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Syntactic and Discourse Features in Chinese Heritage Grammars: A Case of Acquiring Features in the Chinese Sentence-Final Particle *ba*

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Abstract: This study investigates how syntactic and discourse features of Chinese sentence-final particles (the question particle *ba* and the suggestion particle *ba*) are reconfigured in Chinese heritage grammars. It has been argued that features of the Chinese particles *ba* are present in English but are configured differently. An acceptability judgment task, a discourse completion task, and a translation task were adopted in this study. In total, 35 Chinese heritage speakers and 18 Chinese native speakers took part in this study. The results show that none of the heritage speaker groups had any problem in configuring the discourse feature of the suggestion particle *ba* and the syntactic features of the question particle *ba*. However, none of them could successfully reconfigure the discourse feature of the question particle *ba*. It seems that the effects of dominant language transfer, reduced Chinese input, and limited processing resources play roles in the reconfiguration of discourse features in heritage grammars. As compared to previous L2 studies regarding the same phenomenon, heritage speakers with more and early Chinese input seem to have advantages over L2 learners in terms of syntactic features. L2 learners are found to be slightly better than heritage speakers in terms of reconfiguring some discourse properties.

Keywords: sentence-final particle; Chinese heritage speakers; features

1. Introduction

Heritage speakers are those simultaneous or sequential bilinguals whose weaker language corresponds to the minority language of their society and whose stronger language is the dominant language of that society (Polinsky 2018b)¹. These speakers' acquisition of their heritage language is considered an important issue in the field of language acquisition, as it bridges L1 and L2 acquisition. Many studies involving heritage speakers concern their ultimate achievements in their heritage language (Montrul 2009), the effects of language transfer from the dominant language (Montrul 2010; Montrul and Ionin 2012), and heritage language attrition (Montrul 2002, 2008, 2011a; Pallier 2007; Polinsky 2011), as well as their differences from L1 learners and L2 learners (Montrul 2010; Montrul and Foote 2014; Polinsky and Kagan 2007; Rothman 2007). Recently, a significant body of research has explored the underlying characteristics of Spanish heritage speakers (Cuza 2012, 2016; Valenzuela

¹ In the literature, it is difficult to obtain a clear-cut definition of heritage language speakers. Polinsky (2018b) has reviewed several major arguments and pointed out that her definition tries to tie together different dimensions such as early bilingualism, simultaneous and sequential acquisition, and the unbalanced relationship between the two languages. By quoting Polinsky's definition, we hope to present a more general picture of the definition of heritage speakers and their complex nature. For more definitions and discussions, please see Valdés (2000), Fishman (2001), Rothman (2009), and Kupisch and Rothman (2018), among others.

et al. 2015), Russian heritage speakers (Polinsky 2011, 2016, 2018a; Sekerina and Sauermann 2015), and Korean heritage speakers (Chung 2013; Kim 2007; Kim et al. 2009). However, there have been few investigations of Chinese heritage speakers' acquisition of syntactic and discourse features. This study tries to fill this gap by providing evidence related to Chinese heritage speakers in terms of their acquisition of Chinese language properties.

Among the research on heritage grammars, the feature properties of linguistic phenomena (i.e., syntactic, semantic, discourse features) and the influence of the dominant language have all been extensively investigated, particularly under the theoretical framework of the Interface Hypothesis (Montrul 2012; Montrul and Ionin 2012; among others). The Interface Hypothesis (Sorace 2011; Sorace and Filiaci 2006; Sorace and Serratrice 2009; Tsimpli and Sorace 2006) argues that structures that lie at the core of a syntax system (narrow syntax) or at internal interfaces (such as syntax-semantics) are more impervious to cross-linguistic influences than features that lie at syntax interfaces with other modules (external interfaces), such as the syntax–discourse interface. Montrul and Polinsky (2011) further argue that heritage speakers are an “important testing ground” for the Interface Hypothesis, directing researchers' attention from the L2 field to heritage language acquisition. On the basis of findings from empirical studies concerning the linguistic knowledge of heritage speakers and L2 speakers, Montrul (2012) summarizes that syntax (and phonology) are the most resilient area(s) of grammar for heritage speakers, where they have the most advantages over L2 learners. However, aspects at the syntax-discourse interface (semantics and inflectional morphology) seem to be very vulnerable for heritage speakers. By investigating the performance of verb placement (the V2 phenomenon) and nominal agreement in the NPs (gender, number, and definiteness) of both Swedish heritage speakers and L2 learners of Swedish, Håkansson (1995) found that the Swedish heritage speakers followed the V2 rule whereas L2 learners were highly inaccurate in their application. In contrast, in the syntax-discourse domain Keating et al. (2011) showed that although both Spanish L2 learners and heritage speakers were significantly different from Spanish native speakers in preferring the relevant antecedent for overt and null pronouns, there was no difference between them in their choices, which suggests that the heritage speakers did not outperform the L2 learners in terms of syntax and discourse related areas. Regarding transfer effects from dominant languages at interfaces, Montrul (2010) argues that the effects may be found in both Spanish heritage speakers and L2 learners' grammars, and more so at syntax-semantic/pragmatic interfaces than in the core syntax. Montrul and Ionin (2012) further confirmed these findings, reporting transfer effects from the dominant language in the semantic field during the interpretation of definite plural articles in Spanish by L2 learners of Spanish and English-dominant Spanish heritage speakers. Lee (2016) also found that both L2 learners and heritage speakers of Korean exhibited transfer effects from their dominant language, but this effect was stronger in the L2 group. Other recent studies concerning properties at interfaces include Kaltsa et al. (2015), Laleko and Polinsky (2016), Leal et al. (2018) and others.

