure 6.2 illustrate. While the positive correlation between LoR and self-rated L2 proficiency was expected, it may seem counterintuitive that a longer period of residence was also associated with higher proficiency in the L1. We discuss the implications of this finding below.

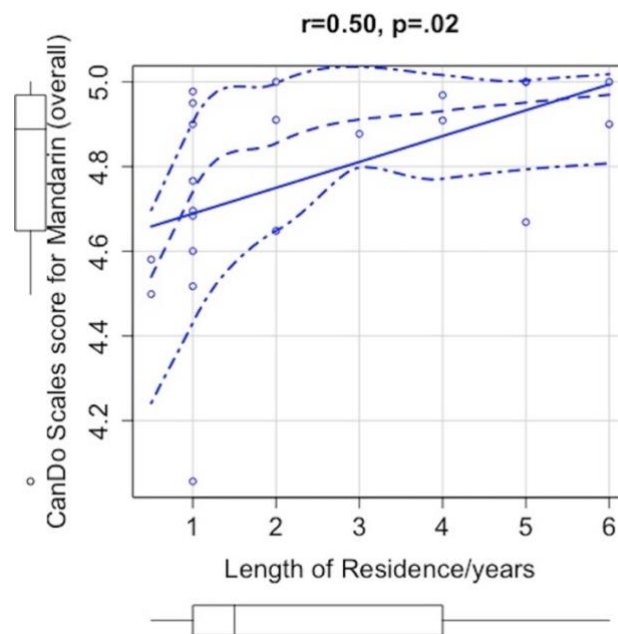


Figure 4.1 Figure 1a. The scatterplot of LoR and Cando Scales scores for Mandarin (overall)

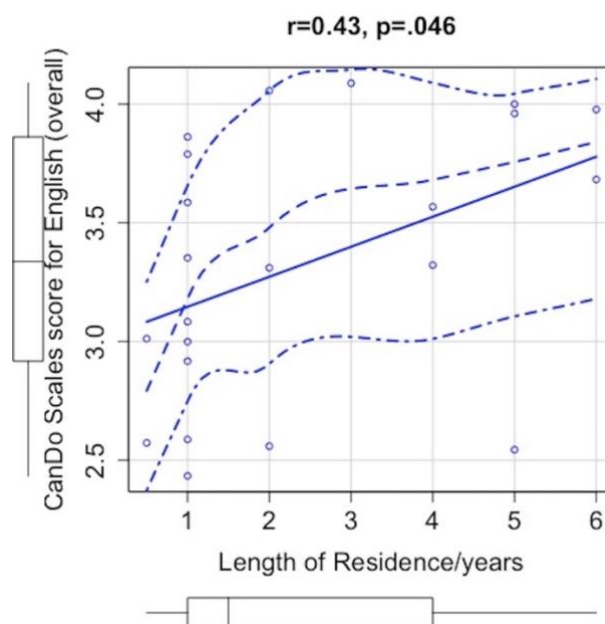


Figure 4.2 The scatterplot of LoR and Cando Scales scores for English (overall)

On the self-rating task, the bilingual group rated themselves at an average of 4.78 (SD=.23). Interestingly, we can see that the monolinguals self-rated their proficiency in Mandarin lower than the bilinguals at an average of 3.91 (SD=0.69), a difference which achieves significance ($Z=91$, $p<.001$). This might be because “in such self-evaluations, speakers may not assess their own proficiency against an abstract model of nativeness but within the frame of reference of their own cohort” (Schmid 2014, p.6). Similar results are also reported in Schmid (2014): German monolingual controls outperformed the bilinguals on all formal proficiency tasks, such as C-Test and verbal fluency, but their self-rated scores were significantly lower than the bilinguals’. Additionally, Schmid finds a strong correlation between self-ratings and C-Test scores in the bilingual populations but not in monolingual controls. Taken together, what is relevant for the current study is that although for monolingual populations, self-evaluation tasks such as CanDo Scales may not be as reliable as other formal tasks, self-ratings do provide a good measure of proficiency in the bilingual population. As mentioned earlier, the bilingual participants in the current study self-rated

their L1 significantly higher than their L2 via CanDo Scales, indicating higher proficiency in L1 Mandarin than L2 English among these bilingual speakers.

Group	n	Age of testing	Age of arrival	Length of residence	CanDo Scales scores for Mandarin	CanDo Scales scores for English
Monolinguals	28	20.29 (0.98)	/	/	3.91 (0.69)	/
Bilinguals	22	25.45 (3.78)	22.91 (3.91)	2.45 (1.91)	4.78 (0.23)	3.33 (0.56)

Table 4.1 Demographic data of the groups.

Materials

The experiment comprised a timed and an untimed grammaticality judgement task, as a measure of participants' sensitivity to four sentence structures (SBIV, SIV, SBAV, *SAV) used in the current study, as summarized in Table 6.2. Both tasks shared the same stimuli. Sixteen pairs of nouns and verbs (eight animate/human nouns, eight inanimate nouns) were used to create 32 target sentences. The length of each target sentence was between 5 and 8 Mandarin characters. The 32 target items were divided into two blocks, and each block comprised four sentence types with four tokens for each type, as shown in 6.9 and 6.10. The same pair of noun and verb only appeared once in the same block, either with or without *ba*. All items, together with fillers, were pseudorandomly presented during the experiment in each block. Half of the participants were asked to do Block A, and the other half to do Block

B. Voice materials for each sentence were recorded in natural speed by a native female Mandarin speaker.

Sentence type	Scrambled	Animate	Definite	DOM	Grammaticality
SAV	+	+	+	-	ungrammatical
SBAV	+	+	+	+	grammatical
SIV	+	-	+	-	grammatical
SBIV	+	-	+	+	grammatical

Table 4.2 Summary of the conditions used in the current study

6. 9.

animate/human scrambled object: He killed the snake

- a. *他 蛇 打死了. (SAV: animate, definite, no *ba*)

He snake hit dead

(He killed the snake.)

- b. 他 把 蛇 打死了. (SBAV: animate, definite, with *ba*)

He *ba* snake hit.dead

(He killed the snake.)

6.10

inanimate scrambled object: He ate the apple

- a. 他 苹果 吃了. (SIV: inanimate, definite, no *ba*)

He apple ate

(He ate the apple.)

- b. 他 把 苹果 吃了. (SBIV: inanimate, definite, with *ba*)

He ba apple ate

(He ate the apple.)

4. 6. Procedure

Participants were asked to do the timed task first, and after a short break, continue to do the untimed task, in order to avoid possible effects of linguistic awareness in the former. Both tasks were presented via a computer screen visually and audibly. At the beginning of each task, participants were asked to read experiment instructions in Mandarin, and then they pressed a keyboard button to proceed to the practice session. After the practice session participants were asked to press a keyboard button when they felt ready to enter the formal session.

In the timed task, a fixation cross was presented at the centre of the screen, signalling the beginning of a trial. For each trial, the sentence was presented at the centre of the screen, and

the recording was played simultaneously. The screen would automatically skip to the judgement slide once the sound ended. On the judgement slide, a green rectangle with word “grammatical” and a red rectangle with “ungrammatical” was presented on the left and the right side of the screen, respectively, to prompt participants to make their grammaticality judgements. Responses were collected by a Chronos multifunctional response device. Corresponding with the rectangles, the left button on the Chronos device indicated the acceptance of the sentence, and the right button signalled its rejection. Participants were told to respond as soon as possible; otherwise, the screen would automatically skip to the next trial after 3 seconds, and their response would not be collected.

For the untimed task, the sentences were presented visually and audibly with a five-point grammaticality scale underneath. Participants were asked to rate each sentence on the scale from 1 “completely ungrammatical” to 5 “completely grammatical” via the Chronos response device. The screen with sentence and scale presented would not skip to the next trial until the participant gave a response. Participants were told to read and rate sentences and to take as long as they needed to make their determination.

4.7. Data analysis

For the timed task, 799 responses (excluding one missed judgement) to four sentence types (SIV, SBIV, SBAV and SAV) were collected from 28 monolingual and 22 bilingual participants. The time between the appearance of the judgement slide and the response to the “grammaticality” question was measured in milliseconds. The RT data were log-transformed, and RTs two standard scores above or below the mean log-transformed RT were removed as outliers. This eliminated 5.6% of the aggregated data, including responses with shorter RTs

below around 80 milliseconds and longer RTs above around 1600 milliseconds. RTs from the trimmed data (skewness = 0.31) were submitted to repeated measures ANOVA for statistical analysis. Grammaticality judgement results from the trials remaining after data trimming were used for statistical analysis by means of mixed logit regressions, with 0 indicating an “ungrammatical” response and 1 a “grammatical” one.

For the untimed task, 784 responses were collected from 28 monolingual and 21 bilingual participants. The time between the appearance of the sentence and the response on the grammaticality scale was also measured in order to remove responses with response times considered too short or too long. Again, the RT data were log-transformed and trimmed in the same way as for the timed data. This removed 3.4% of the aggregated data, including responses with shorter RTs below around 671 milliseconds and longer RTs above around 6238 milliseconds. Judgement results from the trimmed data were used for further statistical analysis. The analysis proceeded in two steps. In the first one, the Likert scale results were transformed to binary data and assessed by logit regression in the same way as the dichotomous responses collected in the timed task for comparison. In the second step, they were categorised into three response types, “full accept (scores of 5)”, “full reject (scores of 1)” and “uncertain (scores of 2 to 4)” and assessed by a multi-nominal regression.

4. 8. Results

Timed grammaticality judgement task

This task was administered under time pressure in order to ensure a high cognitive load.

Although the interval for judgement slide was set to 3 seconds, over 95 percent of responses were carried out within 1000 milliseconds, with a mean RT of about 440 milliseconds, which

is around 100-200 milliseconds longer than the mean simple/two-choice visual reaction times reported by studies on fastest finger reaction time to visual stimuli (e.g., see Jose & Gideon Praveen, 2010; Ng & Chan, 2012). These results seem to suggest that participants were indeed doing their best to provide a response as fast as possible.

Judgement results

Figure 6.3 compares the overall acceptance rates (as “grammatical”) for each sentence type in the timed task between groups. We can see that, as expected, both groups exhibited nearly full acceptance of two with-*ba* sentence types regardless of the animacy (SBIV and SBAV). On the other hand, divergence was observed in the acceptance of no-*ba* sentences. Recall that if L2 transfer from English is at the root of attrition effects, the absence of *ba* would be preferred by bilinguals; in contrast, if internal complexity and reduced cognitive resources are at the root of changes in acceptability, sentences without *ba* should be dispreferred by bilinguals. We can see that, conforming to expectation, both groups overwhelmingly rejected no-*ba* sentences under the (ungrammatical) animate condition (*SAV) whereas under the inanimate condition (SIV) (in which *ba* omission is permitted), the acceptance rate is 54% for the monolingual group but only 32% for the bilingual group. The difference observed between the two groups in their acceptance of SIV sentences was found to be statistically significant in a mixed logit regression ($b=1.80$, $SE=0.88$, $z=2.03$, $p=.04$). In line with our predictions, this result can be interpreted as indicating that the main effect for group is probably due to insufficient cognitive resources to integrate animacy with syntactic processing, rather than being indicative of direct L2 transfer from English.

Further analysis on the acceptance of *no-ba* sentences reveals that both groups had a significantly higher acceptance rate for SIV than for SAV sentences (Bi: $b=3.58$, $SE=1.01$, $z=3.57$, $p<.001$; Mono: $b=4.38$, $SE=0.71$, $z=6.19$, $p<.001$). This result shows that animacy plays an important role in sentence processing not only for the monolingual group but also for the bilingual group. Taken together, we can conclude that even though bilinguals exhibited greater difficulty integrating animacy information with syntactic processing than their monolingual counterparts, they were still able to use the animacy information to some extent during sentence processing.

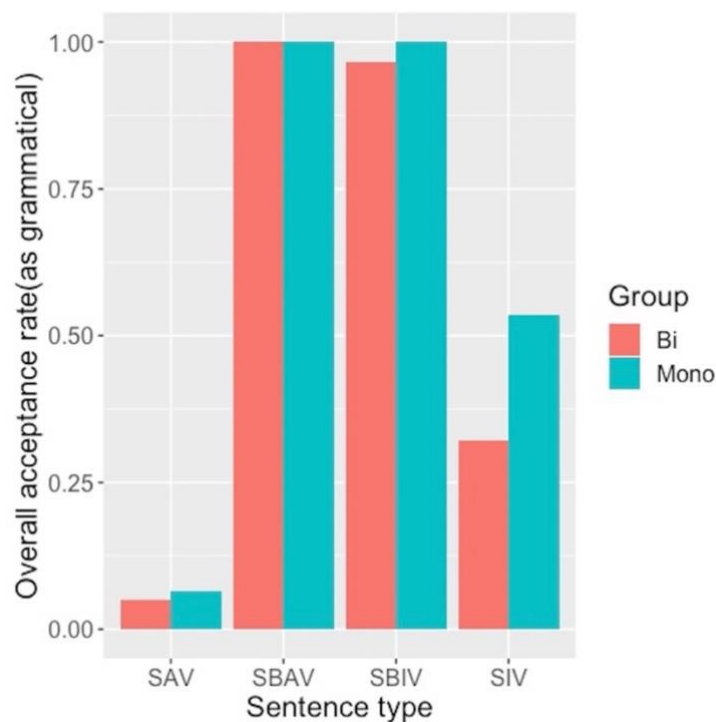


Figure 4.3 The bar plot of overall acceptance rates (as “grammatical”) for each sentence type between groups in the timed task

As the next step, we investigated the correlation between the linguistic performance and sociolinguistic factors such as length of residence (LoR) and age on arrival (AoA). Recall that bilinguals' overall self-rated scores in Mandarin and English positively correlate with LoR. Similarly, bilingual participants' acceptance of SIV showed a marginally positive relationship with their LoR in the UK ($b=0.99$, $SE=0.42$, $z=2.38$, $p=.02$) but not with the age at which they had arrived ($p=.15$), manifested by a mixed logit regression model with LoR and AoA as independent variables. These results indicate that bilinguals with longer LoR are more likely to accept SIV sentences (i.e., accept *ba* omission in those contexts where both its presence and its absence are licensed) and that they also self-rate their language skills in Mandarin at a comparatively higher level than bilinguals with shorter LoR. This phenomenon can be interpreted as suggesting that, after an initial immersion period during which their L1 intuitions as well as their self-perceived proficiency are affected by the developing L2 system, bilinguals might be reverting towards their pre-immigration levels.

Reaction times

The time between the appearance of the judgement page and the participants' response to the grammatical/ungrammatical questions was measured as participants' reaction time (RT).

Figure 6.4 shows the mean RTs for four sentence types by bilingual and monolingual groups.

The RT that participants took to reject the sentence is displayed in the right panel, with acceptances displayed on the left. A repeated-measures ANOVA was carried out on the log-transformed RTs with two within-subjects variables, sentence type (SBIV vs SBAV vs SAV vs SIV) and acceptancy (reject vs accept) on the one hand, and one between-subjects variable, group (Bi vs Mono), on the other hand. Results reveal a main effect of group ($F(1, 741) = 28.72$, $p < .001$) and a three-way interaction effect of acceptancy * group * sentence

type ($F(1, 741) = 4.16, p=.04$). Recall that judgement results, as discussed above, indicate that the norm-deviant performance is probably related to bilinguals' reduced efficiency on sentence processing. This conclusion is further supported by the fact that, as post-hoc comparisons between groups indicate, bilinguals were overall slower to respond ($p<.001$), with a mean difference of about 80 milliseconds in the RT between groups.

In terms of sentence type (*ba* supplied/omitted), further comparisons show that bilinguals had longer RTs than monolinguals in accepting both with-*ba* sentences (SBIV, $b=0.21, SE=0.11, t(46.73)=2.19, p=.05$; SBAV, $b=0.21, SE=0.10, t(46.12)=2.19, p=.03$) in linear mixed regression models. Where sentences with *ba*-omission are concerned, the bilingual group were also slower to accept SIV than the monolingual group ($b=0.33, SE=0.12, t(82.00)=2.75, p=.01$). These results can be interpreted as the manifestation of slower sentence processing by bilinguals compared with their monolingual counterparts. Bilinguals are also descriptively slower in rejecting *ba* omission in either SIV contexts (optional) or SAV contexts (obligatory), but this difference does not reach significance (SIV, $p=.23$; SAV, $p=.44$).

As a next step, we investigated processing differences between the sentence pairs SIV vs SBIV. The former is assumed to require the integration of animacy information with syntactic processing and is therefore cognitively more demanding. This assumption is confirmed by the fact that, as can be seen in Figure 6.4¹⁰, average RTs for accepting SIV are

¹⁰ Figure 6.4 also shows a large descriptive difference between RTs in accepting *SAV sentences between the two populations. This measure is based on very few datapoints, as there were only four acceptances of these sentences among the bilinguals and three among the monolinguals. These judgements are therefore likely to have been made in error, and the difference in RTs will not be further investigated.

longer than for SBIV in both groups. This difference achieves significance at the bilingual group ($b=0.23$, $SE=0.11$, $t(103.37)=2.17$, $p=.03$) but not at the monolingual group ($p=.21$)

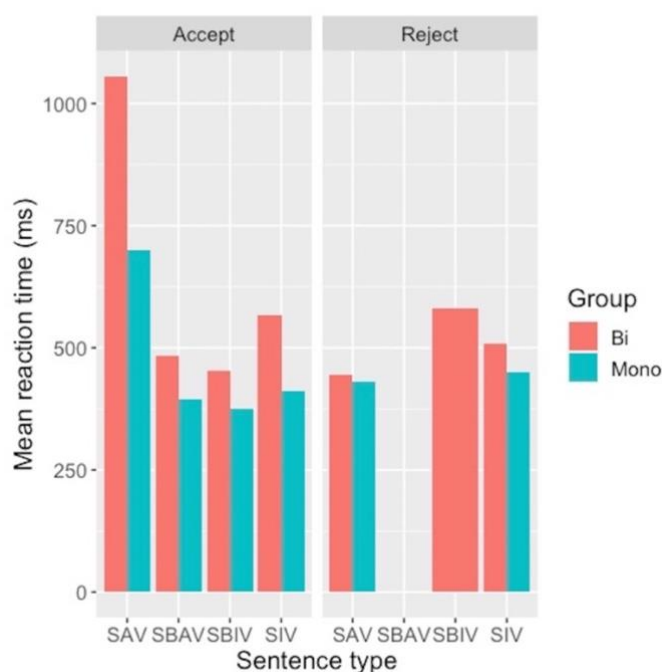


Figure 4.4 The bar plot of mean RTs for each sentence type by group (bilinguals vs. monolinguals) and acceptability (reject vs. accept) in the timed task

Finally, it is also worth noting that even though the somewhat slower RTs for correctly accepting sentences indicate bilinguals are less efficient on sentence processing than monolinguals, no significant difference in RTs was revealed in either (correctly) rejecting *SAV sentences ($p=.44$) or rejecting the optional *ba* omission in SIV contexts ($p=.23$) between groups. A possible explanation is that bilinguals may adopt different processing strategies to reject items which may offset, to some extent, the cognitive deficit. This may also possibly contribute to the tendency that bilinguals are more likely to reject than to accept

SIV. Nevertheless, due to the limitation of the experiment settings in the current study, more research is required to assess this assumption before any firm conclusion is made.

Untimed grammaticality judgement task

Judgement results

In this task, participants were asked to rate the grammaticality of sentences on a five-point Likert scale. Figure 6.5 shows the bar plot of the mean rates of sentence types in the untimed task by both groups. The scaled results from the untimed task were analyzed by means of a two-way ANOVA of sentence type * group, which revealed a significant effect of sentence type was revealed ($F(3,749) = 553.16, p < .001$) but no significant effect for group ($p = .89$).

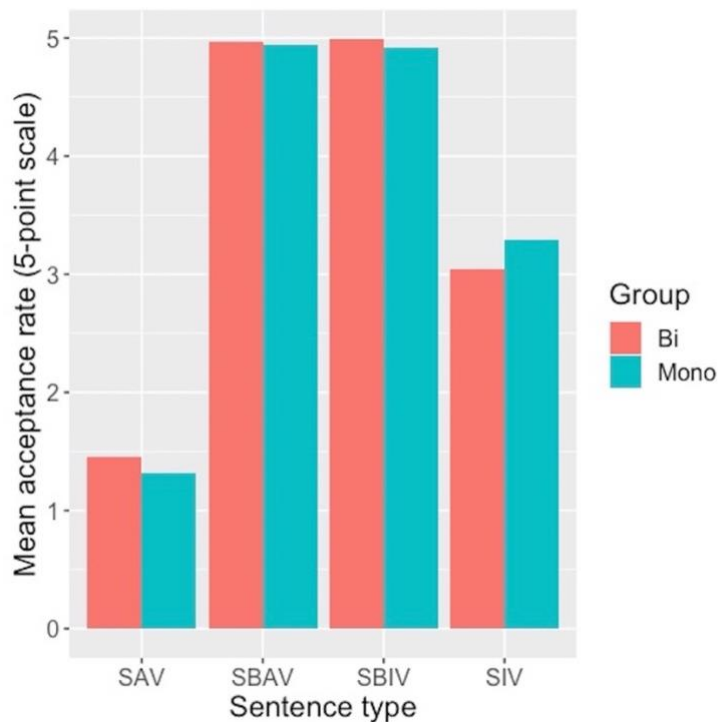


Figure 4.5 The bar plot of mean acceptance rate (five-point Likert scale) for each sentence type between groups in the untimed task

In order to have a straightforward comparison in the acceptance of four sentence types across tasks and groups, scaled responses collected in the untimed task were transformed to binary data where responses of 1 and 2 were recoded as 0 (“reject”) and 4 and 5 as 1 (“accept”). Only five trials received a response of 3 (“I do not know”) comprising two SIV sentences and three SAV sentences; these trials were excluded from the analysis. Figure 5 shows the bar plot of the acceptance rate of sentences across tasks by both groups. In accordance with the result found on the scaled data as reported earlier, no significant group effect ($p=.44$) was found on the dichotomized data, as manifested by a mixed logit regression model. These results seem to suggest that monolinguals and bilinguals performed similarly in the untimed task.