However, the Interface Hypothesis is not without some debates. Hopp (2011), Pires and Rothman (2011), and O'Grady (2011) propose that computational or processing complexity are better factors than interfaces. Duffield (2011), Montrul (2011b), Pérez-Leroux (2011), and White (2011) all criticize the problematic distinction between internal and external interfaces, pointing out that linguistic structures may involve multiple interfaces and learners' difficulties may reside at several of them, and there may also be conflict at the same interface from different linguistic phenomena. Sorace (2012, p. 213) proposes that researchers should “instead allow for a range of interface conditions, graded according to their computational complexity and their dependence on extra-linguistic factors”, and this may lead to a better understanding of learner grammar facts.

In a further discussion of acquisition difficulties in bilingualism and heritage grammars, de Prada Pérez (2010) argues that complexity, as an important alternative explaining factor to interfaces, resides in variability, and she proposes a Vulnerability Hypothesis (de Prada Pérez 2019) that establishes a cross-linguistic permeability hierarchy along a variability continuum spanning from categorical distributions to highly variable context. In her proposal, a linguistic phenomenon is classified by its

relative frequency as being a categorical distribution or a variable distribution. Her study on the use of null and overt pronominal subjects by Spanish-Catalan bilinguals (and Spanish- and Catalan-dominant monolinguals) shows that for categorical distributions, where a specific form is used (near) exclusively, are more invulnerable, whereas variable distributions, where more than one form can be used, are vulnerable to cross-linguistic influences. She further argues that learners with higher proficiency may be affected by cross-linguistic influences in highly variable phenomena, but lower proficiency learners also exhibit this influence in less variable phenomena. However, as [Hoot \(2017\)](#) has pointed out, complexity may vary from structure to structure, and it is hard to generalize its power across linguistic constructions and in heritage language acquisition. As for the variability proposal, it depends on ratings of the frequency/distribution of structures, which relate to social contacts (mostly relying on monolinguals' ratings) and which may be hard to decisively define. As will be discussed below, in the literature the underlying operating mechanism in heritage grammars is influenced by various conditions, as compared to monolingual baselines.

[Polinsky and Scontras \(2020\)](#) discuss the deviation of heritage grammars from the relevant baseline. They propose that this deviation is mainly triggered by the input of the heritage language from which the heritage grammar is acquired (both quantity and quality), as well as the economy of online resources when operating in the heritage language. They conclude that the unique outcomes among heritage speakers (i.e., differences from both the baseline and L2 speakers) are affected by reduced input quality as well as reduced quantity in these heritage speakers' daily lives. In a summary of empirical studies concerning heritage grammars, [Polinsky and Scontras \(2020\)](#) argue that in terms of quantity, the greater their exposure to the heritage language over a longer period of time, the more effectively the heritage grammars are acquired, and thus these speakers will obtain a more balanced bilingual ability. Furthermore, the recency of exposure to the heritage language, both cumulative exposure and current exposure in daily life, are predictive of grammatical outcomes. In terms of quality, community size has an effect on the proficiency of heritage grammars ([Gathercole and Thomas 2007](#); [Gollan et al. 2015](#)). When it comes to the online processing of heritage languages, due to the limited nature of processing resources as well as the additional cost of operating in a less proficient language, heritage speakers tend to apply economical, superficial, and direct strategies, which leads to their preferences for avoidance of ambiguity, resistance to irregularity, and shrinking of structures.

To summarize, it seems that both the recent complexity/variable proposals and the Interface Hypothesis indicate that heritage speakers and bilinguals have difficulty with certain properties (mostly discourse/pragmatics), and this seems ultimately to be an inherent part of bilingualism itself ([Hoot 2017](#)). In addition, the nature of the linguistic phenomenon being acquired, the influence of dominant languages and factors leading to divergence from monolinguals are also important in heritage language acquisition. The Chinese sentence-final particles (SFPs) *ba*, which will be discussed in the next section and which bear mainly discourse as well as other syntactic features, will provide good testing grounds for these theoretical debates.

2. Features of SFPs *ba*

Features, as the undividable ultimate building blocks of language ([Chomsky 2005](#); [Jackendoff 2002](#)) have long been the focus of much linguistic research in both the theoretical and applied linguistic fields. For [Jackendoff \(2002\)](#), words in the lexicon are fully specified with lexical, syntactic, and even discourse pragmatic features already, and no syntactic procedures are needed to enable the specification of features. It is these features that explain linguistic variations. The analysis of the linguistic phenomena in question (i.e., the SFPs *ba*) will be based on this feature perspective.

2.1. Discourse Features of the Suggestion SFP *ba*

The suggestion SFP *ba* in Chinese mainly types a suggestion sentence, as shown in (1). In (1b), with the assistance of the suggestion SFP *ba*, it sounds soft to signify a suggestion. In contrast, in (1a) without the particle, the tone of the sentence is very harsh, as in giving an order. Therefore, we propose

that there is a discourse [suggestion] feature attached to the suggestion SFP *ba*, bearing softening and suggestive functions in Chinese.

- (1) a. Kuài diǎnr zǒu!
 hurry little go
 ‘Hurry up!’
 b. Kuài diǎnr zǒu ba!
 hurry little go BA
 ‘Hurry up, please!’ (Chao 1968, p. 807)

However, there is no suggestive SFP in English. The [suggestion] feature is realized by several suggestive structures—for example, ‘Let’s (Let us) ...’, ‘We/You/They/He’d (We/You/They/He had) better ...’. Sentences without such structural elements are merely general statements; compare (2a–c) and (3a–c).