With respect to the performance across tasks within each group, we can see that, as Figure 6.6 shows, in the contexts of SBIV, SBAV and SAV, the performance of both groups across tasks was similar. For SIV contexts, on the other hand, the acceptance rate by monolinguals in untimed contexts was only slightly higher than in the timed condition, while the bilinguals – who had rejected these sentences at a significantly higher rate than monolinguals under time constraints – increased their acceptance in the untimed condition to the same level as monolinguals. A mixed logit regression finds a significant effect of task (Timed vs Untimed) on the bilingual group ($b=1.52$, $SE=0.54$, $z=2.83$, $p=.005$) but not on the monolinguals ($p=.53$) in SIV contexts. This seems to suggest that the divergence observed in the timed task was indeed caused by a scarcity of cognitive resources under time pressure for the bilinguals.

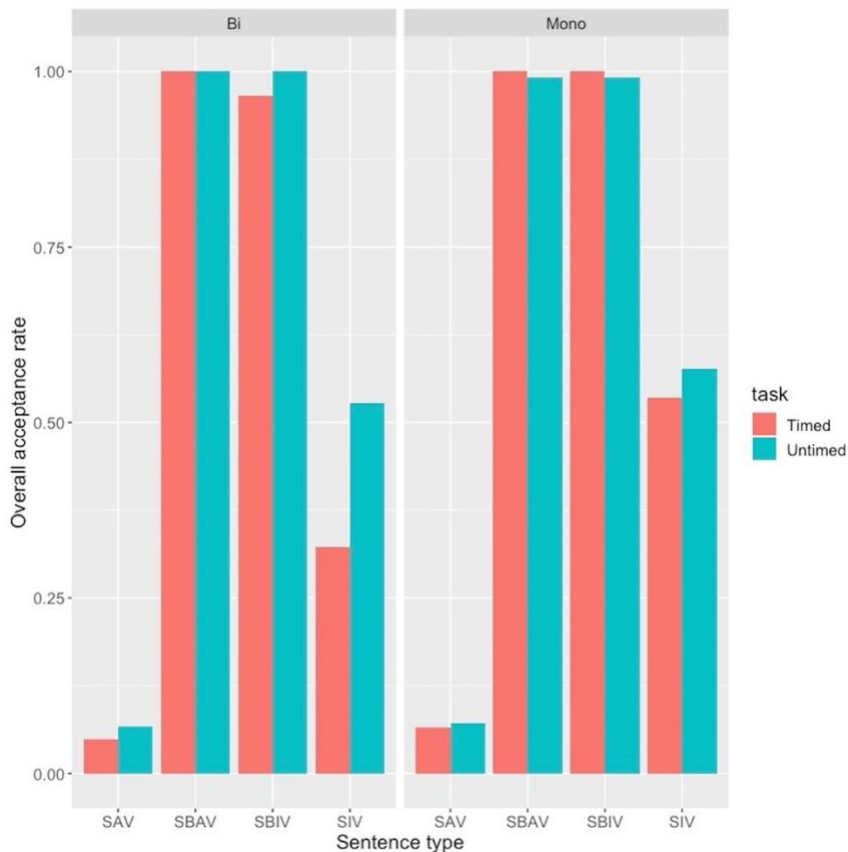


Figure 4.6 The bar plot of overall acceptance rates for each sentence type by group (bilinguals vs. monolinguals) and task (timed vs. untimed)

In order to confirm the above finding in a more fine-grained analysis, it is still worth having a closer inspection of the original scaled data in the untimed task, which may reveal more information about participants' knowledge of the target structures. As illustrated in Figure 6.7 and Figure 6.8, the overall distribution of responses on the two sentence types containing *ba* (SBIV and SBAV) are very similar. For sentences in which *ba* is omitted, responses on *SAV are also similar across groups (although a slightly higher level of uncertainty may be indicated by the fact that the proportion of 'tentative' rejections among the bilinguals is three times as high as among the monolinguals) The strongest divergence between the two groups is again found for SIV sentences. While monolinguals and bilinguals overall have similar proportions of overall acceptances and rejections of these sentences, in both cases, bilinguals

use tentative acceptance/rejections at a much higher rate than monolinguals, who prefer to categorically accept or reject. This result seems to suggest that bilinguals appear to be less certain than monolinguals of their grammaticality intuitions relating to SIV sentences.

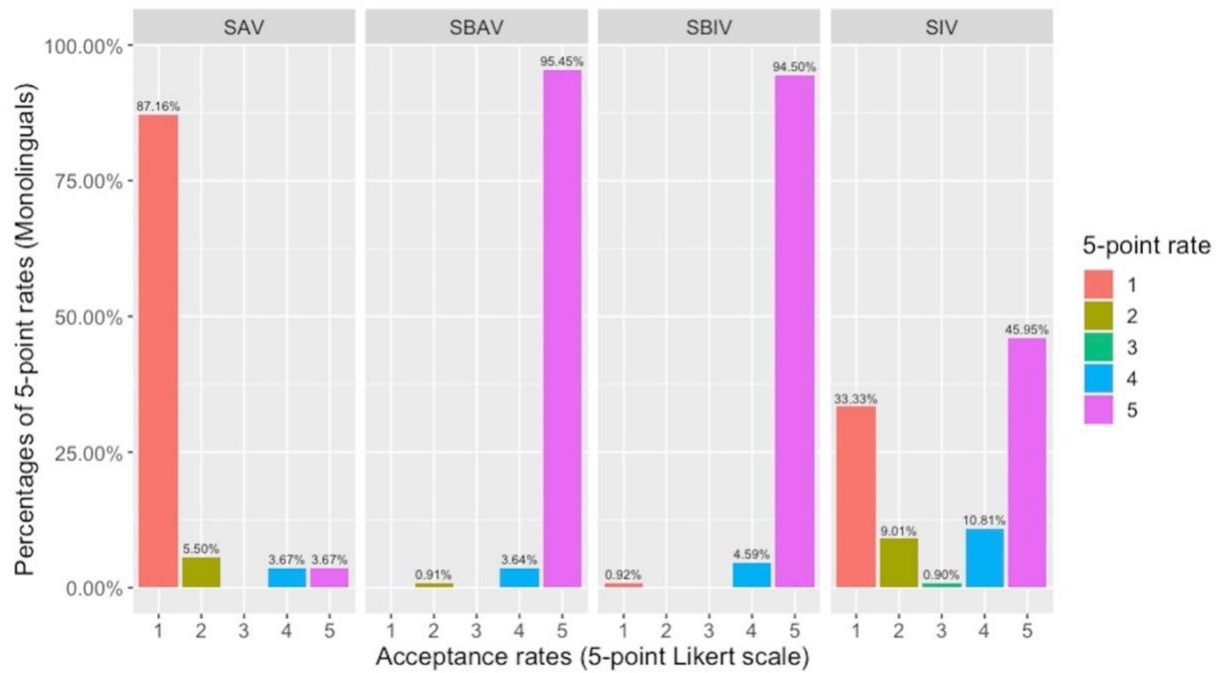


Figure 4.7 Percentages of acceptance rates (five-point Likert scale) for each sentence type by monolinguals

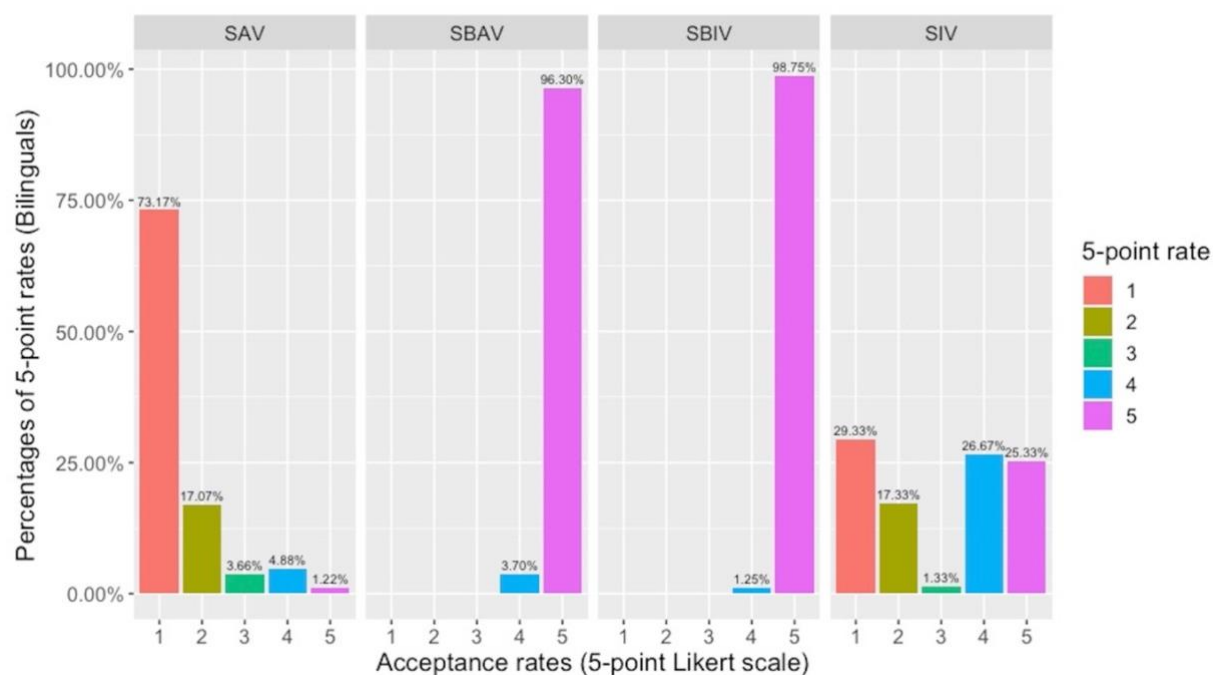


Figure 4.8 Percentages of acceptance rates (five-point Likert scale) for each sentence type by bilinguals

In order to assess this impression statistically, responses were categorized into three groups, “full accept (rate of 5)”, “full reject (rate of 1)” and “not very sure (rates of 2 to 4)”. A multinomial regression was run to assess the difference among participants in their judgement tendency on SIV sentences. A likelihood ratio chi-square ANOVA was conducted to estimate the model. The results indicate that there was indeed a significant effect of group on participants’ judgement on SIV sentences even in the untimed task, $\chi^2(2) = 14.17$, $p < .001$. As shown by post-hoc comparisons, bilinguals were less likely to fully accept SIV sentences ($b = -0.21$, $t(4) = -2.99$, $p = .04$) but more likely to respond within the “not very sure” category ($b = 0.25$, $t(4) = 3.56$, $p = .02$), as displayed in Figure 6.9.

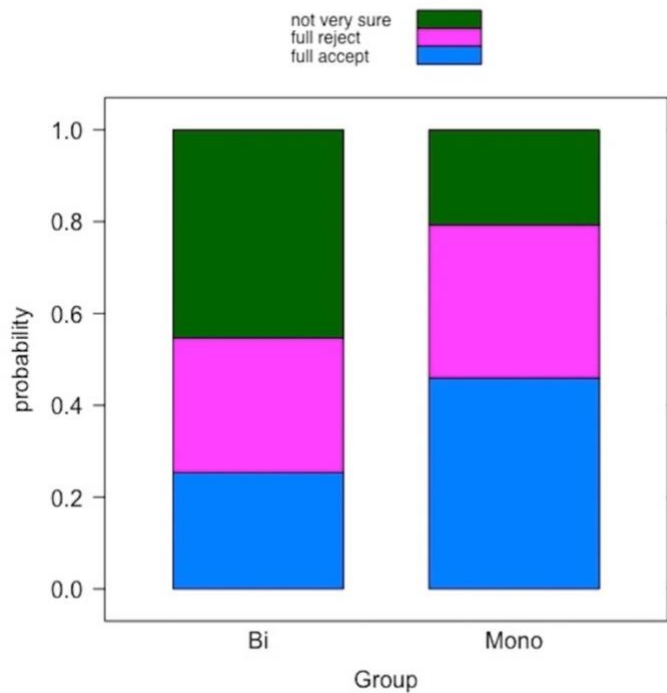


Figure 4.9 The effect plot of group difference among judgements on SIV sentences

The results discussed above can be interpreted as indicating that the difference found between bilinguals and monolinguals on the timed GJT is not limited to the performance level under time pressure, but also manifested in the untimed task.

We furthermore compared how the same SIV sentences were judged across the two tasks. As illustrated in Figure 6.10, those sentences that were fully accepted (rated “5”) in the untimed task were mainly judged as “grammatical” in the timed task, and those that were fully rejected (rated “1”) or received an intermediate judgement (rated from “2” to “4”) were mainly judged as “ungrammatical”. This tendency is further confirmed by a statistical regression: the tokens that were rated as “completely ungrammatical” ($b=-5.61$, $SE=1.81$, $z=-3.09$, $p=.002$) or “grammatical/ungrammatical but not sure” ($b=-3.59$, $SE=1.29$, $z=-2.77$, $p=.006$) in the untimed task were less likely to be judged as “grammatical” in the timed task by bilinguals, compared with tokens that were perceived as “completely grammatical”.

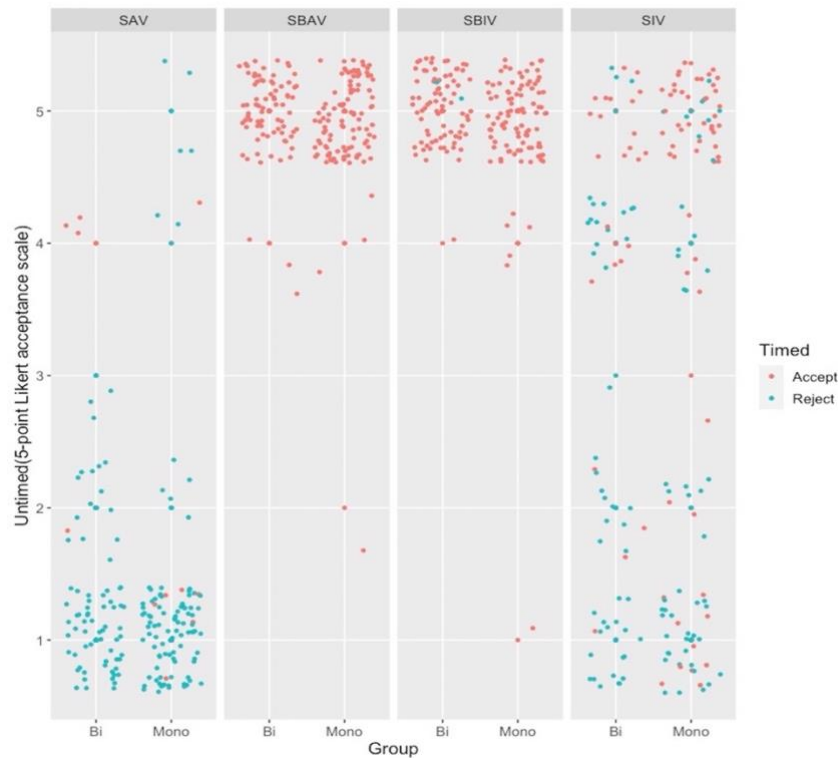


Figure 4.10 The scatterplot of judgement results across tasks for each sentence type between groups

With respect to the impact of extralinguistic factors, the correlation established between LoR and acceptance of SIV in the timed task was replicated for the scaled results on the untimed task ($b=-0.40$, $SE=0.17$, $t(17.60) = 2.43$, $p=.03$). We discuss possible reasons for this consistent impact of LoR below.

To summarize, the results of both timed and untimed tasks show that, overall, bilinguals exhibit significant differences in their acceptance tendency for sentences with *ba*-omission with inanimate objects (SIV) when compared with their monolingual counterparts. This tendency to reject SIV sentences cannot be ascribed to direct L2 transfer but seems to support internally-induced changes due to increased cognitive load and limited resources among

bilinguals as the primary source of attrition. However, attrition was not restricted to the timed task but also observed in the untimed situation, albeit in a more subtle form (fewer decisive judgements and higher levels of uncertainty). This result indicates that the changes observed in the L1 may not be purely processing-related as an outcome of limited resources and time pressure, but that even when given enough time to reflect, attriters may at the very least exhibit reduced confidence in their grammatical intuitions.

4. 9. Discussion

This study investigates the process and knowledge of Mandarin differential object marking (DOM) in a group of native speakers of Mandarin who came to the UK after puberty. In line with previous research, we asked to what extent the ability to determine whether DOM is used in a target-like way based on the integration of various features – animacy, specificity and word order – is resilient in a language contact situation, or whether it may be subject to language attrition (RQ1). In particular, we wanted to know whether this ability presents differently under time pressure than when given time to reflect (RQ2). With respect to RQ1, we hypothesized that any differences observed between an experimental population of immersed bilinguals and a “monolingual” control population might be due either to crosslinguistic influence or to language-internal changes. In the former case, we expected to see a preference for zero-marked sentences in those contexts where use of the DOM is optional (i.e., where the direct object is inanimate) among the bilinguals, since their L2 – English – does not have DOM. In the latter, we expected to see the opposite pattern, with a reduction in optionality and a preference for the use of *ba* with both animate and inanimate objects. With respect to RQ2, we hypothesized that changes due to an increased cognitive load for bilinguals would manifest themselves in greater deviances between groups under

time pressure as well as in longer RTs for bilinguals, with a recovery to normal pattern in the untimed condition, while changes that had reached the level of representation would be found in both conditions. Finally, we wanted to know how personal background factors (length of residence, age of arrival) would impact on the attritional process (RQ3).

The results presented above reveal two main findings. First, we did find differences between our attriters and our controls, in particular in the timed condition. Recall that the use of *ba* is obligatory in SOV sentences with animate subjects (SBAV but *SAV) and is optional for inanimates (SBIV and SIV are both grammatical). In those sentences where *ba* is optionally supplied (SBIV/SIV), monolinguals categorically accepted SBIV and allowed SIV at chance level, while bilinguals clearly dispreferred SIV sentences, which they only accepted in a third of the cases. This finding is different from previous studies, which have tended to find a higher acceptance of ungrammatical DOM omission, which our participants did not have: in both populations and conditions, acceptance of *SAV sentences was similarly low. What we seem to see, therefore, is a dispreference for optionality and a weakening of the animacy constraint, with a stronger preference for the presence of *ba* even in cases where monolinguals allow its omission. In other words, problems in the integration of information during sentence processing under time constraints appears to make speakers rely more on syntactic processes and favour the overtly-marked case than on the semantic information of animacy. This finding licenses two important conclusions, which support assumptions often proposed in research on bilinguals: first that bilinguals are assumed to be less efficient in sentence processing; and secondly, that the processing of zero-marked case is assumed to be cognitively more demanding than that of overtly marked case as a result of integrating information across syntactic and semantic domains.

These findings therefore indicate a process of internal simplification (removal of optionality) rather than CLI (preference for DOM omission under the influence of L2 English). Such a decrease in ambiguity is in line with the expectation that increased pressure on cognitive resources in the bilingual context (due to the need to manage two competing systems and suppress the unwanted language) will lead to greater efficiency in processing, for example through the elimination of competing but equivalent structures in the L1. This assumption is further supported by the differential findings across the two conditions (timed/untimed): bilinguals not only reject the grammatical structures SIV at a higher rate than monolinguals, they also take much longer in those cases where they accept them and, with time pressure removed, they are less certain about their judgements. Having a “take it or leave it” grammatical option appears to be a costly operation that can be removed without any detriment to the overall system (not leading to any ungrammatical or unacceptable contexts of use, unlike the omission of DOM in contexts where it is needed) and thus seems to be one of the luxuries that are first in line for efficiency savings: If L2 transfer from English were at the root of changes in attriters’ DOM, the divergence would be associated with the remapping of the accusative case to word order instead of particular morpholexical terms, and optional DOM suppliance would become the preferred variant; if internally-induced changes are the potential causes of attrition, the divergence would be associated with decreasing acceptance with structures that are cognitively more demanding during processing.

The second main finding is that the divergence between groups extends to both timed and untimed tasks, indicating that the attrition observed in the bilingual group is not restricted to online performance as a result of cognitive overload induced by timing constraints. In particular, it is important to observe that the bilinguals are less confident in their judgements

in both accepting and rejecting the same *ba*-omitted sentences that are rejected under time pressure, where the grammaticality judgement is dichotomous. It seems that the ability to integrate semantic (animacy) and morpho-syntactic (case, word order) information may be attenuated even in those cases where they are given time to reflect. In this context, it is important to point out that the dichotomized responses (i.e., conflating both categorical and uncertain rejects and accepts) showed no difference between monolinguals and bilinguals, but that a look at the full spectrum of responses showed weaker confidence in their intuition among the bilinguals. In other words, while they preserve the ability to determine whether *ba*-omission is grammatically correct, they are less able to apply it under pressure (time constraint) and have lower confidence that their judgement is correct.

Lastly, we would like to address the unexpected positive correlation between LoR and the tendency to accept SIV: speakers with longer periods of residence in the UK were closer to the native norm in accepting as grammatical without-*ba* sentences in contexts where it is grammatical to omit it. This finding appears counterintuitive at first glance, particularly given the widespread notion that language attrition is a very slow process, taking at least several decades. This assumption is partially based on a folk-linguistic understanding of the decline of language skills and partly on some initial findings reported by Clyne and de Bot (1994) and has led to most studies of attrition excluding participants with LoRs of less than 10 years, but very rarely finding any significant effects of LoR (see overview in Schmid 2019). The second author of this paper is partly to blame for this bias, as she issued a recommendation to this effect (Schmid 2011:111) which she herself recently referred to as “well-meaning but misguided” (Schmid, 2019:292) in that it had the regrettable effect of preventing insights into the earlier stages of the attrition process.