- (2) a. We are going to the park this afternoon.
 b. We are going inside as it is going to rain outside.
 c. We will finish this work before starting something new.
 (3) a. Let’s go to the park this afternoon.
 b. We’d better go inside as it is going to rain outside.
 c. Shall we finish this work before starting something new?

2.2. Syntactic and Discourse Features of the Question SFP *ba*

The question SFP *ba* in Chinese has both syntactic ([Q] and [-wh]) and discourse ([confirmation seeking]) features. In syntax, the addition of the question SFP *ba* to a declarative sentence converts the sentence into a question, as shown in (4). It is merely a declarative sentence in (4a), but in (4b) the addition of the particle at the end of the sentence means that it becomes a question. Thus, there is a syntactic [Q] feature attached to this particle. Furthermore, interrogative wh-phrases are not allowed to be present in an SFP *ba* question, i.e., a syntactic [-wh] feature is attached to this particle; see (5) for an example.

In discourse, the use of the question SFP *ba* in a sentence presents the speaker’s attitude of certainty in the conversation (Hu 1987; Lu 1985; Qu 2006). In other words, the use of the question SFP *ba* provides an assumption and asks for a confirmation (Xu 2003). In (4b), the speaker asks the SFP *ba* question with some certainty and expects an answer to confirm his/her assumptions. Therefore, a discourse [confirmation seeking] feature is attached to this particle.

- (4) a. Tā huì kāi chē.
 3SG can drive car
 ‘He(She) can drive a car.’
 b. Tā huì kāi chē ba?
 3SG can drive car BA
 ‘He(She) can drive a car, can’t he(she)/right?’
 (5) *Nǐ wèn le shéi ba?
 2SG ask PERF who BA
 Intended: ‘Whom did you ask?’

In English, tag questions “express a need for confirmation of the statement expressed in the declarative” (Huddleston and Pullum 2005, p. 164). We propose that the functions (typing a question, asking for confirmation) and restrictions (disallowing interrogative wh-phrases) of the question SFP *ba* are manifested by the tag questions in English, which is in accordance with Tang (2015a, 2015b, 2016a, 2016b). The tag question in English (e.g., *The dog is yours, is it/isn’t it/right?*) mainly consists of a declarative clause (i.e., *The dog is yours*), which expresses the view of the speaker, and a tag clause (i.e., *is it/isn’t it/right?*), which indicates that the speaker wishes his/her view to be confirmed. The tag part of the question can be viewed as a reduced form of the yes-no question, whose content can be recovered

from the preceding declarative clause (Huddleston and Pullum 2005). There are two categories of tag questions in English: the canonical tag question, and the invariant tag question. The former can be further divided into the non-disjunctive question (e.g., *The dog is yours, is it?*) and the disjunctive question (e.g., *The dog is yours, isn't it?*); the latter uses *right*, *yeah* and is very colloquial (e.g., *The dog is yours, right?*). In syntax, both types of tag question in English are conjunction structures (Kayne 2016; Sailor 2009), which have two individual CPs. Kayne (2016) argues that the declarative clause in the English tag question is labeled as the external conjunct, i.e., *John is a student*, and the yes-no tag as the internal conjunct, i.e., *isn't he a student*, as in (6b). He also proposes that these two conjuncts are connected by a disjunctive conjunction F. Sailor (2009) suggests that the surface derivation of the tag question is due to ellipsis of the repeated NP or VP, as in (6), where the tag question in (6a) is a result of the deletion of the NP *a student* in (6b). As for the derivation of invariant tag questions, i.e., those with 'right', 'yeah', etc., Kayne (2016) points out that there is a silent element, *ISN'T THAT*, as in (7b) in the internal conjunct. In this sense, the internal conjunct of the invariant tag questions is also a fully-fledged CP. Therefore, we propose that the [Q], [-wh] and [confirmation seeking] features, as with the Chinese question SFP *ba*, are attached to the internal conjunct of the tag question in English, which is a fully-fledged CP (the tag part), specifically the C of the CP.

- (6) a. John is a student, isn't he?
 b. [CP John is a student] F [CP isn't he a student?]
 external conjunct internal conjunct

- (7) a. We are on the list, right?
 b. [CP We are on the list] F [CP ISN'T THAT right?] (irrelevant syntactic details omitted)

In fact, as pointed out by Tang (2016b), Chinese does have tag questions that have a parallel underlying syntactic structure as tag questions in English. There are also canonical and invariant forms of tag questions in Chinese (Li and Thompson 1981; Tang 1988, 2015a, 2015b, 2016a, 2016b; see examples 8, 9). The surface derivation of both forms of Chinese tag questions is also due to ellipsis of the repeated element (which is a CP in Chinese, as in 8, but an NP or VP in English, as in 6), as well as the existence of a silent null element (which is an empty category *e* in Chinese, as in 9, but a silent element *ISN'T THAT* in English, as in 7).

- (8) a. Nǐ yào táotàidiào zhè pǐ mǎ, shì ma?
 2SG will eliminate this CL horse COP MA
 'You will eliminate this horse, will you?' (Tang 1988, p. 271)
 b. [CP Nǐ yào táotàidiào zhè pǐ mǎ] F [CP shì Nǐ yào táotàidiào zhè pǐ mǎ ma?]
 (Tang 2016b, p. 32)
- (9) a. Nǐmen shì jiǔ diǎnzhōng kāimén de, duìbuduì?
 2PL COP nine o'clock open door DE yes-NEG-yes
 'Yours (/your store) opens at nine o'clock, right?' (Li and Thompson 1981, p. 546)
 b. [CP Nǐmen shì jiǔ diǎnzhōng kāimén de]_i F [CP *e_i* duìbuduì?]
 (Tang 2016b, p. 31)

What, then, is the role of the question SFP *ba*? In line with Yan and Yuan (2020), we agree that it is an 'additional' means to realize the function of English tag questions in Chinese.

Furthermore, there is an additional fact that we cannot ignore, which is that Chinese has an SFP *ma* that has same syntactic features (both [Q] and [-wh]; see examples 10, 11) as the question SFP *ba*. Unlike the question SFP *ba*, there is an [information seeking] discourse feature in the SFP *ma*. That is, in an SFP *ma* yes-no question (e.g., 10b), genuine information is being sought from the listener; thus either a positive answer (like 'Yes, he can') or a negative one ('No, he can't') would be suitable, but no particular answer is necessarily expected. This is in contrast to the question SFP *ba* question, as in (4b).

- (10) a. Tā huì kāi chē.
 3SG can drive car
 ‘He(She) can drive a car.’
- b. Tā huì kāi chē ma?
 3SG can drive car MA
 ‘Can he(he) drive a car?’
- (11) *Nǐ wèn le shéi ma?
 2SG ask PERF who MA
 Intended: ‘Whom did you ask?’

3. Previous Research

On the basis of the linguistic comparison between Chinese and English in terms of the features of the SFPs *ba* in the above section, it seems that the realization of relevant features is asymmetric across the two languages. In other words, there is structural ambiguity between Chinese and English. For the suggestion SFP *ba*, there seems to exist a one-to-many mapping between Chinese and English, whereas for the question SFP *ba* there is a many-to-one mapping (also see [Yan and Yuan 2020](#)). The structural ambiguity, which has been summarized by [Müller \(1998\)](#), states that in language acquisition, if a phenomenon has two possible structures in one language but only one in another language, only the similar structure shared by the two languages will be kept. That is, the structure that is not shared will be abandoned in learners’ grammars.

[Scontras et al. \(2017\)](#) showed that in a situation where English allows both surface and inverse interpretations of doubly quantified sentences (e.g., *A shark attacked every pirate*, which can be interpreted in two different ways: a. *There was a single shark that attacked multiple pirates*, or b. *For each pirate, there was a (different) shark that attacked him.*), English-dominant heritage speakers of Mandarin lack scope ambiguities in their Mandarin heritage grammar, which allows only interpretation (a) for the above English sentence. This demonstrates that heritage speakers prefer a one-to-one surface mapping from structure to interpretation. [Ronai \(2018\)](#) followed up on Scontras et al.’s work and found that both Hungarian-dominant heritage speakers of English and English-dominant heritage speakers of Hungarian disallow inverse interpretations of doubly quantified sentences (Hungarian is like Mandarin, disallowing inverse interpretation of scope ambiguity). This further demonstrates that heritage speakers tend to prefer a simplified structure, and they struggle with one-to-many mappings between form and meaning in their heritage grammars. [Polinsky \(2018b\)](#) also concluded that heritage speakers may have morphology problems, as they overextend regular tense morphology and they prefer to reduce multiple allomorphs into one. However, [Anderssen et al. \(2018\)](#) found a different result; in their study, the acquisition of possessive DPs by English-dominant heritage speakers of Norwegian was investigated. In Norwegian, both Possessive-N and N-Possessive are allowed; however, only Possessive-N is allowed in English. Their results show that Norwegian heritage speakers overuse N-Possessive structures and this effect is proficiency related; it seems that learners “inhibit” similar structures between the two languages, thus contradicting to structural ambiguity arguments (i.e., [Müller 1998](#); among others).

In terms of the Chinese SFPs, [Wen \(2014\)](#) studied the pragmatic development of 48 learners of Chinese in producing requests through a discourse completion task. One of her research findings showed that Chinese learners behaved differently from Chinese native speakers, particularly in the use of pragmatically functional particles and phrases such as the suggestion SFP *ba* and the tag-question appealer *xíngma* (‘OK’) for permission. Wen also found that learners have problems with opaque and similar non-literal expressions such as *xíngma* (‘OK’) and *hǎobùhǎo* (‘OK’). By comparing the performance of requests in the grammars of Chinese heritage learners and L2 learners, [Wen \(2019\)](#) found that the SFP *ba* was rarely produced by heritage and L2 learners, although it was frequently used by Chinese native speakers. Furthermore, she also found that the heritage speakers slightly under-produced tag-questions in comparison with L2 learners, and therefore she argued that the

heritage speakers adopted a more conservative strategy. This is in line with Dekeyser (2005), in that the optionality of a form and meaning connection leads to a lack of transparency, which increases the acquisition difficulties.

Using a similar experimental design (see Section 4 for details) but a different learner group, Yan and Yuan (2020) investigated features of the question and suggestion SFPs *ba* and their behaviors in the grammars of English-speaking L2 learners of Chinese. This study concluded that L2 learners have no problem with the features of the suggestion SFP *ba*, but have substantive problems with both the syntactic [Q] and the discourse [confirmation seeking] features of the question particle *ba*, and only at advanced levels could L2 learners successfully reconfigure the discourse [confirmation seeking] feature. These results suggest that the input and the L1–L2 (i.e., English–Chinese) structural difference in realizing the features of the particles significantly affected the successful acquisition of the features. In particular, the ‘one-to-many’ form–meaning mapping imposes great difficulties for L2 learners.