Findings such as the one reported here suggest that the first years after migration are the period during which attrition is most productive and most dynamic, and this is in line with the results reported in the relatively few other studies looking at the early years of the immersion period (see the overview in Schmid 2019). This suggests that L1 attrition phenomena may be not so much the outcome of reduced accessibility due to very long periods of non-use and more problems related to language switching and inhibition of an L2. It has been suggested that high levels of effort at acquiring an L2 reduces the cognitive resources available for maintaining the L1 (Herdina & Jessner 2002), and this may be partly at the root of such findings. Another possible explanation is that speakers with relatively little experience of using an L2 have to expend more effort at inhibiting their stronger and much more accessible L1, making it harder to re-activate subsequently (e.g. Paradis 2007). Both of these phenomena are likely to be more pronounced in the early stages of migration, where speakers are quickly gaining proficiency, experience and confidence in using the language of the environment. That would suggest that, as soon as the bilingual or multilingual proficiency levels become more balanced and L1 is no longer so overwhelmingly dominant, the necessary effort to inhibit it is decreased, as is the effort necessary to reactivate it. Future research should look further into this phenomenon, taking into account phenomena such as processing effort, individual cognitive capacity (such as reaction speed and working memory), asymmetric switch costs and other factors that are beyond the scope of the present study.

4. 10. Conclusion

The current study examines L1 attrition in the domain of Mandarin DOM in a group of Mandarin-English bilinguals through a timed and an untimed grammaticality judgement task.

We investigated sentence contexts in which the use of the Mandarin differential object marker *ba* is obligatory (that is, SOV sentences where the object is animate) and contexts where it is optional (SOV sentences with inanimate objects). Our findings show that bilinguals are less likely to accept optional DOM omission, which rules out direct L2 transfer from English as the potential cause of DOM attrition for our bilingual participants. We interpret our findings as evidence for less efficient processing among bilinguals leading to difficulties in the integration of semantic (animacy) information and syntactic processing. In untimed tasks, while bilinguals accept optional DOM omissions at broadly the same level as monolinguals, the scaled responses show lower confidence in both “accept” and “reject” judgements among the bilinguals. This result suggests that the group difference cannot solely be ascribed to performance attrition due to insufficient computational resources under time pressure, but that they overall do not trust their grammatical intuitions at the same level as monolinguals. The fact that, once the judgements are dichotomized, collapsing categorical and tentative accepts vs. rejects, the group differences disappear seems to suggest that the underlying grammatical knowledge which underpins these judgements remains unimpaired.

Finally, we would like to acknowledge a range of limitations of the present study. First, it was puzzling that DOM omission in what the literature has identified as “optional” contexts was only accepted at chance levels even in the monolingual group. A possible explanation for this is suggested by Li & Thompson (1981) who argue that, in addition to the semantic (animacy) constraint on *ba* omission, there is a further pragmatic one. According to this account, SOV sentences with inanimate objects without *ba* are pragmatically restricted to situations in which the speaker provides information counter to the expectation of the listener. While this suggestion is not supported in the other treatments of *ba* as DOM reviewed above, future studies may want to include a contextual condition in addition to the

semantic and syntactic constraints implemented here. Moreover, although the current study assumes that the L2 transfer would lead to a higher acceptance of DOM omission among other populations (e.g. early bilinguals), no experimental group was included in the current study to verify this assumption. Therefore, further research could examine populations (e.g. heritage speakers or L2 learners) who are expected to be more vulnerable to L2 influence, with respect to the use and knowledge of Mandarin DOM.

Chapter 5. Perception of ba-construction as obligatory word order in late adult bilingual speakers

5.1. Introduction

Cross-linguistic transfer in L1 attrition

Bilingualism research has shown that languages are simultaneously co-activated, even if the task involves just one of the languages (see reviews in (Kroll, Bobb & Hoshino, 2014).

Against this background, transfer effects between the L1 and the L2 are widely investigated.

The majority of previous studies emphasises how the L1 may interact with the late acquired L2 but not the other way round (see reviews in Bai & Qin, 2018). More recently, a growing body of research has observed the permeability of L1 due to L2 exposure (see reviews in Yilmaz & Schmid, 2018).

L2 influence and transfer in bilingual lexicon and phonology have been well-documented in numerous behavioural and neurocognitive studies (e.g., Baus, Costa & Carreiras 2013; Chang, 2012). Contrastingly, the number of studies investigating the transfer effects in morphosyntax remains limited. Among the few studies on bilingual morphosyntax, one of the relatively common findings is that the L2 transfer effect is far less pervasively detected when L2 learning occurs postpuberty (see reviews in Hicks & Domínguez, 2019). This seems to lend credence to the view that L1 morphosyntax remains stabilised and deeply entrenched once fully acquired, thus being immune to the interference of L2. As a case in point, a study conducted by Bergmann and colleagues (2016) investigated the late acquired L2 (English)

influence on the L1 in a group of German-speakers who had been extensively immersed in an English-speaking environment. Although the results of this study illustrated non-native-like L1 pronunciation and reduced speech fluency in these German attriters, no evidence was found for the changes in grammatical gender violation in event-related potential (ERP) results.

On the other hand, there is indeed some research, albeit limited, which suggests that L1 morphosyntax is possibly subject to changes due to L2 influence and transfer in adult bilingualism. For instance, Pavlenko (2000) reviewed studies of the 1990s and summarised that L1 sentence structure is noticeably subject to restructuring under the influence of L2, as exemplified by the studies mentioned below:

Extensions of L2 English rules for word order in L1 Hungarian and German (Seliger & Vago, 1991)

Influence from L2 Swedish on the placement of adverbials in L1 English and on possessive clitics in L1 Finnish (Boyd & Andersson, 1991)

Influence from L2 Norwegian on post-positioning of possessives in L1 Serbo-Croatian (Skadden, 1999)

Influence from L2 English on sentence structure in various L1s (Stoessel, 2000)

More recent studies investigating the processing of relative clause attachment have also reached similar conclusions. For example, an eye-tracking study by Dussias and Sagarra

(2007) tested attachment preferences in Spanish-English bilinguals and found that bilingual speakers with extensive immersion experience tend to employ English-like attachment preference when reading in Spanish. An effect of such kind was also replicated in an up-to-date study carried out by Kasparian and Steinhauer (2020), who tested the perception of four types of relative clauses in a group of Italian-English bilingual speakers. Two of the presented relative clauses are ungrammatical in English but grammatical in Italian. The rationale of this study was that preponderance exposure to English might cause Italian attriters to perceive these structures as anomalous and less acceptable than their monolingual counterparts. According to both behavioural and ERP results, the Italian attriters perceived a grammatical sentence in their mother tongue as ungrammatical because it violates the rules in L2. This indicates that the effect of predominant exposure to L2 could be so overbearing that it renders a grammatical sentence in L1 perceived ungrammatical by the bilingual speakers because it is ungrammatical in L2.

Considering the inconsistency in the L2 influence on L1 morphosyntax, Kasparian and Steinhauer (2020) claim their findings show that attrition in L1 grammar among late adult bilinguals is possibly attributed to L2 influence and that the reason why other studies have not found any changes - for example, the study focusing on German grammatical gender - is because their bilinguals' L2 was English, which lacks a grammatical gender system for lexical nouns that could interfere with the German grammatical gender system. Put differently, selecting structures which would create strong competition between L1 and L2 is a critical condition to be considered to enhance the likelihood of detecting attrition effects in adult L1 morphosyntax.

The current research aims to determine whether this type of L2 effect can be extended to a different morphosyntactic property in a group of Chinese adult bilingual speakers studying and living in the UK. The morphosyntactic target property is *ba*-construction. The word order of the *ba*-construction is S-*ba*-O-V in syntax. The direct object follows the marker *ba* and comes before the verb. In Mandarin, SVO is the canonical word order, whereas *ba*-construction has been claimed as the obligatory form if the verb has two post-verbal noun phrases (NPs), typically when the second is a locative (Liu, 2003), as exemplified in 7.1. The SVO alternation form is exemplified in 7.1b, which has been claimed as ungrammatical; on the other hand, it has a word-for-word translation equivalent in English. Both grammatical *ba*-construction (SBOVP) and its ungrammatical corresponding SVO construction (*SVOP) were presented to the participants. The rationale is that Chinese speakers with English immersion experience might perceive the ungrammatical SVO structure as more acceptable than their counterparts from the homeland. It is likely that strong competition would arise between speakers' L1 (Mandarin) and L2 (English) as the word-for-word translation equivalent of the ungrammatical SVO structure is, in fact, grammatical in English. This setting is expected to maximize the probability of detecting changes in L1 induced by the interference of L2.

7.1

a. 我 把 那盆花 摆在阳台上 了

I ba that potted flower place on the balcony

b. *我 摆 那盆花 在阳台上 了

I place that potted flower on the balcony

(I placed that potted flower on the balcony.)

The obligatory use of ba construction

The ba-construction is a language-specific structure in Mandarin. Similar to English, a canonical Mandarin sentence takes the SVO word order, with subject going first, verb second, and the object third; while in a ba-construction, the object is placed at the preverbal position and marked by the marker ba, forming a Subject ba-Object Verb structure. In addition to the non-canonical word order in syntax, bare verbs are also prohibited in ba constructions. In other words, the verb should be accompanied by an extra element. Thus, one of the most typical forms of ba-construction in Mandarin consists of a subject (S, optional), the morpheme ba, a noun phrase (NP) as the direct object, a verb (V), and an X element, as shown in 7.2. The X element should be either an aspect marker (e.g., Le, "complete"), a resultative complement (e.g., an adjective), or a locative prepositional phrase (Liu, 1997; Xu, 2012; Yang, 2020).

7.2

Subject	+ba-Object	+Verb	+X
Ta	ba chuanghu	da	po le。

(He hit and broke the window)

(Su, 2017)

As shown in 7.3, a ba-construction sentence can be optional and equivalent in meaning to its SVO counterpart. In the case of the optional variation of the two largely equivalent constructions, speakers' preference for ba construction or SVO is mainly driven by semantic

or/and pragmatic constraints. In some cases, nevertheless, a ba-construction is claimed to be obligatorily used.

7.3

a. 他吃了那个苹果 [SVO sentence]

He ate that apple

(He ate that apple.)

b. 他把那个苹果吃了 [ba sentence]

He *ba* that apple ate

(He ate that apple.)

Several assumptions and accounts have been put forward upon the issue of obligatory conditions when a ba-construction is warranted. Lv (1982) exemplified sentences in which the ba-construction is obligatorily used. In sentence 7.4a, as the verb is closely connected to the element followed, the direct object is not allowed to be inserted in between. In this case, the direct object can only be moved to the preverbal position. This statement is further elaborated by Wang (1987), who proposes the internal object constraint on the obligatory use of ba-construction. Wang refers to the element that follows the verb as "internal object." The internal object forms a semantic unit with the verb. As the internal object already fills the object position inside the semantic unit, the direct object is forced to be placed at the preverbal position, and the ba-construction is warranted.

7.4a.

他把银子 揣在怀里, 掉转身走了 SBOVP

He ba the silver carried in his arms, turned around walked away.

*他 揣 银子 在怀里, 掉转身走了 *SVOP

He carried the silver in his arms, turned around and walked away.

(he carried the silver in his arms, and turned around and walked away)

(Lv, 1982).

7.4b.

我等了 他 三个小时

I waited him three hours

(I waited for him for three hours)

(Li, 2011)

Other researchers propose the postverbal constraint, which claims a general tendency in Mandarin Chinese that the number of constituents that may occur at the postverbal position is restricted to at most one. Thus, if another constituent exists after the verb, then the direct object is generally moved to the position before the verb (e.g., Huang, 1984; Li, 2001). Following this, postverbal constraint seems to properly account for the obligatory usage of ba-construction. However, exceptions have been reported to the above arguments (e.g., Zhang, 2010; Li, 2011). As exemplified in 7.4b, both the direct object 他 (he) and the complement of duration 三个小时(three hours) are placed after the verb. This suggests that not all elements may take the postverbal position and kick away the direct verb, which seems against the postverbal constraint.

In the 1950s, Lu (1955, as cited in Xu, 2012) noticed the distinction between optional and obligatory usage of ba-construction. Lu listed a variety of elements that might drive the

obligatory usage of a ba-construction. The one that seems to agree most is when the postverbal element is a complement of place and forms with the verb as a directional or locational verb phrase. Take sentence 7.4a as the example again. The complement of place (in his arms) closely follows the verb and forms a locational phrase. This locational verb phrase does not allow the direct object (the silver) to be inserted in between. In this case, the corresponding SVO order is claimed ungrammatical. Instead, the ba-construction is warranted to express the displacement meaning. This claim seems to be supported by findings from some empirical and corpus studies on the optimal conditions for using ba-construction. These studies report that ba-construction is most frequently used in expressing displacement meaning (e.g., Cui, 2003; Wen, 2010; Lin, 2017).

Cross-linguistic influence in the obligatory use of ba construction,

CLI in L2 acquisition

Though there is a growing number of studies on the acquisition of the ba-construction by adult learners of Mandarin as a foreign language, the amount of research that focuses on the obligatory usage of this phenomenon is still limited. Zhang (2002) examined the production and grammatical awareness of ba-construction ending with the directional complement by a group of L1 English learners of Chinese via three different tasks: grammaticality judgement, translation, and picture cue production. Following the analysis of results, Zhang concludes that directional complements are relatively later acquired than other properties of ba-construction, such as the non-canonical OV word order or the usage of the correct verb. Even after the learners are consciously aware of particular usage of directional complements in ba-construction, it is still difficult for them to understand when a ba-construction sentence should be used obligatorily and its corresponding SVO sentence should be rejected. Similar

results were reported in the studies of Wen (2006, 2010), who first investigated the acquisition sequence of three different linguistic properties of Mandarin and then further explored the development of obligatory usage of ba-construction among English speakers who learned Mandarin as L2. According to Wen's findings, ba-construction was acquired relatively later compared with the other two linguistic properties examined. Moreover, speakers at elementary proficiency levels tended to avoid using ba-construction even when it is obligatorily required. After a follow-up interview of the informants, Wen made a similar conclusion to that in Zhang (2002) that these learners did not completely acquire the constraints when the construction is restricted to a ba-construction sentence; thus, they took ba-construction as a syntactic alternation to SVO construction and preferred the latter form instead.

As summarized above, findings in Zhang (2002) and Wen (2006, 2010) suggest a lack of awareness of obligatory constraints for ba constructions and avoidance of this structure among L2 learners. Both pieces of research attributed the low production of ba-construction to the incomplete acquisition or non-automatic competence. However, they did not consider how speakers' L1 English might influence their preference on the usage of ba-construction or its SVO alternation, especially when the environmental majority language for speakers is English. Unlike Zhang's and Wen's research, which focused on the production, a later study by Xu in 2012 investigated learners' awareness of the obligatory usage of ba-construction. Xu examined a group of L2 Chinese learners' grammatical perception of both obligatory and optional usage of ba-construction via a paired grammaticality judgement task. At this task, a ba-construction sentence and its corresponding SVO construction sentence were presented to the participants, and participants were asked to decide which sentence form is grammatical ("ba only" or "SVO only") or both are grammatical ("both"). According to Xu, results

obtained from the task indicate that the L2 learners did develop some awareness of the special usage of optional and obligatory ba-construction, but this kind of awareness has not reached native-like level yet. In addition, results show that a large number of L2 learners across proficiency levels failed to reject the ungrammatical SVO sentences even when the ba-sentences are obligatory. Following analysis of these results, Xu explains that it could be due to the negative transfer from learners' native language English, in which the word-for-word translation equivalent of the *SVOP structure is grammatical. A very recent study by Yang (2020) also shows supporting evidence for language transfer effect on the production of the ba-construction to express locational displacement. Yang's research examined Cantonese learners' acquisition of Mandarin ba-construction. Compared with learners from other language backgrounds, Cantonese learners produced many more ba-construction sentences and were aware of constraints on the ba-construction. This difference is then attributed to the existence of the zoeng construction in Cantonese, which shares a very similar syntactic structure with the ba-construction, as a positive effect on the obligatory usage of ba-construction from learners' native language.

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CLI in heritage language

Reduced production of ba-construction is also reported in the research targeting heritage speakers in contact with the societal majority language English. Polinsky and colleagues (2010) used an elicited production task to elicit displacement structures from both adult English dominant heritage of Mandarin speakers in the US and their baseline counterparts (Mandarin dominant) in their homeland. The baseline speakers tended to use the ba-construction when describing spatial displacement, while the heritage speakers underused it and employed multiple short utterances in canonical SVO order to express the same meaning

instead. Considering that English uses canonical SVO sentences in displacement context, the authors suggest that cross-linguistic influence from their dominant language English is implicated in the heritage speakers' poor control of ba-construction. Echoing with the findings in Polinsky et al. (2010), Mai and colleagues (2020) reported that a group of school-age heritage children in the UK used fewer ba-utterances as well as a smaller percentage of ba-utterances in a narrative task compared with their parents who had arrived in the UK in their adulthood.

Furthermore, according to Mai et al. (2020), though these heritage speakers could produce some ba-utterances, they showed over-reliance on adopting overtly-marked NPs in the direct object position and instantiated a smaller set of VPs, such as directional/locational VPs, than their input baseline. The authors then conclude that these school-age heritage speakers acquired the basic structure of ba-construction but instantiated a limited set of NPs and VPs that have cross-linguistic equivalents in English. This divergent performance in heritage speakers is considered as a simplification of ba-construction. Mai and colleagues claim that the simplified ba-construction is an optimized structure created in response to the pressure of reduced input and cross-linguistic influence from the dominant language English. What is related to the current study is that in Mai et al. (2020), cross-linguistic influence from English seems to facilitate the usage of ba-utterances ending with directional/locational VP as there are phrasal equivalents in English (e.g., “扔在地上‘throw onto the floor’”(p.22)).

Nevertheless, the positive effect from English reported in Mai et al. (2020) is based on the premise that heritage speakers have already acquired the basic syntactic structure of ba-construction and correctly apply it to expressing spatial displacement during the narration task. Thus, it is interesting to ask if this kind of cross-linguistic influence from English could

be extended to the whole sentential structure and make speakers produce or accept *SVOP sentences that have word-for-word equivalents in English. Unfortunately, Mai et al. (2020) did not report details of utterances used by their heritage speakers as a replacement for ba-construction. Thus it is unknown whether the language transfer at the sentence level did not occur or was just not reported in these heritage speakers.

CLI in L1 attrition

As reviewed above, findings from research focusing on heritage speakers and L2 learners have consistently shown that these bilingual speakers tend to underuse the ba-construction while adhering to the SVO word order or accepting anomalous SVO sentences to express displacement meanings contrasting with the Mandarin baseline speakers as a possible result of cross-linguistic influence from the societal majority language English. Nevertheless, there is no research on ba-construction that investigates language transfer effect in late adult bilingual speakers. The study by Mai and colleagues (2020), as mentioned above, collected narrative data from first-generation adults but did not compare the data with the baseline performance. It is unknown if these first-generation adults exhibited norm-divergent performance in expressing displacement meanings. The most related and informative research to this issue is a study investigating cross-linguistic influence on zoeng-construction in Cantonese by Mai and colleagues (2018). zoeng-construction in Cantonese can be considered equivalent to ba-construction in Mandarin despite subtle cross-linguistic differences in their semantic and pragmatic constraints (Yang, 2020). Mai and colleagues explore the cross-linguistic influence on using zeong construction in displacement contexts in Cantonese heritage speakers and emigre speakers by an elicited oral production task modeled on the fruit cart experiment (Polinsky et al., 2010) and used to elicit displacement instructions

in Cantonese. As introduced in Mai et al. (2018), Cantonese can choose between the canonical SVO word order (SVOP) and noncanonical forms such as topicalization (OSVP) and zoeng construction (S-zoeng-O-V-P) to express displacement meanings. Like ba-construction, zoeng-construction, out of all structure options, is perfectly natural in expressing displacement meanings. Given the cross-linguistic differences in expressing displacement, the authors predicted that if there is cross-linguistic influence from English to Cantonese, the English dominant groups (heritage and emigre speakers) should favour the canonical SVO (SVOP) and topicalization OV structures, which have equivalents in English, over zoeng-construction, which has no equivalent in English. This prediction is borne out in their results that the baseline native Cantonese speakers in Hong Kong preferred the zoeng-construction whereas the heritage speakers produced statistically more canonical SVO utterances than the other forms and emigre speakers made equal use of the three structures. Following these findings, the authors propose a possible mechanism underlying the norm-divergence found in their bilingual speakers. It is likely that English, at the time of testing, influences Cantonese by reinforcing the mental representation of the SOV structures and keeping them more accessible than the Cantonese-specific zoeng-construction in production tasks.

To conclude, existing experimental studies provide evidence for norm-divergent behaviours on ba-construction to express displacement by L2 learners and heritage speakers of Mandarin under the influence of English. These findings suggest that expressions of displacement might be a vulnerable phenomenon to cross-linguistic influence from English: ba-construction, which has been claimed to be obligatorily used in expressing displacement, has no equivalent in English, whereas its ungrammatical corresponding SVO structure has a word-for-word translation equivalent in English. If this is indeed the case, will this kind of

cross-linguistic influence from English also be detected in late adult bilingual speakers with English immersion experience at the time of testing? Unfortunately, research focusing on late bilingual speakers is scarce, and the only one related is the study by Mai et al. (2018), which focused on *zoeng*-construction in L1 Cantonese speakers.

Thus, the current study investigates if the norm-divergent performance in expressions of displacement found in previous studies (as reviewed above) can also reveal itself in a group of late adult Mandarin-English bilingual speakers under the effect of the English immersion experience.

5 .2. The current study and research questions

The critical research question in the present study is whether any attrition effect due to cross-linguistic influence from English can be detected in the awareness of the obligatory use of *ba*-construction to express displacement among a group of Chinese-English bilingual speakers.

The hypothesis to this question is straightforward. If the cross-linguistic influence from English comes into play in the late adult bilingual speakers, it is predicted that they will exhibit norm-divergent performance in the awareness of structures encoding expressing displacement. Specifically, the "bilingual" Mandarin group is expected to more likely accept the *SVOP sentences as a result of exposure to English, in which the word-for-word translation equivalent of *SVOP is perfectly grammatical.

It is worth noting here that in Xu's empirical study (2012), variability was also found in the native baseline speakers of Mandarin regarding the awareness of the obligatory usage of *ba*-construction. Some native Chinese speakers did not reject all *SVOP sentences when the *ba*-

construction is claimed to be obligatorily required. This result is interpreted as evidence supporting the existence of a hierarchy of "obligatory" among ba-sentences that have always been considered "obligatory" to express spatial displacement meanings. In other words, "less 'obligatory' indicates more reliance on the contexts" (p. 97), indicating a more complex condition that regulates the obligatory usage of ba-construction. On the other side, less "obligatory" in ba-construction indicates the "ungrammaticality" of the corresponding SVO structure relies more on the contextual information. A possible explanation for this phenomenon is that in certain circumstances, contextual information factors can rescue utterances that violate grammatical rules or syntactic constraints and render those strings more acceptable and felicitous (see more discussion in Xie, Huang& Lin, 2020). Given this discourse constraint in expressions of displacement, it is understandable why L2 learners who have acquired the basic structure of ba-construction often showed poor awareness of conditions for obligatory and optional usage of ba-construction, as reported in Zhang (2002) and Wen (2006, 2010).

In brief, the acceptability of the "ungrammatical" *SVOP structure is licensed by the contextual information, and their grammaticality disadvantages could be leveled out under specific contexts. If this is the case, we expect similar variability in rejecting SVO word order sentences in expressing displacement reported in Xu (2012) will also reveal itself in this study.

In view of the controversy in the "obligatory" usage of ba-construction, speakers' awareness of the obligatory and optional presence of ba as DOM is also tested in the current study. Given previous findings on ba as DOM (Subject-ba-Object_{animate}-Verb, SBAV-*SAV;

Subject-ba-Object_{inanimamte}-Verb, SBIV-SIV) (see more discussion in Chapter 6), speakers' behaviours in this property can be used as the baseline performance under two conditions:

Condition 1: being aware of the obligatory presence of ba as DOM in sentence-pair "SBAV-*SAV," when the basic syntactic structure of ba -construction (the presence of ba as DOM) is agreed to be grammatical and the alternative structure (the omission of ba as DOM) to be ungrammatical

Condition 2: being aware of the optional presence of ba as DOM in sentence-pair "SBIV-SIV," when the basic syntactic structure of ba- construction (the presence of ba as DOM) is agreed to be grammatical and the alternative structure (the omission of ba as DOM) is optionally accepted (where variability exists).

By comparing the control group's performance in the target sentence-pair "SBOVP-*SVOP" with the other two baseline sentence pairs, we can find the answer to the controversial issue of "obligatory" versus "hierarchy of obligatory" regarding the usage of ba-construction to express displacement meanings.

To conclude, three main research questions are investigated in the current study:

- 1) Does the native baseline group of L1 Mandarin speakers perfectly reject all *SVOP sentences or exhibit variability in the acceptability of *SVOP sentences?

- 2) Does the late Mandarin-English bilingual group show divergence on the awareness of expressions of displacement (ba-construction versus *SVOP construction) compared with the native baseline group?
- 3) What are the potential triggers if the divergence between groups exists?

5.3. Method

Participants

Mandarin “controls” (n=35): L1 Mandarin

The Mandarin control group consists of 35 native Mandarin speakers in their homeland, China. They were recruited via participant recruitment ads posted on Weibo (social media platform) and Wenjuanxing (online survey platform) in mainland China. All participants have little (no more than one month) or no overseas experience, and they reported not using English at work/school or in daily life. The mean age of the control group at the time of testing is 25.46 years ($sd=3.53$, range = 20-30). The participants were asked to answer a list of demographic questions and self-rate their language proficiency as well as language use frequency on 10-point scales. Scores from the 10-point scales were calculated as shown in Table 7.1.

Mandarin “bilinguals” (n=38): L1 Mandarin, L2 English

A total of 51 Mandarin-English bilingual participants were recruited via recruitment ads emailed to Chinese students at the University of Essex and ads posted on a British Chinese community website. Data from 13 participants who reported experience of returning to China within the past six months were excluded in the analysis in case the returning experience might affect their language performance (Chamorro et al., 2016). Finally, the bilingual group comprises 38 Mandarin native speakers studying and working in the UK with a mean age of 23.89 years ($sd=3.38$, range = 20-30) at the time of testing. They arrived in the UK between the ages of 16 and 29 ($sd=2.96$, $M=22.21$) and had lived here for an average of 19.01 months ($sd=19.41$, range= 5-77) at the time of testing. Again, all participants in this group were asked to answer questions related to their demographic background and self-rate the language proficiency and the frequency of use for both languages on 10-point scales. The scores of self-rating scales were calculated, and a Kruskal Wallis test illustrates that bilingual participants self-rated their L1 Mandarin significantly higher than their L2 English ($H(1) = 42.83$, $p < .001$). In terms of the frequency of language use, bilingual participants reported using both languages in daily life, with significantly higher self-rated scores of frequency in using English than Mandarin at work/school ($H(1) = 11.42$, $P < .001$) while the other way round out of work/school ($H(1) = 41.80$, $P < .001$) suggested by Kruskal Wallis test.

Table 7.1 shows a summary of self-rate scores on language proficiency and frequency of language use. As for the group difference in the language proficiency, interestingly, a Wilcoxon signed-rank test shows that the native “control” group self-rated their proficiency in Mandarin significantly lower than the “bilingual” group ($p < .001$). A possible explanation for this is that speakers may be more likely to assess their own proficiency against the reference of their own cohort in self-evaluations instead of a shared nativeness model

(Schmid, 2014). Despite this, there is research indicating that self-ratings do provide a good measure of proficiency in the bilingual populations (see details in Schmid, 2014). Taken together, what is relevant for the current study is that bilingual participants in the current study self-rated their L1 significantly higher than their L2, suggesting higher proficiency in their L1 Mandarin than L2 English among these bilingual participants

Group	Self-rate proficiency [0-10]		Frequency of language use at work/school [0-10]		Frequency of language use off work/school [0-10]	
	Mandarin	English	Mandarin	English	Mandarin	English
UK-group	8.45 (0.83) [7-10]	6.32 (1.07) [5-9]	4.16 (3.51) [0-10]	6.95 (2.37) [0-10]	7.47 (2.14) [0-10]	1.50 (2.83) [0-10]
CH-group	7.71 (0.88) [6-10]	4.91 (1.35) [2-8]	8.83 (1.36) [4-10]	0	6.14 (3.42) [0-10]	0

Table 5.1 Summary of self-rated proficiency and fluency between groups

Materials

This study employed an online questionnaire to measure participants' awareness of grammaticality on the targeted sentence pair: SBOVP-*SVOP and SBOV-SOV. The questionnaire consists of two parts. Part I contains a list of questions related to their

demographic background. In some questions, participants need to fill in related information, and in some questions, they need to self-rate their proficiency or frequency of language on a 10-point scale, as shown in 7.5.

7.5

Do you have any overseas experience? If yes, please indicate:

e.g., UK, traveling, 2 weeks

What language do you use at work/school?

Language used	Frequency (1-10)
e.g., Mandarin	10

The second part of the questionnaire is the paired grammaticality judgement task. This task comprises a set of 58 multiple choice questions, each question containing a pair of sentences followed by five options, as exemplified in 7.6. The 58 questions are realized in three main conditions, as summarized in Table 7.2. Each participant also saw 24 filler sentence pairs.

Both task format and sentence items of SBOVP-*SVOP are borrowed and adapted from Xu (2012), and the sentence items of SBOV-SOV are adapted from the study reported in Chapter 6. The sentence-pair grammaticality judgement task is set to maximize the categorical difference in grammaticality judgement. Participants become relatively lenient when unsure about a given sentence, especially when these sentences are presented in isolation (Schütze, 2019). All questions were pseudorandomly listed on the questionnaire. At the beginning of the second part, instruction was provided in written Mandarin, asking participants to make judgements according to the grammaticality of the following sentences. They were also told

that there were no incorrect answers to these questions, and they only needed to make the decision based on their own perception.

Sentence pair type	Number of multiple choice questions
SBVOP-*SVOP (displacement events)	16
SBAV-*SAV (DOM)	16
SBIV-SIV (DOM)	16
fillers	24

Table 5.2 Summary of sentence pairs used in task

7.6

【A】 我 把 那盆花 摆 在阳台上了

(I ba that potted flower place on the balcony)

【B】 我 摆 那盆花 在阳台上了

(I place that potted flower on the balcony)

- o 只有句子 **【A】** 没有语病 (only sentence A is grammatical)
- o 句子 **【A】** 更正确一些 (sentence A is more grammatical)
- o 两个句子都没有语病 (both sentences are grammatical)
- o 句子 **【B】** 更正确一些 (sentence B is more grammatical)
- o 只有句子 **【B】** 没有语病 (only sentence B is grammatical)

Internal reliability

Cronbach's alpha was computed for all types of sentence pairs as a measure used to assess the reliability or the internal consistency of the test items. The results of all tests within both experimental and control groups are presented in Table 7.3.

Sentence pair type	Cronbach's alpha	
	UK-group	CH-group
SBVOP-*SVOP (16 items)	0.93	0.95
SBAV-*SAV (16 items)	0.86	0.74
SBIV-SIV (16 items)	0.91	0.95

Table 5.3 Summary of internal reliability. Cronbach's Alpha Level of Reliability: > 0.7 refers to acceptable internal consistency; >0.8 refers to good; >0.9 refers to excellent (Cortina, 1993)

Procedure

Participants were asked to click on the web link to the study questionnaire once they decided to take part in the study. They first provided their consent to take part. Following that, instructions were given in written Mandarin. Responses were untimed, and participants were informed that they could complete the questionnaire at their own pace.

5.4. Data analysis

A total of 1824 responses from the bilingual participants(N=39) and 1680 responses from the control participants(N=35) to the multiple-choice questions were analysed to compare linguistic performance between groups. The response variable has five levels, namely “Only A sentence is grammatical”, “A sentence is more grammatical”, “both A and B sentences are grammatical”, “B sentence is more grammatical”, “Only B sentence is grammatical”, coded in 1, 2, 3, 4, and 5 respectively. Thus, due to the ordinal nature of the response variable, ordinal logistic regression was used within each sentence pair type. The regression analysis was carried out separately across three sentence-pair types with the variable of Group included in the model as the fixed predictor to test whether bilingual speakers show norm-divergent performance.

5 .5. Results

Judgement results

Figure 7.1 shows the overall percentages of choices across all sentence-pair types between the control and bilingual groups. From the general picture of overall performance between groups in Figure1, there seems to be a similar tendency in the sentence-pair type of SBAV-*SAV, whereas a different tendency in the other two sentence-pair types. The following sections take a closer look into the behaviours in each sentence-pair type separately.

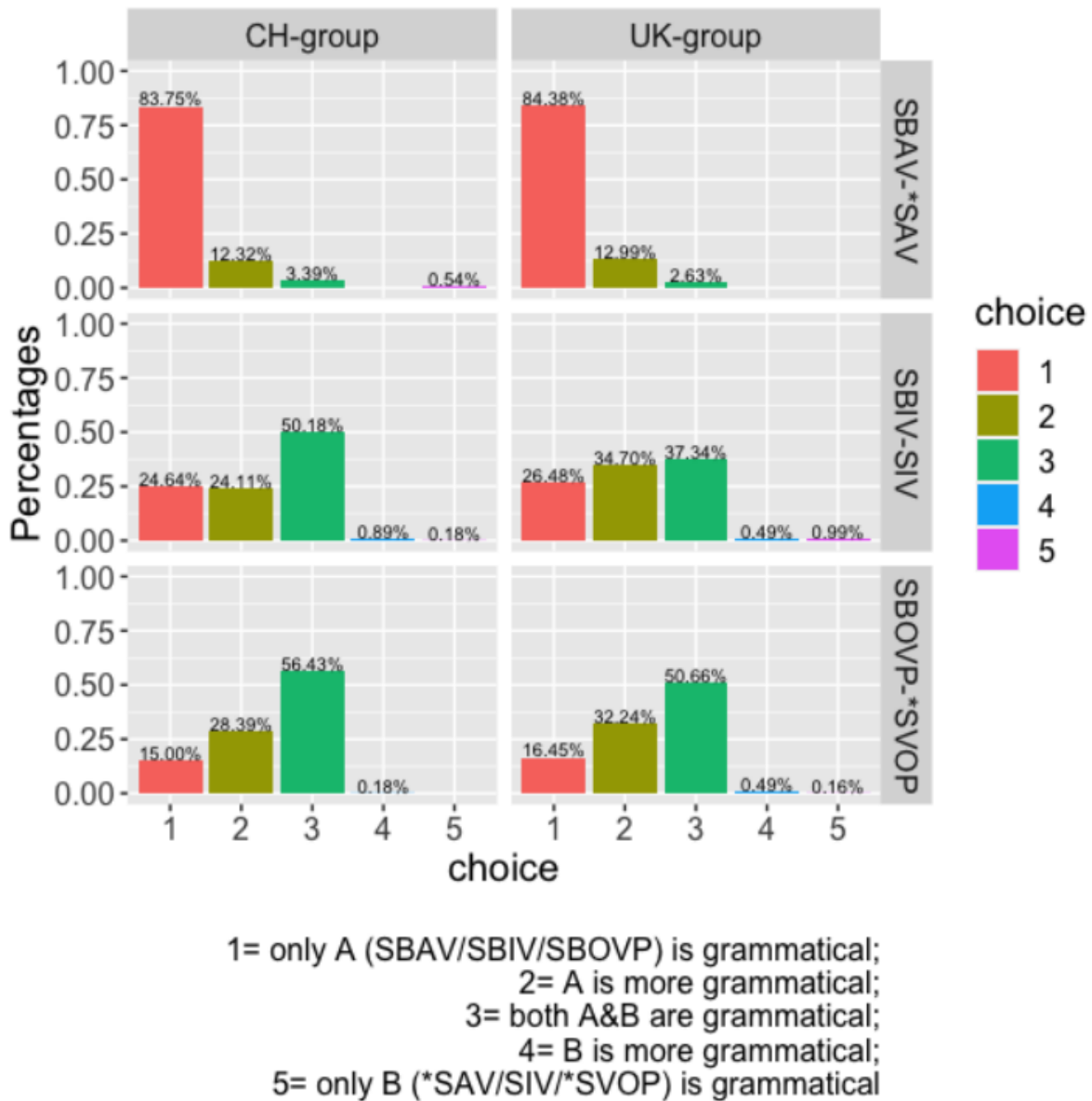


Figure 5.1 Bar plots of percentages of choices across sentence pairs and groups

SBAV-*SAV

This sentence pair was used to set a baseline performance under the condition when there is a clear grammaticality effect in the native control group (with the grammatical SBAV being accepted and the ungrammatical *SAV rejected). As shown in Figure 7.1, our prediction was borne out: around 85% of the responses were Option 1, indicating that only the SBAV form

of the sentence was grammatical, and another 14% fell into Option 2 or 3. A similar tendency in responses was also shown in the bilingual group. Ordinal logistic regression was then conducted on the responses under this sentence pair with group as the independent variable (3 responses of option 5 were removed as outliers). In accordance with the findings in Chapter 6, no group effect was revealed ($\text{Wald } X^2(1) = 0.02, p = .89$). This result indicates that all participants from both groups showed a high acceptance of SBAV construction and high rejection of *SAV construction as grammatical.

SBIV-SIV

This sentence pair was used to set a reference for performance when participants show a clear preference to the grammatical ba-construction but an optional acceptance of the other without-ba construction. As shown in Figure 7.1, we can see that in the native control group, about 99% of responses fall in Option 1 to 3, indicating that the control group perfectly accepted SBIV as grammatical; besides, the control group clearly preferred Option 3 ("both sentences are grammatical") contrasting with the other two options. This indicates a trend towards accepting the without-ba construction SIV as grammatical in the native control group. It is worth noting that in accordance with findings in Chapter 6, the optionality in accepting SIV utterances is revealed by around chance level percentage of responses in the option that accepts SIV. This is most likely because when contextual licensing sentences like SIV are set to judge in null-context condition, speakers could take into account some contextual information when judging these sentences (see more discussion in Chapter 6).

On the other hand, although the group of the bilingual participants also shows a perfect acceptance of SBIV and a preference for Option 3, the distribution of response seems to be

more even: we can see a numerical decrease in the percentage of Option 3 and an increase in Option 1 and 2 compared with the native control group. An ordinal logistic regression then assessed this difference with group as the independent variable (15 responses of options 4 and 5 were removed as outliers). Statistical results reveal a significant effect of group (Wald $X^2(1) = 11.23, p < .001$). To be specific, the odds of native control group being more likely to accept SIV is 1.45 times (95% CI, 1.18 to 1.79) that of the bilingual group. To summarize, all these results indicate that both groups accept SBIV as grammatical and reject the options that exclude this version. Both groups also exhibited the tendency to accept the "optional" without-ba construction SIV, but this optionality was more pronounced among the native control group than the bilingual group.

SBOVP-*SVOP

This sentence pair is the target item to assess the direct L2 transfer effect on speakers' L1 performance. We first look into the overall performance revealed in the native control group. Over 99% of responses fall into the Option 1 to 3, indicating that both groups showed an absolute acceptance of the ba-construction SBOVP. On the other hand, around 56% of responses went for Option 3 ("both sentences are grammatical"). This indicates a trend towards accepting the corresponding SVO form *SVOP as grammatical. This tendency seems similar to that in the sentence-pair type of SBIV-SIV, where participants exhibited a clear preference for the basic syntactic structure of ba construction whereas an optional acceptance of the Ba-omitted form is revealed by an overall chance-level percentage of preferring Option 3. The trend revealed by the native control group here is against the idea that ba-construction is obligatory to express displacement regulated by internal object constraint or postverbal constraint, as mentioned earlier. On the other hand, variability in

accepting the "anomalous" or "ungrammatical" *SVOP sentences is in accordance with results reported in Xu (2012), which noted that some native speakers did not reject all SVO sentences in the "obligatory" condition.

Further analysis was carried out at the individual sentence-pair level to understand better the variability in accepting these *SVOP sentences. As shown in Figure 7.2, *SVOP in 7 sentence pairs are accepted by over 60% of participants. Interestingly, these highly accepted sentences fell into the same grammatical structure: negative form in the imperative mood. There are a total of 8 sentence pairs with negative imperative sentences. All 16 sentences pairs are then categorized into two groups: Group "high" including 8 sentence pairs that have negative imperative *SVOP sentences (5 accepted by over 70%, 2 over 60% and 1 around 57%), Group "low" including the remaining sentences which are relatively less accepted (2 accepted below 60%, and 6 accepted below 50%). The overall percentages of acceptability for the two categories are presented in Figure 7.3, indicating a categorical preference for SVOP sentences in the negative imperative mood. This categorical difference is also verified by the statistical analysis ($\text{Wald } X^2(1) = 36.66, p < .001$). These results seem to suggest that ba-construction is not as absolutely obligatory as it has been claimed in expressing displacement. For *SVOP sentences in the negative imperative mood, the overall acceptance rate is up to almost 70%, and for the others that are relatively less accepted, the acceptance rate is also over 40% in the native control group, far more accepted than the ungrammatical *SAV construction (accepted by around 3% only).