In this study, we look further at the re-configuration of the features of the SFPs *ba* in heritage grammars. With relatively more and earlier input than L2 speakers of Chinese, but also with influence from the dominant language (English), we expect to discover whether the syntactic and discourse feature properties carried by the Chinese SFPs *ba* will exhibit any differences for heritage speakers.

4. This Study

In particular, we are interested in the following questions:

- (1) How are the syntactic and discourse features represented in Chinese heritage speakers’ grammars?
- (2) What are the possible hidden mechanisms that influence their successful acquisition?

4.1. Participants

In total, 35 Chinese heritage speakers and 18 Chinese native speakers participated in this study. Table 1 gives detailed information about the participants. All the heritage speakers were born and raised in an English-speaking country, except for six who reported immigrant status (before the age of 5). They all reported English as their dominant (native) language. Almost all the heritage speakers had frequent exposure to Chinese, including both Mandarin and dialects, since they were young (32 reported ‘always’, 3 ‘seldom’)—i.e., in their family there was at least one parent frequently speaking Chinese to them. Among these heritage speakers, 71.4% (25 out of 35) had exposure to Mandarin. The remaining 28.6% had exposure to Chinese dialects, which were mainly the Cantonese and Fujian dialects². In this study, the amount of naturalistic exposure and formal learning of Chinese by heritage speakers were combined and seen as early input for these speakers³. Data collection took place in four universities in Beijing and Shanghai in China while the heritage speakers were taking a Chinese language course.

² Three heritage speakers reported that they had exposure to the Wenzhou dialect, Taiwanese, and Hakka respectively, but at the same time they also reported exposure to Mandarin.

³ As a reviewer has pointed out, it is better to minimize the amount of learning (especially classroom instruction) that heritage speakers receive, in order to be more confident that any effect that we are seeing is really the outcome of naturalistic heritage language acquisition rather than classroom “re-acquisition”. However, it was almost impossible for us to find ideal data from HSs who have no experience of formal learning of Chinese. Among our Chinese HSs, almost all of them reported early exposure to and learning of Chinese since a very young age, either by attending formal classes or weekend classes or via informal learning at home (this was probably due to a cultural phenomenon whereby the parents of our HSs expect more connections to the Chinese language and culture). Moreover, the inclusion of the time spent learning Chinese allows us to make comparisons with L2 learners of Chinese, who have also been learning Chinese but from a later age. Therefore, the findings can to some extent inform us about whether early Chinese input has any effects on the acquisition of relevant features.

Table 1. Information about participants in each group.

Groups	Number of Participants	Average Age	Average Months of Studying Chinese ⁴	Average Months in China	Mean Score in Cloze Test (SD)
HS High-int	16	24	199	13.5	25.3 (3.5)
HS Advanced	19	22	187	23.2	33.2 (2.4)
Native	18	23	N/A	N/A	38.8 (1.1)

Notes: ‘HS High-int’ hereafter stands for heritage speakers at high-intermediate proficiency levels, and ‘HS Advanced’ hereafter stands for heritage speakers at advanced proficiency levels.

All the Chinese native speakers were born and raised in northern China, and none of them had ever been to an English-speaking country. They were mainly post-graduate students majoring in Arts and Humanities at a university in Beijing. The heritage speakers were divided into two proficiency groups according to their performance in an established cloze test, which consisted of two short passages with 40 blanks (cf. Yuan 2014, 2015; Yuan and Dugarova 2012). The Chinese native speakers also participated in the cloze test, and they were treated as the baseline group. Results of a one-way ANOVA and post hoc Tukey tests indicate that all the groups were significantly different from each other ($F(2, 50) = 123.537, p < 0.001$).

4.2. Tasks and Procedures

4.2.1. Acceptability Judgment Task (AJT)

The Acceptability Judgment Task explicitly asks participants to judge sentences as acceptable or not. In particular, this task is used to test whether participants have acquired the syntactic [Q] and [-wh] features of the question SFP *ba*. Examples are shown in (12) and (13). Participants who accepted the sentence in (12a), and at the same time rejected that in (12b), counted as evidence that [Q] and [-wh] features were attached to the question *ba* in their Chinese grammars. Meanwhile, control sentences, as shown in (13), were also included to ensure that the acceptance or rejection of the experimental sentences was not for any lexical or structural reasons.

The major consideration in adopting the AJT in this study is because of its advantages in providing acceptance and especially rejections of the structures. Mackey and Gass (2005) have pointed out that the AJT explicitly provides evidence of what participants include and particularly exclude in their grammars. In this study, we are interested in syntactic features (i.e., [Q] and [-wh] features), which were tested by asking participants to judge grammatical and ungrammatical sentences. However, ungrammatical sentences never (or at least rarely) occur in real linguistic environments. AJT can thus provide us with at least some evidence of the learners’ rejection of ungrammatical sentences.

There were four tokens for each of the four types. In total there were 16 test items, and they were randomized with 128 other sentences that were used either to test other aspects of L2 Chinese grammars or to serve as distractors. In the AJT, as well as in the tasks in the following sections, only basic everyday words were included in the tasks. Words that might be new or difficult for the participants were provided with their English translations. The instructions were given to the HSs in English and to the Chinese native speakers in Chinese.