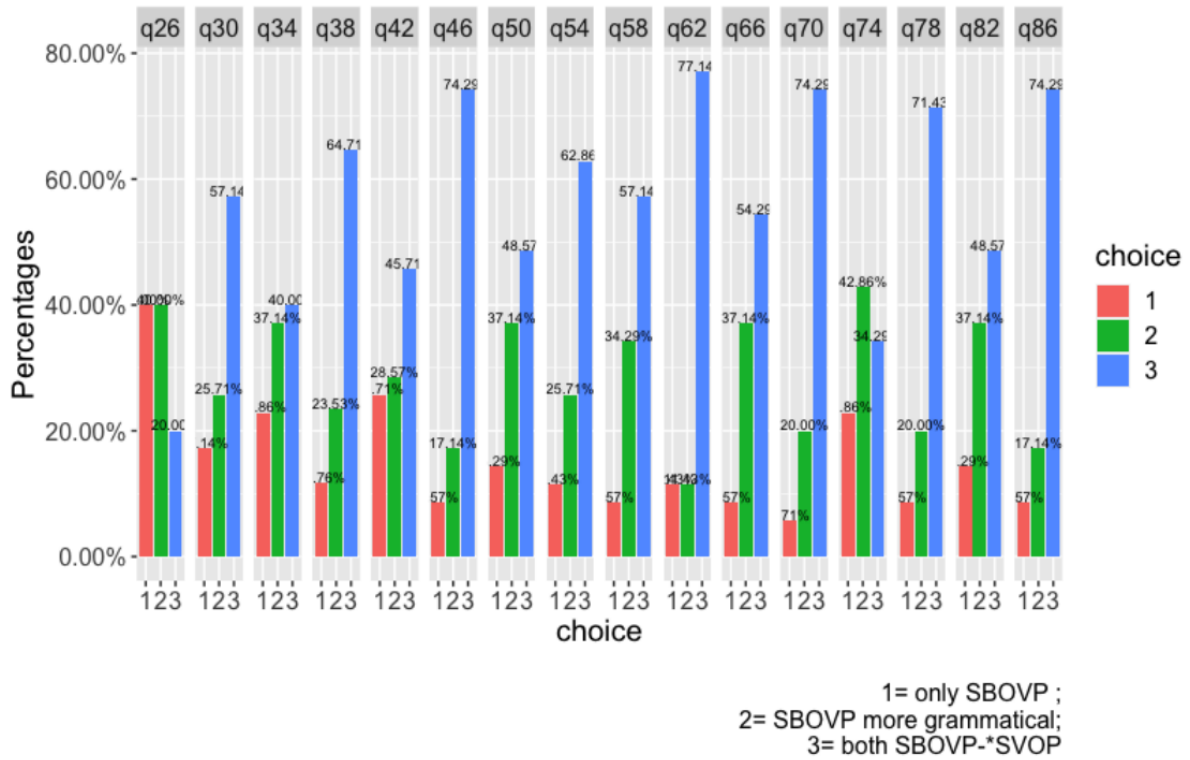


Figure 5.2 Bar plot of percentages of choices by item for SBOVP-*SVOP

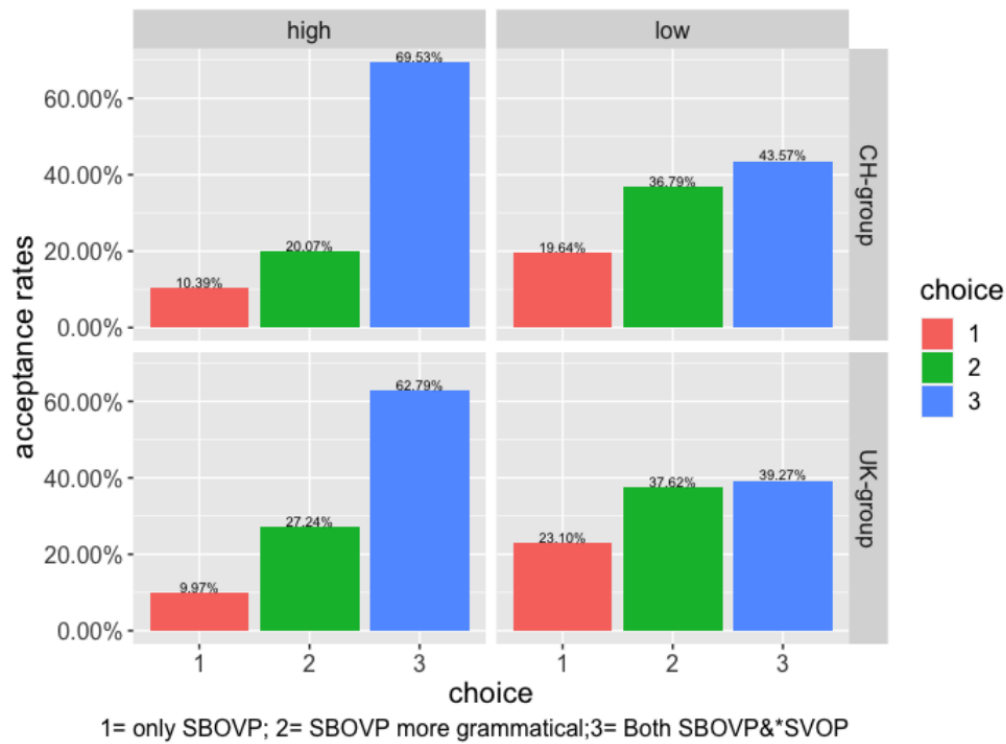


Figure 5.3 Bar plots of percentages of choices by category for SBOVP-*SVOP between groups

As for group comparison, the bilingual group shows a similar tendency in choices as shown in both Figure 7.1 (overall performance) and Figure 7.3 (categorized performance). Nevertheless, we can still see a numerical difference in the distribution of choices between groups. The bilingual participants perfectly accepted the ba-construction as the native control group did, while at the same time, they seem to be less likely to accept the *SVOP construction as grammatical than their peers in the control group. Again, ordinal logistic regression was conducted to assess the group effect on participants' overall and categorical performance in the sentence-pair type of SBOVP-*VOP (5 responses of options 4 and 5 were removed as outliers). No significant group effect was revealed within either the "high" or "low" category, but a trend towards significance was revealed in the overall performance (Wald $X^2(1) = 3.09$, $p = .079$). These results indicate that the acceptance of the *SVOP construction does not differ significantly between groups but that bilinguals have a slightly stronger tendency to reject *SVOP than the native controls. This seems against the assumption that bilinguals might be more likely to accept *SVOP, which has a word-for-word translation equivalent in English, under the L2 transfer effect.

5 .6. Discussion

Summary of findings

Expressions of displacement in Mandarin (ba-construction versus *SVOP construction) is a good testing ground for cross-linguistic influence from English. On the one hand, the ba-construction has been claimed to be obligatorily used in expressing displacement, and its corresponding SVO word order construction is claimed to be ungrammatical and infelicitous. On the other hand, the ba-construction has no equivalent in English, whereas the

"ungrammatical" SVO construction has a word-for-word translation equivalent in English which is perfectly grammatical. This study used a paired grammaticality judgement task (Xu, 2012) to assess participants' awareness of the usage of ba-construction versus *SVOP construction to express displacement meanings in a group of late adult Mandarin-English bilingual speakers and their baseline native speakers from the homeland. The native baseline group exhibited a perfect acceptance of ba- construction and, at the same time, an optional acceptance of the corresponding SVO word order sentences. The bilingual group showed a similar pattern in the acceptability of ba-construction but a slightly stronger tendency to reject SVO word order sentences.

The "obligatory" usage of ba-construction

Participants from the native baseline group in the current study perfectly accepted ba-construction as grammatical to express displacement meanings. On the other hand, they did not reject all SVO word order sentences that have been claimed as ungrammatical, but showed an overall chance-level accepting rate of the SVO word order construction. This tendency in choices is similar to their performance on the sentence-pair "SBIV-SIV". Recall that the awareness of the sentence-pair "SBIV-SIV" is tested as the baseline performance under the condition when the ba-construction is agreed to be grammatical, and the alternative structure is optionally accepted. Following this, it can be inferred that the native baseline group in the current study showed an optional acceptance of *SVOP, which seems to go against the claim for the obligatory usage of ba-construction to express displacement. This finding is in accordance with the results reported in Xu (2012), where variability is detected in rejecting the "ungrammatical" SVO word order sentences among native control participants.

To summarize, all these results seem to indicate a hierarchy of "obligatory" in using ba-construction to express displacement. In other words, under certain contexts, the usage of ba-construction is less obligatory to express displacement meanings, and at the same time, the acceptability of its corresponding SVO word order construction is ameliorated. At last, it is worth noting here that the native baseline participants in the current study exhibited a higher acceptance of the category of *SVOP sentences in imperative mood than one in a neutral mood. Xu (2012) provides a possible explanation for this category difference within *SVOP sentences. When computing *SVOP sentences, participants are likely to assign a focus on the sentence unconsciously: if the focus is assigned on how the direct object is affected or disposed of, they tend to reject *SVOP sentences; whereas if the focus is on what the subject has done, they tend to accept *SVOP sentences. Following this, it is likely that the imperative mood renders some *SVOP sentences more acceptable than others as the imperative mood expresses an intention to command or request the subject to do something, thus providing contextual information that favours the focus on what the subject (a second-person subject "you" in this case) should or should not do.

Cross-linguistic influence

It is predicted that the bilingual speakers would show more acceptance of the *SVOP sentences, which have equivalents in English, under the cross-linguistic influence from English on Mandarin. This prediction is not confirmed in our results. The performance by the bilingual participants seems to steer in the opposite direction. Bilingual speakers exhibited a slightly stronger tendency to reject *SVOP sentences compared with the native baseline

participants. This finding seems to discard the direct language transfer from English to Mandarin.

Though the direct L2 transfer is excluded as the source of a stronger tendency to reject the *SVOP construction by bilingual participants, is it possible that cross-linguistic influence from English is implicated in the divergent performance in another way? A recent study on Norwegian heritage speakers in the US provides a possible answer to this question (Anderssen et al., 2018). The authors report that most of their heritage participants overused structures that are maximally different from English structures. This norm-divergent pattern is explained as a result of cross-linguistic overcorrection or hypercorrection. Put another way, these Norwegian heritage speakers avoided English-like structures in their heritage language, despite those structures being grammatical in Norwegian. Following this, it seems that bilingual speakers' lower acceptance of *SVOP sentences in the current study could be interpreted as avoiding English-like structures because of cross-linguistic overcorrection. We would also expect a relatively lower acceptance of *SVOP than SIV between groups, as the former structure has word-for-word translation equivalent in English, thus should be more English-like than the latter structure. Nevertheless, we do not see evidence for this as a significant difference is only detected in accepting SIV sentences between groups.

To summarize, the pattern in bilingual speakers' performance in the current study is not likely to result from cross-linguistic influence (direct language transfer or cross-linguistic overcorrection). A possible explanation for not detecting changes induced by cross-linguistic influence may be related to the linguistic backgrounds of these bilingual participants. As reviewed earlier, studies that found cross-linguistic influence from English all reported a dominance in English by their bilingual participants, including the emigre speakers.

Differently, bilingual participants in the current study, though self-rated as more frequent users of English than Mandarin at work/school, showed an average score (both at work/school and out of work/school) of frequency in using English significantly lower than Mandarin. Meanwhile, they self-rated less proficient in English than Mandarin. Taking the two points together, English is considered as the weaker language and Mandarin as the dominant language for these bilingual speakers. The predominant use of L2 has been emphasized by some researchers (e.g., Kasparian & Steinhauer, 2020) as a critical factor that makes it possible to detect L1 attrition due to cross-linguistic influence. Related to the current study, Mai and colleagues (2018) provide a possible explanation of how being dominant in English would influence the weaker language as the underlying mechanism of cross-linguistic influence on expressions of displacement. They explain that using English as the dominant language would influence the weaker language Cantonese by reinforcing the mental representation of the English-like SVO construction and keeping it more accessible than the Cantonese-specific *zoeng*-construction. Following this explanation, we predict that adult Mandarin bilingual speakers who have shifted dominance to English would exhibit higher acceptance of *SVOP construction than native speakers of Mandarin from the homeland under cross-linguistic influence from English. This prediction is left to be examined in future research.

Simplification

Results have shown that in sentence pairs where group difference was revealed, a similar pattern in the tendency of choices was found in the native control group. The native participants perfectly accepted the *ba*-construction sentences (SBIV and SBOVP) as

grammatical, whereas they exhibited variability in accepting the alternative structures (SIV and SVOP).

SIV is the alternative form to SBIV. The presence of "ba" as a DOM marker is required when the direct object is forced to preverbal position, forming the basic syntactic structure of a ba-construction SBOV. However, this DOM marker can be optionally omitted under certain circumstances (see details in Chapter 6). "Optionally omitted" means the DOM marker *ba* might be dropped under certain conditions, but it does not have to be. This type of optionality is manifested in the variability in judging the DOM-omitted structure SIV in null-context conditions by native speakers. Moreover, the standard topicalization structure OSV, another object-preposed structure in Mandarin, could cause ambiguity when interpreting the SOV structure. This ambiguity also increases the importance of semantic and pragmatic constraints in processing SIV sentences. Furthermore, this structure is rather rare in real language use (Lipenkova, 2016). Considering all features discussed above, the structure SIV is undoubtedly more marked than SBIV, the basic syntactic form of ba-construction with *ba* overtly presented as the DOM marker. In terms of markedness, marked structures are generally syntactically more complex or discourse bound or less frequently used or all of the above. Studies have consistently shown that speakers experienced a certain amount of processing difficulty and degraded acceptability when computing these marked structures (see reviews in Weskott et al., 2011). Following this, it can be foreseen that marked structures that have caused some amount of processing difficulty and reduced acceptability by native speakers from the homeland would incur more processing difficulty and less accessibility on the bilingual speakers who are experiencing the pressure of developing and maintaining two language systems with limited cognitive resources. In response to the pressure of dealing

with two languages, bilingual speakers are likely to resort to an "optimization strategy" for managing their linguistic performance (Mai, Zhao & Yip, 2020). In the case of the current study, bilingual participants seem to instantiate a simplified usage of *ba* as DOM in Mandarin. They tend to reject the marked condition when *ba* as DOM can be omitted and take the overt presence of DOM as the default option.

Participants exhibited a similar tendency towards acceptability between the sentence-pairs "SBIV-SIV" and "SBOVP-*SVOP". Following this, the trend towards a greater rejection of *SVOP sentences revealed in bilingual participants could also be attributed to a simplified version of structures expressing displacement in response to the pressure of managing two language systems with limited cognitive resources. As mentioned earlier, the grammaticality or acceptability of *SVOP is licensed by the contextual information, making this structure more marked than the *ba*-construction, which is accepted as grammatical to express displacement meanings regardless of the contexts. Thus, in line with the simplified usage of *ba* as DOM due to employing an optimization strategy in response to the pressure of managing two language systems, bilingual participants tend to regress to a simplified version of expressions of displacement in Mandarin. They seem to steer toward rejecting the marked SVO word order and perceiving the *ba*-construction as the default word order to express displacement meanings.

Finally, it is worth noting here that group differences only achieved significance in the overall acceptance of SIV but not in *SVOP. This result can be interpreted as a larger effect size of group difference in SIV than in *SVOP. Two possible explanations might account for this divergence. First, according to Wescott and Fanselow (2011, as cited in Namboodiripad,

Kim, & Kim, 2019), increased markedness correlates with decreased acceptability. Following this, it might be the case that *SVOP is less marked than SIV, thus causing less processing difficulty and higher acceptability. As a result, the magnitude of group difference remains smaller in *SVOP than in SIV. Secondly, the divergence might be related to different sentence settings for the two structures. Recall that half of *SVOP sentences are in the imperative mood. This setting presented the contextual information that favours the acceptance of this structure. It has been suggested that the markedness effect, such as decreased acceptability and increased processing difficulty, can be ameliorated by presenting context (Weskott et al., 2011). Based on this, by presenting contextual information in some of the SVOP sentences, the effect size of group difference in this structure is modulated to a smaller level contrasting with the SIV structure. If this is the case, we would predict that group effect in accepting SIV sentences can also be ameliorated in the presence of contextual information. This prediction is left to be examined in future research.

5.7. Conclusion

The current study has investigated the "obligatory" usage of ba- construction to express displacement by a group of Mandarin-English bilingual speakers in the UK. It has been claimed that ba-construction is obligatorily used to express displacement meanings while its corresponding SVO construction is ungrammatical and anomalous. A paired grammaticality judgement task with ba-construction and its corresponding SVO construction (SVOP) presented as a sentence pair is used to test participants' awareness of grammaticality in the expressions of displacement. Both groups perfectly accepted ba-construction as grammatical structure, while variability emerged in rejecting SVO construction. This result is interpreted as evidence for the existence of a hierarchy of "obligatory" in expressions of displacement:

the *ba*-construction is not as obligatory as it has been claimed to express displacement meanings, and its corresponding *SVO* construction can be accepted under certain circumstances.

As for group comparison, the bilingual speakers exhibited less acceptance of *SVO* word order construction, contrasting with the baseline participants. This result is interpreted as evidence against the assumption that bilingual speakers are expected to exhibit higher acceptance of *SVO* word order construction as it has a word-for-word translation equivalent in English due to the direct L2 transfer effect. Given that the grammaticality of *SVO* word order construction to express displacement is licensed by certain contexts only, this structure is considered more marked than the *ba*-construction. Bilingual participants' divergent performance is then interpreted as a simplification of structures encoding expressions of displacement as a result of employing an optimization strategy for managing linguistic behaviours in response to the pressure of developing and maintaining two language systems with limited cognitive resources.

The current study is the first experimental study to investigate the "obligatory" usage of *ba*-construction in late adult bilingual speakers, but it is not the first study that reports simplification in word order. This finding is in accordance with the results reported in a recent study investigating word order flexibility in Korean in contact with English (Namboodiripad et al., 2019). By using an acceptability judgement experiment, the authors assessed the acceptability of the canonical word order *SOV* and a list of non-canonical word orders in Korean by English-dominant Korean speakers. They found lowered acceptability for non-canonical orders relative to canonical orders. This pattern is then interpreted as reduced flexibility in word order. It is also worth noting here that the Korean speakers

assessed in this study are English dominant and only used Korean as a heritage language, but surprisingly, they did not show any increased acceptance of SVO structure due to direct English transfer. This finding suggests that predominance in English might be one of the critical factors for cross-linguistic influence, but it does not mean that changes induced by this type of effect will be definitely detected among those who have shifted dominance to their L2 English for daily conversation.

Though results from the current study discard the direct L2 transfer as the potential trigger for norm-divergent performance revealed in bilingual participants, just as Namboodiripad and colleagues (2019) pointed out, a single study that tests bilingual speakers' awareness of a language-specific syntactic property cannot tell the whole story of how the experience of immersion in English might affect the speaker's first language. More research in the future is warranted to reassess the findings and examine the predictions proposed in the current study.

Chapter 6. Conclusion

The aims of this thesis are twofold. First, the early migration period – where bilingual speakers are faced with great pressure of developing and maintaining two languages-- is probably a relatively active phase of L1 attrition. However, despite this supposition, much previous research on L1 attrition is limited to bilinguals who have been extensively exposed to L2 for a considerable period of time and speak their L2 at highly advanced or near-native levels. This paper is to explore attrition effects (especially on syntactic properties) in late unbalanced adult bilinguals during their early period of migration, as contributing to a larger variety of studies attempting to explore L1 attrition in late adult bilinguals.

Secondly, L1 attrition has been hypothesized to work differently for phenomena in different kinds of categories, as indicated by findings that some morphosyntactic structures remain intact after prolonged immersion experience in an L2 environment whilst some structures undergo changes after just a relatively short period of L2 immersion experience (e.g., Schmid, 2012; Ribbert & Kuiken, 2010; Montrul et al., 2019; Dussias, 2004). To accommodate this type of selectivity in L1 attrition on mature grammars, several accounts have been proposed to predict the features for linguistic structures that are more prone to attrition effects, e.g., 1) a property in L1 that shares features with L2 but configured in a cross-linguistically different way (FRH, Lardiere, 2009); 2) an element in L1 that is less used and has a corresponding competing element in the L2 that is more frequently used (ATH, Paradis, 1993) ; 3) a syntactic structure that is at the interface of syntax and pragmatics (IH, Sorace & Filiaci, 2006). The first two accounts ascribe changes to cross-linguistic influence under exposure to L2 and the third account attributes divergence to processing difficulty as a side effect of inhibiting the language not in use. This thesis aims to find out if any of the three hypotheses can be extended to account for linguistic performance in unbalanced bilingual speakers. For this purpose, *ba*-construction is a good testing ground as this Mandarin-specific linguistic structure exists at the intersection of a range of featured phenomena.

The unbalanced Mandarin bilinguals were compared to native speakers of Mandarin from the homeland in perception of different aspects of *ba*-construction: the discourse-driven optional usage of *ba*-construction vs. *SVO* in Chapter 3, *ba* as a function of DOM in Chapter 4 and the obligatory usage of *ba*-construction to express displacements in Chapter 5. Divergent performance was found between groups in all three studies. The bilingual speakers exhibited more uncertainty in selecting contextual felicitous construction (*ba*-construction vs. *SVO*)

and were less accepting of the more marked condition of *ba* as DOM (SIV) as well as the more marked construction of expressions of displacement (SVO).

6.1. General discussion

Before interpreting these norm-divergent performances by bilingual speakers, we first look into the linguistic behaviours in native control speakers, which provide informative results that can advance our understanding about *ba*-construction.

Linguistic performance by native control speakers

Predictions on linguistic performance in different aspects of *ba*-construction are partially confirmed by the results in the group of native control speakers. In terms of the discourse-driven optional usage of *ba*-construction vs. SVO, native control speakers exhibited sensitivity to the manipulation of contexts and sentences in both timed and untimed contextual acceptability judgement tasks. They performed categorically, as expected, showing higher acceptability under the matching condition and lower acceptability under the mismatching condition. In the multiple-choice completion task, the native control speakers showed a categorical preference for the construction that is more felicitous under the given context, consistent with their performance in the other tasks. These results confirm the pragmatic effect on the usage of *ba*-construction vs. SVO.

In terms of *ba* as a function of DOM, native control speakers perfectly accepted structures with the presence of *ba* as the DOM marker (SBIV and SBAV) but showed categorical difference in the acceptance of structures with *ba* omitted. They almost fully rejected structures with animate direct objects (SAV) but allowed structures with inanimate direct

object at chance level (SIV). These results are also consistent with expectations as *ba* as DOM is obligatory in the case when the direct object is animate but optional when the direct object is inanimate. As for the chance level acceptance rates for the “optional” omission of *ba* as DOM, a possible explanation is suggested by L1 & Thompson (1981) that in addition to semantic (animacy) constraint on the presence of *ba* as DOM, there is a further pragmatic constraint which restricts *ba* omission to situations in which the speaker provides information counter to the expectation of the listener. This assumption has not been investigated by any empirical study. However, if the pragmatic constraint is confirmed in the usage of *ba* as DOM, the interpretation of bilingual speakers’ performance will be a bit different (see details in next section). These results indicate that *ba* as a function of DOM, especially the “optional” omission of *ba* as DOM, is regulated by a relatively complex constraint system.

In terms of the obligatory usage of *ba*-construction to express displacement, against expectation, the usage of *ba*-construction seems not as “obligatory” as it has been claimed in the displacement condition as displayed in native control speakers’ performance. They perfectly accepted *ba*-construction ending with complement of place (SBOVP) as grammatical but exhibited variability in rejecting the corresponding SVO construction (*SVOP). Interestingly, similar to the tendency in the “optional” omission of SIV, they exhibited chance level acceptance of *SVOP. This result seems to be against the claim for the obligatory usage of *ba*-construction to express displacement but in favour of the existence of a hierarchy of “obligatory” of using *ba*-construction. In fact, this is not the first study reporting evidence supporting a hierarchy of “obligatory” in *ba*-construction vs. SVO to express displacement. Xu (2012) also detected similar performance by native speakers in that some of them did not reject all SVO word order sentences in the “obligatory *ba*-construction” condition. These results can be interpreted as evidence for a further contextual information

constraint on the grammaticality of SVO word order sentences to express displacement in addition to syntactic and semantic constraints such as internal object constraint and postverbal constraint. Another interesting finding is a categorical preference revealed within SVO word order sentences which can also be interpreted as evidence in favour of a contextual constraint on the usage of ba-construction vs. SVO to express displacement. Native control speakers exhibited significantly higher acceptance of those expressing a negative imperative mood compared with the ones in neutral mood. A possible explanation for this difference is suggested in Xu (2012): speakers are likely to assign a focus on the sentence unconsciously; if the focus is assigned on how the direct object is affected or disposed of, they tend to reject *SVOP sentences, whereas if the focus is on what the subject has done, they tend to accept *SVOP sentences. Following this, the imperative mood renders the sentences more acceptable than others as the imperative mood expresses an intention to command or request the subject to do something, providing contextual information in favour of assigning focus on what the subject should do or should not do.

To summarize, the contextual information factor seems to come into play across all three aspects of ba-construction tested in the current research. This is not surprising as Mandarin is one of the topic-prominent languages and ba-construction is also one of the Mandarin-specific structures that are employed to mark the topic. In the case of the discourse-driven optional usage of ba-construction vs. SVO, the contextual information only affects the felicity of ba-construction/SVO in a given context but both constructions are syntactically and semantically well-formed, whereas in the case of ba as a function of DOM and the obligatory usage of ba-construction vs. SVO to express displacement, the contextual information directly affects how speakers perceive the grammaticality of the omission of ba and SVO construction to express displacement. In other words, the grammaticality of the

“optional” *ba* omission and *SVOP construction is only licensed under certain contexts. The difference between these two types of linguistic phenomena would also help to interpret the performance by bilingual speakers.

Linguistic performance by bilingual speakers

Discourse-driven optional usage of *ba*-construction vs. SVO

Two main norm-divergences were found in bilingual speakers’ performance. In the online contextual acceptability judgement task, bilingual speakers did not show a symmetric sensitivity to mismatching and matching conditions between the two contexts, namely, *ba*-construction preferred context and SVO-construction preferred context. Interestingly, they exhibited a significantly categorical preference for *ba*-construction in matching conditions compared with mismatching conditions but no difference in the case of SVO-construction. Moreover, within group, bilingual speakers showed a shorter time to judge correctly under *ba*-preferred contexts than under SVO-preferred contexts. These results are interpreted as a different processing strategy employed by bilingual speakers when processing these interfacing structures. *Ba*-preferred context provides a contextual cue for the speaker to mark a specific NP in the given context as the special topic in the sentence that follows while this is not the case in SVO-preferred contexts. In other words, *ba*-construction always correlates with an NP that belongs to old information given in the context. This can be a shortcut for bilingual speakers to make judgements regarding *ba*-construction in the task, as they could just rely on the information cue (new/old) to decide the matching (*ba*-NP as the old information in the context) or mismatching (*ba*-NP as the new information in the context) conditions for *ba*-construction, exhibiting a pseudo-sensitivity to *ba*-construction in different contexts. On the other hand, the correlation between information cue and SVO construction is

not as clear cut as in the case of *ba*-construction. *SVO* construction can use both new and old information as its direct object. Thus, when the shortcut of information cue is not available, i.e., as in the case of *SVO* construction, their “pseudo-sensitivity” just disappears as indicated by there being no difference found in accepting *SVO* construction between contexts. A possible explanation for bilingual speakers resorting to a different strategy when processing these interfacing structures is that the contextual constraint on the usage of *ba*-construction vs. *SVO* may have been loosened to some extent. Following this, processing interfacing structures with reliance on contextual cues is likely to incur reduced efficiency for bilingual speakers. As a result, they resort to more efficient and straightforward way to do the task.

This assumption seems to be borne out by results from the multiple-choice completion task, where bilingual speakers exhibited another norm-divergence in their performance. They showed more uncertainty in selecting the contextually preferred construction as revealed by a higher percentage of accepting both constructions regarding the given contexts compared with their native control counterparts. This is interpreted as evidence supporting a loosened contextual constraint on the usage of *ba*-construction vs. *SVO*. Since the completion task was presented with no time limitation, bilinguals’ performance cannot be only ascribed to online processing difficulty on integrating information from different domains when computing interfacing structures. It is more likely that the contextual constraint on the usage of *ba*-construction vs. *SVO* has been eroded in a deeper way, suggesting that attrition effects may begin in the first instance as the transient processing difficulty and eventually lead to permanent changes in the knowledge representations.

It is also interesting to note here that if cross-linguistic influence from English comes into play in bilinguals’ divergent performance, it is predicted that the *SVO* option should be

preferred regardless of contexts as it has an equivalent in English, while *ba*-construction does not. However, against this prediction, bilingual speakers did not show a tendency towards the SVO construction regardless of contexts, suggesting the L2 transfer would be discarded as the potential cause for norm-divergent performance in bilinguals.

Contextual licensed aspects of *ba*-construction

The omission of *ba* as a function of DOM

The omission of *ba* as a function DOM is a good testing ground for teasing apart cross-linguistic influence and processing limitation. If L2 transfer is the potential trigger for norm-divergent performance in bilinguals, a preference for the omission of *ba* as DOM is expected as their L2 English does not have DOM. On the other hand, if processing limitation is the potential trigger, then we would expect to see the opposite pattern, with a reduced acceptance in the omission of *ba* as DOM as this property is regulated by a complex constraint system. Against the prediction for the L2 transfer effect, bilingual speakers clearly exhibited a lower acceptance of SIV sentences compared with native control speakers, indicating the tendency towards rejecting the “optional” option while accepting the less marked form (presence of DOM) as the default usage of *ba* as a function of DOM. Moreover, this norm-divergent difference is levelled out in the untimed task, in which the same experiment was carried out but with the time pressure removed. This can be interpreted as the evidence for a processing difficulty on computing the “optional” omission of *ba* as DOM. As for the mechanism underlying this kind of processing difficulty, a weakening of the animacy constraint can be considered as a possible explanation as the omission of *ba* is only allowed for an inanimate direct object. Following this account, it is the problems in the integration of both morphosyntactic and semantic (animacy) information under time pressure that makes

speakers experience reduced efficiency in real-time processing and favour the overtly marked case which is simpler and more transparent to compute. Nevertheless, as discussed in the native control speakers' section, the explanation will be different if the pragmatic constraint is confirmed as a further factor regulating the omission of *ba* as DOM in addition to syntactic and semantic constraints. If this is the case, bilingual speakers' performance, oppositely, indicate that their animacy constraint on this linguistic phenomenon remain intact as they perfectly rejected the condition with animate direct object but categorically accepted the condition with inanimate direct object (although the acceptance is still as low as below chance level). On the other hand, their dispreference for the omission of *ba* can be explained by reduced efficiency when integrating contextual information in real time as a result of a processing limitation in response to bilingual disadvantages (e.g., slower L1 access or cognitive effort on inhibiting the language not in use). Nevertheless, both semantic and pragmatic accounts indicate a pattern that the bilinguals in the current study instantiated a simplified usage of *ba* as a function of DOM. They tend to reject the optionality and accept the less marked option as the default.

Another interesting finding is from bilingual speakers' performance in the untimed grammaticality judgement task. Though the average scores of grammaticality judgements by bilingual speakers were not significantly different from those by native control speakers, it is worth noting here that the rate tendency (1 vs. 2 vs. 3 vs. 4 vs. 5) indicates that bilingual speakers are less confident in both accepting and rejecting the same *ba*-omitted sentences that are rejected under time pressure as they showed a categorical preference for the options of "2" and "4" ("It is ungrammatical/grammatical, but I am not sure"). These results seem to indicate that bilinguals' ability to integrate semantic/pragmatic and morphosyntactic

information may be attenuated even in those cases where they are given sufficient time to reflect.

The usage of ba-construction vs. SVO to express displacement

Bilingual speakers' performance regarding the obligatory condition of expressions of displacement (ba-construction vs. SVO) exhibited a similar pattern to that in ba as a function of DOM. Firstly, expressions of displacement in Mandarin are a good testing ground for distinguishing effect from cross-linguistic influence and processing difficulty. Following a cross-linguistic influence prediction, a higher acceptance of the SVO word order construction as the form to express displacement will be expected as it has a word-for-word equivalent in English. However, this prediction is not verified in the performance by bilingual speakers, which steers towards the opposite direction that they exhibited a slight trend to reject this construction. This finding discards the direct L2 transfer from English as the potential trigger for norm-divergent performance. Following a comparison of group difference between the performance in *SVOP and SIV, the pattern overcorrection or hypercorrection (avoidance of using English-like structures) as a result of cross-linguistic influence is also excluded as the cause for changes found in bilinguals' performance. If cross-linguistic overcorrection is underlying the dispreference for both *SVOP and SIV structures, we would expect a relatively slower acceptance of *SVOP than SIV between groups, as *SVOP has the word-for-word translation equivalent in English, thus should be more English-like than the SIV structure. Nevertheless, we do not see evidence for this as the group difference only achieved to significant level in SIV but not in *SVOP. In fact, all results seem to suggest that bilingual speakers resort to a simplified version of structures expressing displacement. As mentioned earlier, it is very likely that the grammaticality of *SVOP is licensed only under certain

contexts. Following this feature, the processing of *SVOP seems to correlate with more linguistic computations and thus incurs increased processing difficulty for bilingual speakers. In response to the processing difficulty, they showed a tendency towards rejecting the marked SVO word order and resorting to ba-construction as the default word order to express displacement meanings. It is also worth noting here that just like the performance in the other two aspects of ba-construction, the norm-divergent difference in grammaticality judgement of expressions of displacement (*SVOP vs. SBOVP) is also found in the experimental setting when no time limit is given. Based on the agreement that an untimed grammaticality judgement task reflects linguistic competence, the results of the current study seem to suggest that these norm-divergent linguistic behaviours cannot be only attributed to changes in online processing strategies, but indicate that the contextual constraint on the expressions of displacement has been attenuated in a deeper way.

To summarize, all these findings across three aspects of ba-construction tested in the current research seem to suggest that it is possible for attrition effects to be detected in a group of unbalanced bilingual speakers who are less proficient in L2 and immersed in the L2 environment for fairly short period. As for the potential triggers for their norm-divergent performance, results from three aspects of ba-construction indicate a process of simplification of a linguistic phenomenon rather than cross-linguistic influence from English. To be specific, for linguistic phenomena (ba as a function of DOM and expressions of displacement) that contains more than one option, bilingual speakers tend to reject the more marked option (e.g., contextual licensed grammaticality, low frequency in real language use, more linguistic computations, increased ambiguity in interpretation) but resort to accepting the less marked one as the default form. For the linguistic phenomenon (optional usage of ba-construction vs. SVO) of which the felicity is constrained by contextual information,

bilingual speakers tend to broaden the range of contexts in which a construction is preferred by losing its context sensitive features (Chamorro et al., 2016). The above two trends resemble closely the idea of “going back to basics” (Montrul et al., 2009, p. 381), which leads to simplification of the grammar by letting go of the most marked and non-core options (such as the interfacing features from three aspects of *ba*-construction in the current study), while retaining the core function structures (such as the basic syntactic form of *ba*-construction across different aspects). Such reduction and implication is in line with the expectation that increased pressure on cognitive resources in the bilingual context will lead to reduced efficiency in processing. It is noted here that the precise nature of the increased pressure for bilingual speakers remains unclear in the current study as it can be attributed to several explanations, e.g., 1) the side effect of the need to manage two competing systems and suppress the unwanted language (Chamorro & Sorace, 2019); 2) reduced cognitive resources available for maintaining L1 as a result of high levels of effort to be spent on acquiring L2 (Herdina & Jessner, 2002); 3) increased difficulty in reactivating L1 as a result of sustained inhibition of the dominant language L1, presumably to facilitate linguistic performance in weaker L2 under the bilingual contexts (Peeters & Dijkstra, 2018). Given the linguistic background of bilingual speakers (unbalanced, less L2 proficient, short L2 immersion experience) in the current study, the last two explanations are favoured. However, further research is warranted upon this issue before any conclusion is withdrawn.

Impact of LoR on attrition effect

A few more remarks need to be made here regarding the impact of LoR on attrition effect found in the current study as these findings on LoR effect can help us to further understand the linguistic performance in early stages of migration by bilingual speakers.

A widespread assumption in studies of L1 grammar attrition is that language attrition is a very slow process, taking at least several decades, partially based on a folk-linguistic understanding of the decline of language skills and partly on some initial findings reported in Clyne & de Bot (1994). This view, nevertheless, “has shifted to the current consensus that attrition is a processing which mainly takes place within the first ten years, after which the L1 will ‘stabilize’ again at whatever level of attrition has been reached during this time” (Schmid, 2019, p.291). As reviewed in Schmid (2019), this consensus is rooted in the absence of significant LoR effects on the degree of L1 erosion reported in the research focusing on populations with minimum LoR over ten years. For instance, an investigation of the same population of long-term Dutch migrants in Australia reported little change between two different testing times (de Bot & Clyne, 1994). Oppositely, Schmid (2019) summarizes an interesting pattern from the scrutiny of the available data in relation to the impact of LoR that the significant LoR effect is more likely to be detected in the research of samples with the minimum LoR lower than ten years. Despite this interesting pattern in relation to LoR and L1 attrition, studies with insights into the earlier stages of the attrition process remain limited (see overview in Schmid, 2019). Findings from the current research seem to suggest that attrition effects in the first years of L2 immersion period can be productive and these effects may not be so much the result of disuse or less use after a long period but more likely be the outcome of problems in relation to the pressure of managing two languages. Given the linguistic background of the bilingual speakers assessed in the current study, it may also be the case that for these unbalanced speakers who are still struggling with developing their L2 and assimilating into the L2 dominant environment, cognitive effort with managing two languages is more pronounced in the early stages of migration, resulting in reduced efficiency in processing complex linguistic phenomena such as interfacing structures assessed in the

current research. Following this, we would also expect that as soon as the bilingual or multilingual proficiency levels become more balanced, the necessary effort of managing two languages will decrease. This prediction seems borne out in the findings in Chapter 6, which reported speakers with longer periods of residence in the UK were closer to the native norm in accepting the omission of *ba*, the more marked condition of usage of *ba* as a function of DOM.

Another piece of evidence for L1 attrition being productive and dynamic in early stages of migration may come from the sample group investigated in Chapter 5. The impact of LoR is not discussed in that chapter because it is not the focus of the main research questions.

However, some of the results revealed from the statistical analysis regarding the impact of LoR do show some interesting findings, which is worth discussing further in this section.

A scatter plot is presented in Figure 8.1, which shows the relationship between LoR and mean scores of judgements for linguistic phenomena that contains a contextual licensing option (SBIV-SIV; SBOVP-*SVOP). In order to draw this scatter plot and foresee trends between the performance and LoR among the targeted 38 bilingual participants, judgements to each question were labelled with numerical values with 3 to “both sentences are grammatical”, 1 to “only A is grammatical”, 2 to “A is more grammatical”, 4 to “B is more grammatical”, 5 to “only B is grammatical”. Given that almost all judgement responses fell into Option 1 to 3 (with 9 responses into Option 4 and 5), higher mean scores indicate perfect higher acceptance of the contextual licensing forms, SIV and *SVOP (with perfect acceptance of the less marked forms, SBIV and SBOVP). Interestingly, as shown in Figure 8.1, participants’ performance did not follow a single either positive or negative trend along with the change of their LoR in the UK. We can see from the trend curve that there seems to

be a turning point to participants' performance, which is between 20 and 40 months. Before this turning point, participants with longer LoR were more likely to reject the contextual licensed structures; while after the turning point, those with longer LoR were more likely to accept these contextual licensed forms.

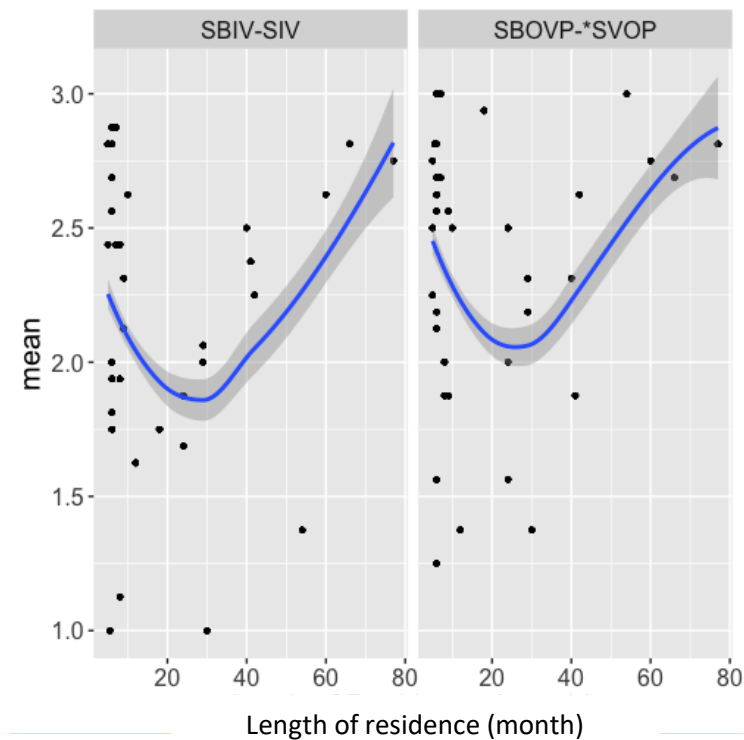


Figure 6.1 Scatterplot of mean scores of judgements along with LoR across four types of sentence pairs among UK-group

To further explore the trends shown in Figure 8.1, participants were divided into two groups according to their LoR and their performance was tested by multinomial logit regression. According to the turning point shown in Figure 8.1, the cut-off point between two groups is set to 30 months: Group 1 with LoR no longer than 30 months (N=31, LoR [5,30]) and Group 2 with LoR longer than 31 months (N=7, LoR [40,77]). Unfortunately, considering the small sample size in Group 2, we can only carry out the regression test in Group 1.

Results show that the effect of LoR achieved significance on the judgement performance among participants from Group 1 on “SBIV-SIV” ($X^2(2) = 62.96, p < .001$) and “SBOVP-*SVOP” ($X^2(2) = 25.33, p < .001$). As the effect plots in Figure xx show, for the sentence pairs “SBOVP-*SVOP” and “SBIV-SIV”, participants with longer LoR display higher probability of selecting “both sentences are grammatical” and lower probability of selecting “only the left sentence is grammatical” or “the left sentence is more grammatical”, indicating that the change of LoR affects participants’ probability of acceptance of these contextual licensing sentences in a negative way.

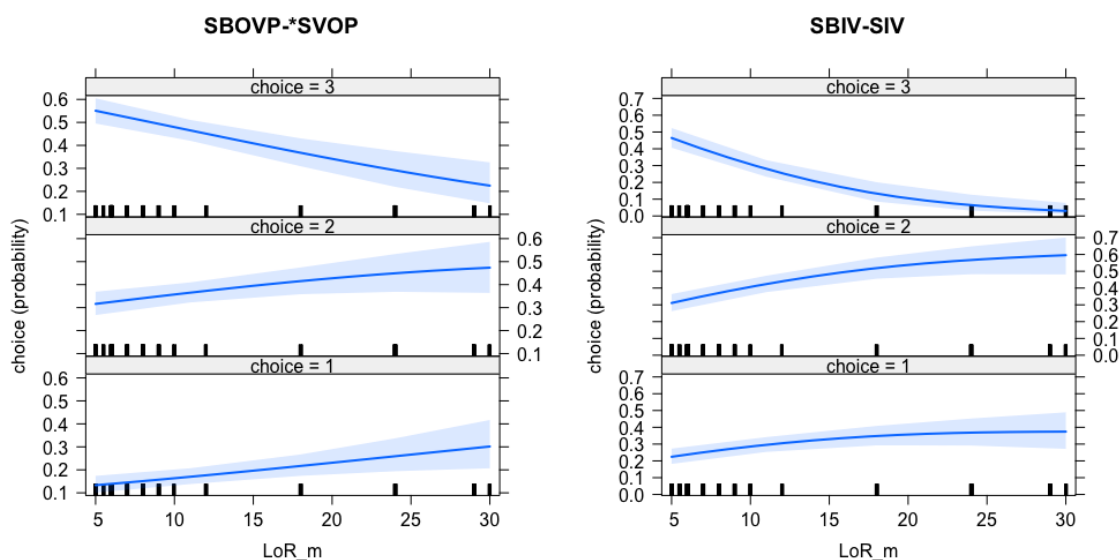


Figure 6.2 Effect plots of LoR on the probability of judgements across sentence pair types by Group 1. Note: choice 1= Only the left sentence is grammatical; choice 2= the left sentence is more grammatical; choice 3 = both sentences are grammatical

Though we cannot further examine the impact of LoR ranging from 40 to 80 months due to limitation of the sample size, results from the Group 1 can still provide informative findings

for a short-term LoR effect. Within the short period of residence in the L2 environment, bilingual speakers with relatively longer LoR exhibited a tendency towards higher degree of rejecting the contextual licensing structures. A possible explanation for this pattern is similar to what has been discussed above that the first years of migration is the period when bilingual speakers struggle with developing L2 and assimilating into the local environment, with more effort spent on managing two languages resulting in reduced efficiency on L1 processing.

Taken together the findings of LoR impact from sample groups of Chapter 4 and Chapter 5, we would see a dynamic picture of how attrition effect manifests itself on bilingual speakers' linguistic performance throughout the early stages of migration. It is likely that these unbalanced bilingual speakers firstly experience a stage when increasing effort spent on acquiring the L2 (or sustained inhibition of their L1); and then to some point, presumably the moment they start getting used to the L2 dominant environment and become better in managing two language systems, they then experience the next stage when cognitive resources slowly adjusted into a more balanced way developing L2 and maintaining L1. Nevertheless, considering the small sample size used to build a regression model for prediction, these findings should be treated very cautiously, and future research with larger size of participants is warranted before any conclusion is drawn.