⁴ Here, the statistics are an overall measurement of their time spent learning Chinese. Future studies could further investigate the effects of different learning status (i.e., formal vs. informal) on the acquisition of Chinese.

- (12) a. Experimental A:
Mǎlǐ chángcháng qù chāoshì mǎi cài ba?
Mary often go supermarket buy vegetable BA
‘Mary often goes to the supermarket to buy vegetables, right?’
b. Experimental B:
Mǎlǐ wèishénme chángcháng qù chāoshì mǎi cài ba?
Mary why often go supermarket buy vegetable BA
Intended: ‘Why does Mary often go to the supermarket to buy vegetables?’
- (13) a. Control A:
Mǎlǐ chángcháng qù chāoshì mǎi cài.
Mary often go supermarket buy vegetable
‘Mary often goes to the supermarket to buy vegetables.’
b. Control B:
Mǎlǐ wèishénme chángcháng qù chāoshì mǎi cài?
Mary why often go supermarket buy vegetable
‘Why does Mary often go to the supermarket to buy vegetables?’

This task was designed with the E-Prime 2.0 software, and sentences were presented on a computer monitor one by one. Participants were tested individually. They were required to press a key to indicate their judgment of the degree of the acceptability of each sentences: key ‘A’ represented ‘completely unacceptable’, key ‘D’ ‘probably unacceptable’, key ‘J’ ‘probably acceptable’, and key ‘L’ ‘completely acceptable’. A separate key ‘T’ was used to represent the option ‘I don’t know’. To make these keys and their representations clearer, small word tags were stuck on the relevant keys. Participants were also given six practice examples before they begin the main test.

4.2.2. Dialogue Completion Task (DCT)

The acquisition of the [confirmation seeking] feature of the question *ba* and the [suggestion] feature of the suggestion *ba* were tested in this task. The DCT allows us to see whether participants can distinguish different particles in a specific context which particularly favors only one particle. Many prior studies have provided evidence that the DCT is a valid instrument to investigate discourse or pragmatic features (Mackey and Gass 2005; Pinto and Raschio 2007; Rose 2009; Wen 2014, 2019). In terms of practical issues (i.e., space and time limitations on the tasks in the project), the dialogues in this task were designed to be miniature and as self-evident as possible. However, the data elicited from this task can still provide us with information about specific and authentic situations for social communication and pragmatic purposes.

Participants were presented with short dialogues which had a part missing. Their task was to choose the most appropriate item to complete the dialogue. In the instructions the participants were particularly asked to read the whole conversation and told that only the single most appropriate answer should be chosen. This was to exclude cases where participants may have found more than one item that was suitable to complete the conversation, thus ensuring that only the most appropriate item was selected. The list of items provided was *de* (an auxiliary word), *yòu* (‘again’), SFP *ma*, SFP *ba*, SFP *ne*, SFP *le*, and SFP *a*. Examples are shown in (14) and (15). In (14), the question SFP *ba* was expected mainly due to the answer from Speaker B, which implies that Speaker A already knows that Speaker B can speak Chinese (as suggested by Speaker B’s utterance ‘*nǐ zěnmē zhīdào?*’). There were four tokens for each SFP, randomized with 30 other sentences, which either tested other aspects of Chinese grammars or served as distractors and fillers. This task was administered before the other two tasks to avoid any priming effects.

- (14) (the question SFP *ba* is expected)⁵
- Speaker A: Nǐ huì shuō Hànyǔ _____?
 2SG can speak Chinese
 ‘You can speak Chinese, right?’
- Speaker B: Wǒ huì, nǐ zěnmē zhīdào?
 1SG can 2SG how know
 ‘I can. How do you know?’
- (15) (the suggestion SFP *ba* is expected)
- Speaker A: Wàimiàn fēng tài dà le. Guānshàng huānghu _____.
 outside wind too big LE close-PRP window
 ‘It is too windy outside. (Please could you) close the window.’
- Speaker B: Hǎo, méi wèntí.
 good NEG problem
 ‘OK, no problem.’

4.2.3. Translation Task (TT)

The translation task asks participants to translate Chinese sentences into English ones. It was used to supplement the results of the other tasks; specifically, it allows us to see what potential English counterparts exist for the Chinese question SFP *ba* and suggestion SFP *ba* in heritage speakers’ grammars, and further to see whether there is any effect from the dominant language. Since there are no SFPs in English, it is important to see how the features of the Chinese SFPs *ba* are manifested in English, which was the dominant language of the Chinese heritage speakers studied in this research. There was only one token for each SFP in this task. In addition, there were also 9 other sentence types, which tested other aspects of Chinese grammars⁶. This task was administered after the two tasks described above in order to avoid any priming effects. Examples are shown in (16) and (17).

- (16) Xiǎohóng xǐhuān lǚyóu ba?
 Xiaohong like travel BA
 ‘Xiaohong likes travelling, doesn’t she/right?’
- (17) Wǒmén yìqǐ qù xué Hànyǔ ba.
 1PL together go learn Chinese BA
 ‘Let’s go to learn Chinese together!’

5. Results

5.1. AJT: Syntactic Features of the Question SFP *ba*

Participants were first screened by their acceptance of control sentences (i.e., those in 13). Those who failed to accept at least three out of the four tokens in each control sentence type were excluded from further analysis in this task. The results showed that all participants successfully accepted those sentences. Table 2 shows the descriptive results for all groups.