6.2. Implication of this study

The findings of the current study have two main implications. Firstly, it is the first study looking into L1 attrition effect on ba-construction. Previous studies on ba-construction in bilingual research mainly focused on two populations, the Mandarin heritage speakers and the L2 learners of Mandarin. Findings from these studies are also in line with each other,

revealing that bilingual speakers exhibited underuse of ba-construction and they tended to produce or accept structures that have equivalents in English instead as a result of CLI. This pattern makes sense as both populations were dominant in English and used Mandarin either as the heritage language or weaker L2. In contrast, bilingual speakers' performance in this thesis differed from previous findings. CLI is discarded as the direct potential trigger, and norm-divergent performances are attributed to internal simplification of ba-construction as a consequence of processing difficulty. This finding is expected to bring new insights into the bilingual research on ba-construction that simplification of features bundled with ba-construction can also be taken into account as a potential consequence of language contact. In other words, CLI may not be likely to come into place at early stages of migration, but it is still possible for L1 attrition to take place as a result of processing difficulty by letting go of the most marked features and non-core options.

Secondly, this thesis investigated L1 attrition effects by looking into "untypical" bilingual speakers who are at "untypical" point of their migration period. The former "untypical" refers to a group of unbalanced bilingual speakers who were less proficient in the L2 and maintaining a frequent use of their L1; the latter "untypical" refers to early stages of migration/immersion in the L2 environment. However, this thesis reported norm-divergent performance across all three aspects of ba-construction. These findings tend towards a conclusion that is in line with previous predictions on L1 attrition effects at early stages of migration. It has been suggested that L1 attrition is probably evident more strongly at early stages of migration where a lot of cognitive effort goes into acquiring L2 and assimilating into the L2 environment (see more discussion in Schmid, 2011). Findings in this thesis are expected to contribute to more supporting evidence for early stages of migration being the period of time when L1 attrition is expected to be more productive and dynamic.

Another implication revealed in this thesis is related to the assumption of sustained inhibition of L1 in mixed-language contexts. Findings in this thesis cannot directly verify all predictions of this assumption, e.g., the precise nature of the processing difficulty that our bilingual participants experienced remains unclear, but this assumption can still be used as one of the frameworks for investigating the L1 attrition on a group of unbalanced bilingual speakers who are at their early stages of migration. Given this assumption is rooted in bilinguals' performance in the laboratory settings, findings in this thesis suggest those behaviours of bilingual control under laboratory settings of mixed language contexts can generalize to the experience by unbalanced bilingual speakers in the real language switching context. If this is the case, it is expected that future research based on laboratory settings of mixed language context can also contribute to informative findings in the study of unbalanced bilingual speakers at their early stages of migration.

References

- Aissen, J. (2003). Differential object marking: Iconicity vs. Economy. *Natural Language & Linguistic Theory*, 21(3), 435–483.
- Anderssen, M., Bentzen, K., Busterud, G., Dahl, A., Lundquist, B., & Westergaard, M. (2018). The acquisition of word order in L2 Norwegian: The case of subject and object shift. *Nordic Journal of Linguistics*, 41(3), 247-274.
- Bai, L., & Qin, J. (2018). A study of negative language transfer in college students' writing from cultural perspective. *Theory and Practice in Language Studies*, 8(3), 306-313.
- Baus, C., Costa, A., & Carreiras, M. (2013). On the effects of second language immersion on first language production. *Acta psychologica*, 142(3), 402-409.
- Beganovic, J. (2006). *First language attrition and syntactic subjects: A study of Serbian, Croatian, and Bosnian intermediate and advanced speakers in Dutch* (Master's thesis, University of Edinburgh). Edinburgh Research Archive.
- Bender, E. (2000). The syntax of Mandarin Bǎ: Reconsidering the verbal analysis. *Journal of East Asian Linguistics*, 9(2), 105-145.
- Bergmann, C., Nota, A., Sprenger, S., & Schmid, M. (2016). L2 immersion causes non-native-like L1 pronunciation in German attriters. *Journal of Phonetics*, 58, 71-86.
- Bice, K., & Kroll, J. (2015). Native language change during early stages of second language learning. *NeuroReport*, 26(16), 966.
- Birjandi, P., & Rezaei, S. (2010). Developing a multiple-choice discourse completion test of interlanguage pragmatics for Iranian EFL learners. *ILLI Language Teaching Journal (Special issue: Proceedings of the first conference on ELT in the Islamic world)*, 6(1), 2.
- Chamorro, G., Sorace, A., & Sturt, P. (2016). What is the source of L1 attrition? The effect of recent L1 re-exposure on Spanish speakers under L1 attrition. *Bilingualism: Language and Cognition*, 19(3), 520-532.
- Chamorro, G., Sturt, P., & Sorace, A. (2016). Selectivity in L1 attrition: Differential object marking in Spanish near-native speakers of English. *Journal of psycholinguistic research*, 45(3), 697-715.
- Chamorro, G., & Sorace, A. (2019). The Interface Hypothesis as a framework for studying L1 attrition. In M. Schmid & B. Köpke (Eds.), *The Oxford Handbook of Language Attrition* (pp. 24-35). Oxford University Press.

- Chang, C. (2012). Rapid and multifaceted effects of second-language learning on first-language speech production. *Journal of Phonetics*, 40(2), 249-268.
- Chen, Y., & Rau, V. (2013). Developing multiple-choice discourse completion tasks as pedagogical materials in L2 pragmatics. *Research Gate*, 1(1), 106-120.
- Christoffels, I., Firk, C., & Schiller, N. (2007). Bilingual language control: An event-related brain potential study. *Brain research*, 1147, 192-208.
- Cui, Y. (2003). An analysis of “ba-fang-construction” in Chinese as a second language. *Chinese Language Learning*, 133(1), 50-55.
- De Swart, P. (2007). *Cross-linguistic Variation in Object Marking*. (Doctoral dissertation, Radboud University Nijmegen). Radboud Repository.
- Declerck, M., & Grainger, J. (2017). Inducing asymmetrical switch costs in bilingual language comprehension by language practice. *Acta Psychologica*, 178, 100-106.
- Domínguez, L. (2013). *Understanding Interfaces: Second language acquisition and first language attrition of Spanish subject realization and word order variation* (Vol. 55). John Benjamins Publishing.
- Domínguez, L., & Hicks, G. (2016). Synchronic change in a multidialectal Spanish community. *Inquiries in hispanic linguistics: from theory to empirical evidence*, 12, 53.
- Du, H. (2004). *The acquisition of the Ba construction by adult second language learners* (Doctoral dissertation, University of Arizona). ProQuest Dissertations and Theses.
- Dussias, P. (2004). Parsing a first language like a second: The erosion of L1 parsing strategies in Spanish-English bilinguals. *International Journal of Bilingualism*, 8(3), 355-371.
- Dussias, P., & Sagarra, N. (2007). The effect of exposure on syntactic parsing in Spanish-English bilinguals. *Bilingualism: Language and Cognition*, 10(1), 101-116.
- Green, D. (1998). Mental control of the bilingual lexico-semantic system. *Bilingualism : Language and cognition*, 1(2), 67-81.
- Grosjean, F., & Py, B. 1991. La restructuration d'une première langue : l'intégration de variantes de contact dans la compétence de migrants bilingues. *La linguistique*, 27(2), 35-60.
- Guijarro-Fuentes, P. (2012). The acquisition of interpretable features in L2 Spanish: Personal a. *Bilingualism: Language and cognition*, 15(4), 701-720.
- Gürel, A. (2004). Selectivity in L2-induced L1 attrition: a psycholinguistic account. *Journal of neurolinguistics*, 17(1), 53-78.
- Hawkins, R., & Casillas, G. (2008). Explaining frequency of verb morphology in early L2 speech. *Lingua*, 118(4), 595-612.

- Herdina, P., & Jessner, U. (2002). *A dynamic model of multilingualism: Perspectives of change in psycholinguistics*. Multilingual Matters.
- Hicks, G., & Domínguez, L. (2020). A model for L1 grammatical attrition. *Second Language Research*, 36(2), 143-165.
- Huang, C. (1984). Phrase structure, lexical integrity, and Chinese compounds. *Journal of the Chinese Language Teachers Association*, 19(2), 53-78.
- Huang, C. (1989). Complex predicates in generalized control. In *MIT Workshop on Control*. Cambridge: MIT.
- Huang, C. (1998). *Logical relations in Chinese and the theory of grammar*. Taylor & Francis.
- Iverson, M. (2012). *Advanced language attrition of Spanish in contact with Brazilian Portuguese* (Doctoral dissertation, University of Iowa). Iowa Research Online.
- Jing-Schmidt, Z. (2005). *Dramatized Discourse: The Mandarin Chinese Ba-construction*. John Benjamins.
- Just, M., & Carpenter, P. (1992). A capacity theory of comprehension: individual differences in working memory. *Psychological review*, 99(1), 122.
- Jose, S., & Gideon Praveen, K. (2010). Comparison between auditory and visual simple reaction times. *Neuroscience & Medicine*, 1(1), 30-32 .
- Karayayla, T., & Schmid, M. (2019). First language attrition as a function of age at onset of bilingualism: First language attainment of Turkish–English bilinguals in the United Kingdom. *Language Learning*, 69(1), 106-142.
- Keijzer, M. (2007). Last in first out? An investigation of the regression hypothesis in Dutch emigrants in Anglophone Canada. *Toegepaste Taalwetenschap in Artikelen*, 78(1), 131-139.
- Kim, K., O’Grady, W., & Schwartz, B. (2018). Case in heritage Korean. *Linguistic Approaches to Bilingualism*, 8(2), 252-282.
- Köpke, B. (2002). Activation thresholds and non-pathological L1 attrition. In F. Fabbro (Ed.), *Advances in the neurolinguistics of bilingualism. Essays in honor of Michel Paradis* (pp. 119-142). Undine: Forum.
- Köpke, B. (2007). Language attrition at the crossroads of brain, mind, and society. *Language attrition: Theoretical perspectives*, 9(37), 1-30.
- Köpke, B. & Schmid, M. (2004). First language attrition: The next phase. In M. Schmid, B. Köpke, M. Keijzer & L. Weilemar (Eds.), *First Language Attrition: Interdisciplinary perspectives on methodological issues* (pp. 1-43). Amsterdam: John Benjamins.
- Kroll, J., Bobb, S., & Hoshino, N. (2014). Two languages in mind: Bilingualism as a tool to investigate language, cognition, and the brain. *Current directions in psychological science*, 23(3), 159-163.

- Laleko, O. (2010). *The syntax-pragmatics interface in language loss: Covert restructuring of aspect in Heritage Russian* (Doctoral dissertation, University of Minnesota). ProQuest Dissertations and Theses.
- Laleko, O., & Polinsky, M. (2016). Between syntax and discourse: Topic and case marking in heritage speakers and L2 learners of Japanese and Korean. *Linguistic Approaches to Bilingualism*, 6(4), 396-439.
- LaPolla, R. (1990). *Grammatical relations in Chinese: Synchronic and diachronic considerations* (Doctoral dissertation, University of California). ProQuest Dissertations and Theses.
- Lardiere, D. (2009). Some thoughts on the contrastive analysis of features in second language acquisition. *Second language research*, 25(2), 173-227.
- Li, C., & Thompson, S. (1981). *A functional reference grammar of Mandarin Chinese*. University of California Press.
- Li, C. (2011). Postverbal constituents in Mandarin Chinese. In Z.Jing-Schmidt (Ed.), *Proceedings of the 23rd North American Conference on Chinese Linguistics (NACCL-23)* (Vol. 2, pp. 30-47).
- Lin, C. (2017). A Corpus-based Study on the Acquisition of “Ba” Construction by Thai Learners. *Journal of International Studies, Prince of Songkla University*, 7(1), 140-162.
- Lipenkova, J. (2016). *The syntax-semantics interface in the Chinese ba-construction* (Doctoral dissertation, Freien Universität Berlin).
- Liu, F. H. (1997). An aspectual analysis of ba. *Journal of East Asian Linguistics*, 6(1), 51-99.
- Liu, L. (2013). Analysis of Ba Marker in Chinese. *Theory & Practice in Language Studies*, 3(12), 2277-2233.
- Liu, X., Wang, W., & Wang, H. (2019). Age differences in the effect of animacy on Mandarin sentence processing. *PeerJ*, 7, e6437.
- Lv, S. (1982). *中国文法要略 (Essentials of Chinese Grammar)*. Commercial Press.
- Mai, Z., Kwan, C., & Yip, V. (2018). Expressing displacement in heritage Cantonese: Cross-linguistic influence and structural vulnerability. *International Journal of Bilingualism*, 22(6), 603-618.
- Mai, Z., Zhao, L., & Yip, V. (2021). The Mandarin ba-construction in school-age heritage speakers and their parental input. *Linguistic Approaches to Bilingualism*.
- Montrul, S. (2004). Subject and object expression in Spanish heritage speakers: A case of morphosyntactic convergence. *Bilingualism: Language and cognition*, 7(2), 125-142.

- Montrul, S. (2019). The acquisition of differential object marking in Spanish by Romanian speakers. *Revista Española de Lingüística Aplicada/Spanish Journal of Applied Linguistics*, 32(1), 185-219.
- Montrul, S., & Bowles, M. (2009). Back to basics: Differential object marking under incomplete acquisition in Spanish heritage speakers. *Bilingualism*, 12(3), 363-383.
- Montrul, S., & Sánchez-Walker, N. (2013). Differential object marking in child and adult Spanish heritage speakers. *Language Acquisition*, 20(2), 109-132.
- Montrul, S., Bhatt, R., & Girju, R. (2015). Differential object marking in Spanish, Hindi, and Romanian as heritage languages. *Language*, 91(3), 564-610.
- Montrul, S., Bhatia, A., Bhatt, R., & Puri, V. (2019). Case marking in Hindi as the weaker language. *Frontiers in psychology*, 10, 461.
- Namboodiripad, S., Kim, D., & Kim, G. (2019). English dominant Korean speakers show reduced flexibility in constituent order. *Proceedings of CLS*, 53.
- Ng, A. W., & Chan, A. H. (2012). Finger response times to visual, auditory and tactile modality stimuli. In *Proceedings of the international multiconference of engineers and computer scientists* (Vol. 2, pp. 1449-1454).
- Opitz, C. (2011). First language attrition and second language acquisition in a second language environment (Doctoral dissertation, Trinity College Dublin). TARA.
- Paradis, M. (1993). Linguistic, psycholinguistic, and neurolinguistic aspects of “interference” in bilingual speakers: The activation threshold hypothesis. *International Journal of Psycholinguistics*, 9(2)[26], 133–145.
- Paul, W. (2014). *New perspectives on Chinese syntax*. De Gruyter Mouton.
- Pavlenko, A. (2000). L2 influence on L1 in late bilingualism. *Issues in Applied Linguistics*, 11(2).
- Peeters, D., & Dijkstra, T. (2018). Sustained inhibition of the native language in bilingual language production: A virtual reality approach. *Bilingualism: Language and Cognition*, 21(5), 1035-1061.
- Polinsky, M. (2006). Incomplete acquisition: American Russian. *Journal of Slavic linguistics*, 14(2), 191-262.
- Polinsky, M., Zhang, B., & Gallo, C. (2010). Heritage Chinese: a new view from production. *Fourth Heritage Language Institute*.
- Putnam, M., & Sánchez, L. (2013). What’s so incomplete about incomplete acquisition?: A prolegomenon to modeling heritage language grammars. *Linguistic Approaches to Bilingualism*, 3(4), 478-508.

- Ribbert, & Kuiken. (2020). L2-induced changes in the L1 of Germans living in the Netherlands. *Bilingualism: Language and Cognition*, 13(1), 41-48.
- Satterfield, T., Tortora, C., & Cresti, D. (Eds.). (2002). *Current Issues in Romance Languages: Selected Papers from the 29th Linguistic Symposium on Romance Languages (LSRL), Ann Arbor, 8-11 April 1999* (Vol. 220). John Benjamins Publishing.
- Schmid, M. (2002). *First language attrition, use and maintenance: The case of German Jews in Anglophone countries* (Vol. 24). John Benjamins Publishing.
- Schmid, M. (2011). *Language attrition*. Cambridge University Press.
- Schmid, M. (2014). The debate on maturational constraints in bilingual development: A perspective from first-language attrition. *Language acquisition*, 21(4), 386-410.
- Schmid, M. (2019). The impact of frequency of use and length of residence on L1 attrition (Chapter 25). In M. Schmid & B. Köpke (Eds.), *The Oxford handbook of language attrition* (pp. 288–303). Oxford: Oxford University Press.
- Schmid, M., & Köpke, B. (2017). The relevance of first language attrition to theories of bilingual development. *Linguistic Approaches to Bilingualism*, 7(6), 637-667.
- Schmid, M., Köpke, B., Cherciov, M., Karayayla, T., Keijzer, M., De Leeuw, E., Mehotcheva, T., Montrul, S., & Polinsky, M. (2019). *The Oxford handbook of language attrition*. Oxford University Press.
- Seliger, H., & Vago, R. (Eds.). (1991). *First language attrition*. Cambridge University Press.
- Serratrice, L. (2013). Cross-linguistic influence in bilingual development: Determinants and mechanisms. *Linguistic Approaches to Bilingualism*, 3(1), 3-25.
- Setoguchi, E. (2008). Multiple-choice discourse completion tasks in Japanese English Language Assessment. *University of Hawai'i Second Language Studies Paper*, 27 (1), 41-101.
- Silva-Corvalán, C. (1994a). The gradual loss of mood distinctions in Los Angeles Spanish. *Language variation and change*, 6(3), 255-272.
- Silva-Corvalán, C. (1994b). *Language contact and change: Spanish in Los Angeles*. Oxford University Press.
- Sorace, A. (2000). Syntactic optionality in non-native grammars. *Second language research*, 16(2), 93-102.
- Sorace, A. (2011). Pinning down the concept of “interface” in bilingualism. *Linguistic approaches to bilingualism*, 1(1), 1-33.
- Steinhauer, K., & Kasparian, K. (2020). Brain Plasticity in Adulthood—ERP Evidence for L1-attrition in Lexicon and Morphosyntax After Predominant L2 Use. *Language Learning*, 70(S2), 171-193.

- Su, D. (2017). Significance as a lens: Understanding the Mandarin ba construction through discourse adjacent alternation. *Journal of Pragmatics*, 117, 204-230.
- T Schütze, C. (2016). *The empirical base of linguistics: Grammaticality judgments and linguistic methodology*. Language Science Press.
- Torrego, E. (1998). *The dependencies of objects* (Vol. 34). MIT Press.
- Tsao, F. (1987). A Topic-comment Approach to the Construction/从主题-评论的观点看“把”字句. *Journal of Chinese linguistics*, 15(1), 1-54.
- Tsimpli, I., Sorace, A., Heycock, C., & Filiaci, F. (2004). First language attrition and syntactic subjects: A study of Greek and Italian near-native speakers of English. *International journal of bilingualism*, 8(3), 257-277.
- van Bergen, G. (2006). *To ba or not to ba. Differential object marking in Chinese* (Master's thesis, Radboud University Nijmegen).
- Wang, M. (1987). *Transitivity and the ba-construction in Mandarin* (Doctoral dissertation, Boston University).
- Wen, X. (2006). Acquisition sequence of three constructions: An analysis of the interlanguage of learners of Chinese as a foreign language. *Journal of the Chinese Language Teachers Association*, 41(3), 89.
- Wen, X. (2010). Acquisition of the displacement ba-construction by English-speaking learners of Chinese. *Journal of the Chinese Language Teachers Association*, 45(2), 73-100.
- Weskott, T., Hörnig, R., Fanselow, G., & Kliegl, R. (2011). Contextual licensing of marked OVS word order in German. *Linguistische Berichte*, 2011(225), 3-18.
- Xu, H. (2012). The acquisition of the Ba construction by English-speaking learners of Chinese (Doctoral dissertation, University of Kansas).
- Yang, N., & van Bergen, G. (2007). Scrambled objects and case marking in Mandarin Chinese. *Lingua*, 117(9), 1617-1635.
- Yao, Y., Xie, Z., Lin, C.-J. C., & Huang, C.-R. (2020). Acceptability or Grammaticality: Judging Chinese Sentences for Linguistic Studies. In *Cambridge Handbook of Chinese Linguistics*. Cambridge University Press.
- Yang, Y. (2020). Acquisition of the Mandarin ba-construction by Cantonese Learners. *Macrolinguistics*, 8(1), 88-104
- Yilmaz, G., & Schmid, M. (2018). First language attrition and bilingualism. *Bilingual Cognition and Language: The state of the science across its subfields*, 54, 225.

Zhang, S. (2002). *Second language acquisition of the Ba-construction in contemporary mandarin Chinese* (Master's thesis, University of Southern California). ProQuest Dissertations and Theses.

Appendix A. Linguistic background questionnaires

English version

Gender:

Age:

L1:

Email:

Name:

At what age did you start acquiring this language? L1 () L2 ()

At what age did you come to the UK? ()

How many days a week do you use this language? L1 () L2 ()

In which particular context and for which specific purposes do you use this language?

L1 ()

L2 ()

How often are you in a situation in which you switch between languages?

()

Listed below are a number of “can-do” scales. They consist of statements about your language proficiency in both Mandarin and English. What I am interested in is how well or bad you perceive your current language proficiency in both languages to be. Please read each description carefully and write down the appropriate number to indicate whether, at the present time, you would be able to carry out each task in each language. Please use the following scale:

- 1 = I cannot do this at all
- 2 = I can do this, but with much difficulty
- 3 = I can do this, although with some difficulty
- 4 = I can do this fairly easily
- 5 = I can do this without any difficulty at all

Listening
1. I can understand most TV news and current affairs programs.
2. I can understand the main points of many radio or TV programs on current affairs or topics of personal or professional interest when the delivery is relatively slow and clear.
3. I have no difficulty in understanding any kind of spoken language, whether live or broadcast, even when delivered at fast native speed, provided that I have some time to get familiar with the accent.
4. I can understand extended speech even when it is not clearly structured and when relationships are only implied and not signaled explicitly.
5. I can understand the main points of clear standard speech on familiar matters regularly encountered in work, school, leisure, etc.

6. I can understand extended speech and lectures and follow even complex lines of argument provided the topic is reasonably familiar.
7. I can understand television programs and films without too much effort.
8. I can understand the majority of films in standard dialects.
Reading
1. I can understand long and complex factual and literary texts, appreciating distinctions of style.
2. I can read articles and reports concerned with contemporary problems in which the writers adopt particular attitudes or viewpoints.
3. I can read with ease virtually all forms of the written language, including abstract, structurally or linguistically complex texts such as manuals, specialized articles and literary works.
4. I can understand the description of events, feelings and wishes in personal letters.
5. I can understand texts that consist mainly of high frequency everyday or job-related language.
6. I can understand specialized articles and longer technical instructions, even when they do not relate to my field.
7. I can understand contemporary literary prose.
Writing
1. I can select style appropriate to the reader in mind.
2. I can write simple connected text on topics which are familiar or of personal interest
3. I can write an essay or report, passing on information or giving reasons in support of or against a particular point of view.
4. I can write complex letters, reports or articles which present a case with an effective logical structure which helps the recipient to notice and remember significant points.
5. I can write summaries and reviews of professional or literary works.
6. I can express myself in clear, well-structured text, expressing points of view at some length.
7. I can write clear, detailed text on a wide range of subjects related to my interest
8. I can write personal letters describing experiences and impressions.
9. I can write clear, smoothly flowing text in an appropriate style.
10. I can write letters highlighting the personal significance of events and experiences.
11. I can write about complex subjects in a letter, an essay or a report, underlying what I consider to be the salient issues.
Speaking
1. I can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible.
2. I can present a clear, smoothly flowing description or argument in a style appropriate to the context and with an effective logical structure which helps the recipient to notice and remember significant points.
3. I can enter unprepared into conversation on topics that are familiar, of personal interest or pertinent to everyday life (e.g. family, hobbies, work, travel, current events).
4. I can take part effortlessly in any conversation or discussion and have a good familiarity with idiomatic expressions and colloquialisms.
5. I can narrate a story or relate the plot of a book or film and describe my reactions.
6. I can deal with most situations likely to arise whilst travelling in an area where the language is spoken.
7. I can take an active part in discussion in familiar contexts, accounting for and sustaining my views.

8. If I do have a problem I can backtrack and restructure around the difficulty so smoothly that other people are hardly aware of it.
9. I can connect phrases in a simple way in order to describe experiences and events, my dreams, hopes and ambitions.
10. I can present clear, detailed descriptions on a wide range of subjects related to my field of interest.
11. I can express myself fluently and convey finer shades of meaning precisely.
12. I can explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.
13. I can briefly give reasons and explanations for opinions and plans.
14. I can express myself fluently and spontaneously without much obvious searching for expressions.
15. I can formulate ideas and opinions with precision and relate my contribution skillfully to those of other speakers.

Chinese version

语言能力自评量表

性别 年龄 联系方式

以下表格列出了一系列有关普通话在生活中的运用情况，请仔细阅读每一条，然后根据您自己的实际运用情况选择相应的选项，以评估您目前的普通话使用能力。请使用以下比例：

- 1 =我完全不能这样做
- 2 =我能做到这一点，但困难重重
- 3 =我可以做到这一点，虽然有些困难
- 4 =我可以相当容易地做到这一点
- 5 =我可以毫无困难地做到这一点

听力部分
1.我可以理解大多数电视新闻和时事节目。()
2.如果语速相对缓慢并且表达清晰的话，我可以理解广播或电视节目的内容要点，不管是时事还是个人言论或者专业领域相关。()
3.只要有足够的时间去熟悉当地的口音，即便是语速较快的直播或者广播，我也可以轻松的理解。()
4.即使一段相对较长的话，且没有清晰的条理和结构，我也能够理解。()
5.在熟悉的日常生活，工作或者学习中，如果对方发音准确的话，我可以知晓对方想要表达的东西。()

6.对于长篇幅的演讲稿或者句子，只要是我熟悉的话题，我也可以和对方进行相对复杂的讨论和交流。()
7.日常生活中的电视节目或者电影我可以准确理解。()
8.对于大部分使用标准普通话配音的电影我都能理解。()
阅读部分
9.我可以理解不同的写作风格，对于篇幅较长且复杂的的文学类或者非文学类的文本也可以阅读和理解。()
10.我可以阅读关于时事问题的文章和报道，即便它们都有相对专业的态度和观点。()
11.我几乎可以轻松阅读所有形式的书面文本，包括说明指南，专业文章或者文学作品等这些抽象，结构复杂或者语言复杂的文章。()
12.我可以理解私人信件中关于事件，感受和愿望的描述。()
13.我可以理解主要由高频日常用语或工作相关用语组成的文章。()
14.对于和我的领域无关的相对专业的文章和篇幅较长的技术说明我也可以理解。()
15.对于大部分的现代散文我都可以理解。()
写作部分
16.我可以根据可能出现的读者群体来选择对应的写作风格。()
17.针对熟悉或个人感兴趣的主题，我可以写出相对简单且较为连贯的段落。()
18.我可以撰写一篇文章或报告，来传递信息或者提供说明支持或反对某个观点的理由。()
19.我可以撰写相对复杂的信件，报告或文章，保证文本逻辑和结构清晰，并且能让读者读出文中的重点并将它们记住。()
20.我可以写专业作品或文学作品的摘要和评论。()
21.我可以撰写脉络清晰的文章来准确地表述自己的观点。()
22.对于我感兴趣的主题，我可以写出逻辑清晰，且相对详细的文章。()
23.我可以写一些描述经历和感想的私人信件。()
24.我可以写一些相对简单，连贯且风格适当的文章。()
25.我可以在信件中着重描写生活经历中的个人体验。()
26.我可以在信件，文章或者报告中写一些主题相对复杂的文章，同时突显出我觉得重要的点。()
口语部分

27.我可以使用相对流利的口语且能积极的进行交流互动，所以我能与普通话母语者进行日常的交流和沟通。()
28.我可以利用适合上下文的风格呈现清晰，流畅的描述或论证，并具有有效的逻辑结构，有助于接收者注意并记住重要的观点。()
29.对于相对熟悉和个人兴趣相关，或与日常生活相关的话题例如(家庭，爱好，工作，旅行，时事等)，我可以随时融入对话中。()
30.我可以毫不费力地参与任何对话或讨论，并且熟练使用惯用语和口语。()
31.我可以讲述一个故事，或者描述一本书或一部电影的情节，并准确描述我的反应。()
32.我可以处理在母语为普通话的地区旅行时可能出现的大多数情况。()
33.我可以在熟悉的话题里积极参与谈论，解释或者补充自己的观点。()
34.如果我在口语中犯了错，我可以立刻发现出错的地方，然后重新组织语言进行交流。一般身边的人不会察觉到我的失误。()
35. 我可以使用简单的话语来描述生活经历和体验，还有我的梦想，愿望和抱负。()
36.对于我感兴趣的话题我可以进行清楚详细的描述。()
37.我可以流利地表达自己的想法，并且可以准确地传达更精细的想法。()
38.我可以解读一个时事问题上的观点，并且罗列出利弊。()
39.我可以就意见和计划给出简要的理由和解释。/我可以简要说明意见和一个计划的理由和解释。()
40.我不需要费力去想怎么表达，就可以流利且自然地说出自己的想法。()
41.我可以在对话中准确地表达自己的想法和意见，让听者领会到我的意思。()

Appendix B. Grammaticality judgement stimuli

DOM (SBAV-*SAV)

我把蛇打死了 -我蛇打死了 I killed the snake.
村民把野猪打死了-村民野猪打死了 Villagers killed the boar.
我把老鼠赶跑了-我老鼠赶跑了 I chased the rat away.
我把苍蝇赶跑了-我苍蝇赶跑了 I chased the flies away.
我把小女孩弄哭了-我小女孩弄哭了 I made the little girl cry.
张三把小红弄哭了-张三小红弄哭了 Zhang San made Xiaohong cry.
我把小红吵醒了-我小红吵醒了 I woke Xiaohong up.
小红把小明吵醒了-小红小明吵醒了 Xiaohong woke Xiaoming up.

DOM (SBIV-SIV)

我(把)牛奶喝掉了 I (ba) milk drank.
我(把)果汁喝掉了 I (ba) juice drank.
我(把)饭吃完了 I (ba) rice ate.
我(把)蛋糕吃完了 I (ba) cake ate.
我(把)玻璃擦干净了 I (ba) window cleaned.
我(把)黑板擦干净了 I (ba) blackboard cleaned.
我(把)房子卖掉了 I (ba) house sold out.
我(把)车子卖掉了 I (ba) car sold out.

Appendix C. Contextual acceptability stimuli

ba preferred context	
<p>昨晚刮了一夜的大风。早上小红看到地上有块广告牌，她就问丽丽：这广告牌什么情况？丽丽回答道：</p>	<p>[ba sentence] 昨晚上大风把这块广告牌吹倒了。 [SVO sentence] 昨晚上大风吹倒了这块广告牌。</p>
<p>丽丽和张三是同事，他们在同一间办公室。有天早上丽丽来到办公室看到她桌上有杯咖啡，丽丽以为是别人不要的，就顺手扔进了垃圾桶。张三进来的时候看到咖啡不见了，就问丽丽：“我的咖啡呢？”丽丽回答说：</p>	<p>[ba sentence] 不好意思，我把你的咖啡扔掉了。 [SVO sentence] 不好意思，我扔掉了你的咖啡。</p>
<p>艾米丽在中国呆了一年了。她的中国朋友丽丽正在教她怎么做一道中国菜：番茄炒蛋。丽丽从冰箱里拿出三个鸡蛋，说道：</p>	<p>[ba sentence] 先把鸡蛋打碎。 [SVO sentence] 先打碎鸡蛋</p>
<p>小红喜欢读书。她昨天刚借的一本 400 页的书，今天就还回去了。图书管理员惊呆了，问道：</p>	<p>[ba sentence] 你这么快就把这本书看完了？ [SVO sentence] 你这么快就看完这本书了？</p>

SVO preferred context	
<p>小红在和邻居抱怨她的猫，丁丁。丁丁老爱往外跑。小红总要在饭点的时候到处去找丁丁。今天早上也不例外。小红找了十五分钟才把丁丁找回来吃饭。现在丁丁又跑不见了。小红抱怨道：</p>	<p>[ba sentence] 你看，她一把饭吃完就又出去了。 [SVO sentence] 你看，她一吃完饭就又出去了。</p>

<p>有人请去吃酒，小红回复说她也想去的，但是有事暂时脱不开身。小红解释道：</p>	<p>[ba sentence] 不好意思啊，我得先把孩子们送回家。</p> <p>[SVO sentence] 不好意思啊，我得先送孩子们回家。</p>
<p>小红昨晚要吃饭的时候听到有人敲门，开门看见是她的邻居，丽丽。丽丽已经吃过饭了，但是小红不知道，要丽丽坐下来和她一起吃。丽丽解释道：</p>	<p>[ba sentence] 不好意思啊，我已经把饭吃过了。</p> <p>[SVO sentence] 不好意思啊，我已经吃过饭了。</p>
<p>丽丽和小明是室友。晚上他们去看了电影。等回来走到家门口的时候，丽丽在包里各种找钥匙，她说：</p>	<p>[ba sentence] 哎呀，我好像把钥匙忘了带了。</p> <p>[SVO sentence] 哎呀，我好像忘了带钥匙了。</p>

Appendix D. Multiple-choice discourse completion task stimuli

ba preferred context	
<p>昨晚刮了一夜的大风。早上小红看到地上有块广告牌，她就问丽丽：这广告牌什么情况？丽丽回答道：</p>	<p>[ba sentence] 昨晚上大风把这块广告牌吹倒了。</p> <p>[SVO sentence] 昨晚上大风吹倒了这块广告牌。</p>
<p>丽丽和张三是同事，他们在同一间办公室。有天早上丽丽来到办公室看到她桌上有杯咖啡，丽丽以为是别人不要的，就顺手扔进了垃圾桶。张三进来的时候看到咖啡不见了，就问丽丽：“我的咖啡呢？”丽丽回答说：</p>	<p>[ba sentence] 不好意思，我把你的咖啡扔掉了。</p> <p>[SVO sentence] 不好意思，我扔掉了你的咖啡。</p>
<p>艾米丽在中国呆了一年了。她的中国朋友丽丽正在教她怎么做一道中国菜：番茄炒蛋。丽丽从冰箱里拿出三个鸡蛋，说道：</p>	<p>[ba sentence] 先把鸡蛋打碎。</p> <p>[SVO sentence] 先打碎鸡蛋</p>
<p>小红喜欢读书。她昨天刚借的一本 400 页的书，今天就还回去了。图书管理员惊呆了，问道：</p>	<p>[ba sentence] 你这么快就把这本书看完了？</p> <p>[SVO sentence] 你这么快就看完这本书了？</p>
<p>小红昨晚要吃饭的时候听到有人敲门，开门看见是她的邻居，丽丽。丽丽已经吃过饭了，但是小红不知道，要丽丽坐下来和她一起吃。丽丽解释道：</p>	<p>[ba sentence] 不好意思啊，我已经把饭吃过了。</p> <p>[SVO sentence] 不好意思啊，我已经吃过了饭。</p>
<p>张三和小红是室友。上个周末，张三给自己做了一盘饺子。他正要吃的时候，听到他卧室里的手机响了。张三就冲去</p>	<p>[ba sentence] 不好意思，我把那些饺子吃掉了。</p> <p>[SVO sentence]</p>

<p>卧室接电话了。等他挂了电话从卧室出来的时候，看见盘子里少了一半的饺子。小红正坐在沙发上看电视，张三就问小红：“另一半的饺子去哪里了？”</p>	<p>不好意思，我吃掉了那些饺子。</p>
<p>丽丽在给她的孩子讲睡前故事，但是故事太长了，而且很晚了。丽丽就说她第二天再接着讲完。可是孩子很想听完这个故事，求着丽丽说道：</p>	<p>[ba sentence] 你把故事讲完吧。</p> <p>[SVO sentence] 你讲完故事吧。</p>
<p>小红在屋里做事的时候，突然听到有人在敲门。她开门看到是宜家的配送人员送来一个盒子。小红说道：</p>	<p>[ba sentence] 请把这个盒子放下，你可以走了。</p> <p>[SVO sentence] 请放下这个盒子，你可以走了。</p>

SVO preferred context	
<p>小红在和邻居抱怨她的猫，丁丁。丁丁老爱往外跑。小红总要在饭点的时候到处去找丁丁。今天早上也不例外。小红找了十五分钟才把丁丁找回来吃饭。现在丁丁又跑不见了。小红抱怨道：</p>	<p>[ba sentence] 你看，她一把饭吃完就又出去了。</p> <p>[SVO sentence] 你看，她一吃完饭就又出去了。</p>
<p>有人请去吃酒，小红回复说她也想去的，但是有事暂时脱不开身。小红解释道：</p>	<p>[ba sentence] 不好意思啊，我得先把孩子们送回家。</p> <p>[SVO sentence] 不好意思啊，我得先送孩子们回家。</p>
<p>小红昨晚要吃饭的时候听到有人敲门，开门看见是她的邻居，丽丽。丽丽已经吃过饭了，但是小红不知道，要丽丽坐下来和她一起吃。丽丽解释道：</p>	<p>[ba sentence] 不好意思啊，我已经把饭吃过了。</p> <p>[SVO sentence] 不好意思啊，我已经吃过饭了。</p>

<p>丽丽和小明是室友。晚上他们去看了电影。等回来走到家门口的时候，丽丽在包里各种找钥匙，她说：</p>	<p>[ba sentence] 哎呀，我好像把钥匙忘了带了。</p> <p>[SVO sentence] 哎呀，我好像忘了带钥匙了。</p>
<p>琳达每天都督促她的儿子都喝牛奶。这周她在外出差不在家。下午的时候她就打了个电话给她儿子，问道：</p>	<p>[ba sentence] 你今天把牛奶喝了吗？</p> <p>[SVO sentence] 你今天喝牛奶了吗？</p>
<p>杰克和泰勒在同一个中文班里。明天他们会有一个测试。下课后，杰克问泰勒要不要和他一起复习。泰勒回答道：</p>	<p>[ba sentence] 不好意思，下午我得把我妈妈送去机场。</p> <p>[SVO sentence] 不好意思，下午我得送我妈妈去机场。</p>
<p>今天是丽丽的生日，她邀请了好多朋友一起庆祝，小红也来了。她们玩了一晚上，看电影，吃蛋糕，玩游戏，特别开心。小红表示要先走了，明天还得工作。丽丽想确认下小红还能不能自己开车回去，问道：</p>	<p>[ba sentence] 你把酒喝了吗？</p> <p>[SVO sentence] 你喝酒了吗？</p>
<p>小红和丽丽每天下午三点都在一块上数学课。丽丽每次都是又困又累而小红却特别清醒。小红打算和丽丽分享下她精神抖擞的小秘密，她告诉丽丽：</p>	<p>[ba sentence] 我每次都把咖啡喝了才来上课。</p> <p>[SVO sentence] 我每次都喝了咖啡才来上课。</p>

Appendix E. Paired grammaticality judgement stimuli

SBAV-*SAV

1.我把蛇打死了- 我蛇打死了
I killed the snake.
2.村民把野猪打死了- 村民野猪打死了
Villagers killed the boar.
3.我把老鼠赶跑了- 我老鼠赶跑了
I chased the rat away.
4.我把苍蝇赶跑了- 我苍蝇赶跑了
I chased the flies away.
5.我把小鸡踩死了- 我小鸡踩死了
I tramped the chick to death.
6.我把虫子踩死了- 我虫子踩死了
I tramped the bugs to death.
7.我把小松鼠吓跑了- 我小松鼠吓跑了
I scared the squirrel away.
8.我把蝴蝶吓跑了- 我蝴蝶吓跑了
I scared the butterfly away.
9.我把小女孩弄哭了- 我小女孩弄哭了
I made the little girl cry.
10.张三把小红弄哭了- 张三小红弄哭了
Zhang San made Xiaohong cry.
11.我把小红吵醒了- 我小红吵醒了
I woke Xiaohong up.
12.小红把小明吵醒了- 小红小明吵醒了
Xiaohong woke Xiaoming up.
13.我把老师撞伤了- 我老师撞伤了
I bruised the teacher.
14.小红把张三撞伤了- 小红张三撞伤了
Xiaohong bruised Zhangsan.
15.妈妈把妹妹骂哭了- 妈妈妹妹骂哭了
Mom scolded my sister and made her cry.
16.老师把小刚骂哭了- 老师小刚骂哭了
The teacher scolded Xiaogang and made him cry.

SBIV-SIV

1. 我(把)牛奶喝掉了 I (ba) milk drank.
2. 我(把)果汁喝掉了 I (ba) juice drank.
3. 我(把)饭吃完了 I (ba) rice ate.
4. 我(把)蛋糕吃完了 I (ba) cake ate.
5. 我(把)苹果洗干净了 I (ba) apple cleaned.
6. 我(把)碗洗干净了 I (ba) dishes cleaned.
7. 我(把)作业写完了 I (ba) homework finished.
8. 我(把)报告写完了 I (ba) report finished.
9. 我(把)玻璃擦干净了 I (ba) window cleaned.
10. 我(把)黑板擦干净了 I (ba) blackboard cleaned.
11. 我(把)房子卖掉了 I (ba) house sold.
12. 我(把)车子卖掉了 I (ba) car sold.
13. 我(把)电视机关掉了 I (ba) tv turned off.
14. 我(把)电脑关掉了 I (ba) computer turned off.
15. 我(把)电池用完了 I (ba) battery ran out of.
16. 我(把)墨水用完了 I (ba) ink ran out of.

SBOVP-*SVOP

1.我把那盆花摆在阳台上了-我摆那盆花在阳台上了
I put the potted flower on the balcony.
2.我把车停在路边了-我停车在路边了
I parked my car at the side of the road.
3.我把电视机放在客厅了-我放电视在客厅了
I put the TV in the living room.
4.我把中文书塞进书包里了-我塞中文书进书包里了
I stuffed the Chinese book in my schoolbag.
5.我把电话号码写在黑板上了-我写电话号码在黑板上了
I wrote the phone number on the blackboard.
6.我把饺子丢进锅里了-我丢饺子进锅里了
I threw dumplings into the pot.
7.我把自行车锁在家里了-我锁自行车在家里了
I locked my bike at home.
8.我把地图挂在墙上了-我挂地图在墙上了
I put the map on the wall.
9.别把衣服摆在床上-别摆衣服在床上
Don't lay your clothes on the bed.
10.别把小轿车停在操场上-别停小轿车在操场上
Don't park your car on the playground.
11.别放水果在冰箱里-别放水果在冰箱里
Don't keep the fruit in the fridge.
12.别把垃圾塞在书桌的抽屉里-别塞垃圾在书桌的抽屉里
Don't stuff your rubbish in your desk drawer.
13.别把你的名字写在教室的墙上-别写你的名字在教室的墙上
Don't write your name on the classroom wall.
14.别把硬币丢在这个水池里-别丢硬币在这个水池里
Don't drop your coins in the sink.
15.别把小狗锁在厕所里-别锁小狗在厕所里
Don't lock your puppy in the toilet.
16.别把中国结挂在书柜上-别挂中国结在书柜上
Don't hang Chinese knots on your bookcase.