⁵ It may be argued that at a first glance at Speaker A’s utterance in (14), the SFP *ma* may be a possible candidate. However, in the instruction for the task, participants were explicitly told that to complete the task they should read the whole conversation including the response from Speaker B and should only choose the single most appropriate answer. The utterance by Speaker B in (14) indicates that the question SFP *ba*, not the SFP *ma*, is required in Speaker A’s utterance. However, as a reviewer has pointed out, we cannot totally exclude the possibility that participants’ errors were from their sloppy reading, such as neglecting the second sentence. Future research adopting other tasks may reveal more evidence on this.

⁶ The Chinese native speakers did not participate in this task as it was designed to see how learners of Chinese treat the SFPs in their native English.

Table 2. Mean scores in the AJT for sentences testing the [Q] and [-wh] features of the question SFP *ba*.

Group	N (after Screening)	Control A (SD) (e.g., (13a))	Experimental A (SD) (e.g., (12a))	* Experimental B (SD) (wh-Phrase + Question <i>ba</i> , e.g., (12b))	Control B (SD) (wh-Phrase, e.g., (13b))
HS High-int	16	3.91 (0.2)	2.69 (1.1)	1.72 (0.8)	3.92 (0.2)
HS Advanced	19	4.00 (0.0)	3.55 (0.7)	1.22 (0.4)	3.93 (0.2)
Native	18	4.00 (0.0)	3.89 (0.2)	1.32 (0.5)	3.96 (0.1)

Notes: * is standing for ungrammatical sentences.

Recall that participants were making judgments on an acceptability scale. In the data analysis, participants' judgments were transformed into numerical values, where 1 stands for 'completely unacceptable', 2 for 'probably unacceptable', 3 for 'probably acceptable', and 4 for 'completely acceptable'. Therefore, participants' judgments ranged from 1 to 4. For the [Q] feature (i.e., experimental A sentences) of the question SFP *ba*, both the HS advanced group and the Chinese native group were able to accept these sentences (mean scores > 3), but the HS high-intermediate group showed indeterminacy in accepting them. However, all groups rejected the ungrammatical sentences (i.e., those where a wh-phrase occurs in a question SFP *ba* sentence; mean scores approaching 1).

Linear mixed-effects models were performed to find whether there was any statistical difference among the variables (fixed factors and random factors). In this study, R (R Core Team 2014) and *lme4* (Bates et al. 2013) were applied to perform a linear mixed-effects analysis of the relationships between different fixed factors. The fixed factors included Condition (i.e., grammatical (G) vs. ungrammatical (UG) sentences), Group (Chinese native, HS advanced, HS high-int), Age, and Length (i.e., number of words included in each sentence). As random effects, we have intercepts for subjects and items, as well as by-subject and by-item random slopes included.

The results from the mixed-effects models show that both the HS advanced group and the HS high-intermediate group (all $t < |2|$, $p > 0.05$) were found not to be significantly different from the Chinese native group in accepting the grammatical experimental A sentences (i.e., testing the [Q] feature). However, the high-intermediate group was found to be significantly different from the Chinese native group in rejecting the ungrammatical experimental B sentences ($t > |2|$, $p < 0.05$; see Table 3). Therefore, these results suggest that all HS groups are able to reconfigure the [Q] feature of the question SFP *ba*, as well as the [-wh] feature, except the high-intermediate group.

Table 3. Summary of the fixed effects and random effects in the mixed-effects model (for the [-wh] feature).

Parameters	Fixed Effects			Random Effects			
				Subject Analysis		Item Analysis	
	Estimates	SE	t	Var	SD	Var	SD
(Intercept)	1.33	0.21	6.25 ***	0.29	0.54	0.03	0.16
Condition G	2.55	0.27	9.29 ***	0.31	0.55	-	-
Cage	-0.02	0.02	-1.45	-	-	-	-
HS Advanced	-0.13	0.19	-0.70	-	-	-	-
HS High-int	0.40	0.20	2.04 ***	-	-	-	-
Condition G: Cage	0.03	0.02	1.66	-	-	-	-
Condition G: HS Advanced	0.19	0.21	0.91	-	-	-	-
Condition G: HS High-int	-0.37	0.21	-1.74	-	-	-	-

Notes: reference level for condition=UG (ungrammatical), for group=Chinese native; Model formula: ratings ~ condition * cage * clength⁷ + factor (group) + condition: factor (group) + (1 + condition|subject) + (1|item); here values of $t > |2|$ can be informally considered significant (Gelman and Hill 2007); *** $p < 0.001$.

5.2. DCT: Discourse Features of Suggestion SFP *ba* and Question SFP *ba*

In the analysis of data in this task, all participants' selections of items were converted into numerical values. Specifically, if they selected the expected SFP *ba* in relevant dialogues, their selections received a score of 1; otherwise, they received a score of 0. The 'I don't' know' option was treated as a missing value.

5.2.1. [Suggestion] Feature of Suggestion SFP *ba*

As shown in Table 4, the mean scores of the participants in all groups were close to the ceiling score of 4. Generalized linear mixed-effects models were conducted to see whether there was any statistical difference between groups. In the models, the fixed factors included Group (Chinese native, HS advanced, HS high-int), Age, and Length (i.e., the number of words included in sentences). As random effects, we included intercepts for subjects and items, as well as by-subject and by-item random slopes. The results show that there were no statistically significant differences between any pairs of groups ($z < |2|$, $p > 0.05$). This indicates that all the heritage groups were able to select the expected suggestion SFP *ba* in required dialogues, and they had no problem with the [suggestion] feature of the suggestion SFP *ba*.

Table 4. Mean scores of all groups in the DCT concerning the [suggestion] feature of the suggestion SFP *ba*.

Groups	N	Use of <i>ba</i> in Suggestions (Max. = 4, SD)
HS High-Int	16	3.94 (0.3)
HS Advanced	19	3.95 (0.2)
Native	18	4.00 (0.0)

5.2.2. [Confirmation Seeking] Feature of Question SFP *ba*

The participants were first screened by their acceptance (3 out of 4 tokens) of the experimental A sentences in (12a), which indicates their knowledge of the question SFP *ba* as used in questions (i.e., a [Q] feature of this SFP). The rationale for this is that being a question (having a [Q] feature) for a question SFP *ba* is the prerequisite for investigation of the [confirmation seeking] feature of the SFP. None of the participants had a problem with the experimental A sentences in (12a), and no one was excluded. Table 5 shows the results.

Table 5. Mean scores of all groups in the DCT concerning the [confirmation seeking] feature of the question SFP *ba*.

Groups	N (after Screening)	Use of <i>ba</i> in Confirmation Seeking (Max. = 4, SD)
HS High-Int	16	0.94 (1.3)
HS Advanced	19	1.95 (1.3)
Native	18	3.78 (0.4)

These results clearly show that Chinese native speakers selected the expected question SFP *ba* in required dialogues, as their mean scores were at 3.78 (close to the ceiling 4). However, heritage speakers at advanced levels were indeterminate (mean score at 1.95) in selecting the expected SFP *ba* in required dialogues, and those at high-intermediate levels tended not to select the question SFP *ba* (mean score was only 0.94).

⁷ Here 'age' stands for age (centered), 'c' is abbreviated for centered, 'clength' for length (centered), 'ratings' for the acceptability scores. In the models, we included the length (centered) as a factor. However, due to the collinearity issue, its effect is converged with condition and thus cannot be obtained in the models; it is not reported here.

A generalized linear mixed-effects analysis was applied to examine the statistical relationships between different fixed factors. The results are summarized in Table 6 and show that both the Chinese heritage high-intermediate and advanced speakers were significantly different from the Chinese native group (both $z > |2|$, $p < 0.001$). Therefore, it seems that all heritage speaker groups have difficulty in reconfiguring the [confirmation seeking] feature of the question SFP *ba*.

Table 6. Summary of the fixed effects and random effects in the generalized linear mixed-effects model (for the question SFP *ba*).

Parameters	Fixed Effects			Random Effects			
				Subject Analysis		Item Analysis	
	Estimates	SE	z	Var	SD	Var	SD
(Intercept)	119.06	19.84	6.00 ***	11,208	105.87	6711	81.92
HS Advanced	−64.11	13.87	−4.62 ***	-	-	-	-
HS High-int	−115.64	17.57	−6.58 ***	-	-	-	-

Notes: reference level for group=Chinese native; Model formula: cbind⁸ (ratings, 1 – ratings) ~ factor (group) + (1|subject) + (1|item); here values $z > |2|$ can be informally considered significant; *** $p < 0.001$.

Since heritage speakers in two proficiency groups did not select the expected question SFP *ba* in the required dialogues, we were curious to see what items that they preferred rather than the expected question SFP *ba*. An error analysis was conducted, to give us more information about the behavior and nature of the question SFP *ba* in the heritage speakers' Chinese grammars. Specifically, we analyzed the cases where the participants consistently (3 out of 4 tokens) selected items other than the expected question SFP *ba*. The results are presented in Figure 1.

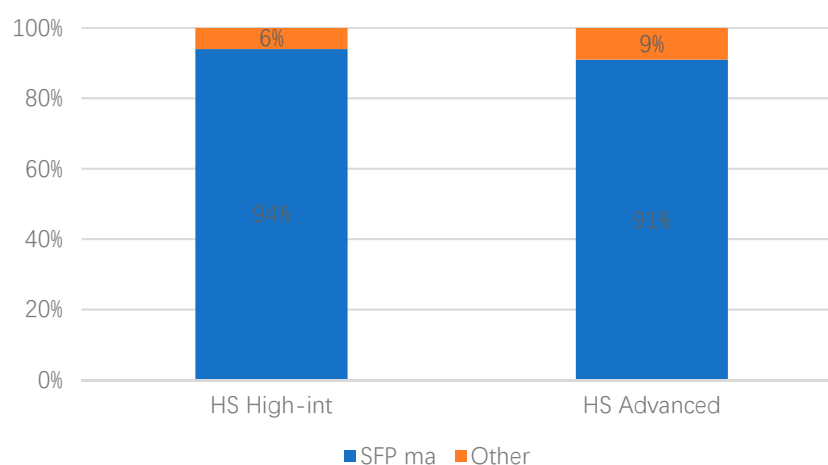


Figure 1. Percentage of *ma* and other errors consistently selected by heritage speakers at high-intermediate and advanced levels in confirmation seeking contexts in the DCT.

As shown in Figure 1, more than 90% of the heritage speakers at both high-intermediate and advanced levels selected the SFP *ma* in contexts favoring the question SFP *ba*. This suggests that all heritage speakers have difficulty making a clear distinction between the [confirmation seeking] feature attached to the question SFP *ba* and the [information seeking] feature of the SFP *ma*.

⁸ Here 'cbind' represents the scores of participants.

5.3. TT: Feature Mapping between Chinese SFP *ba* and English Structures

Participants' translations were counted and converted into percentages, except for the Chinese native speakers as they did not take part in this task. The results are presented in Figures 2 and 3.

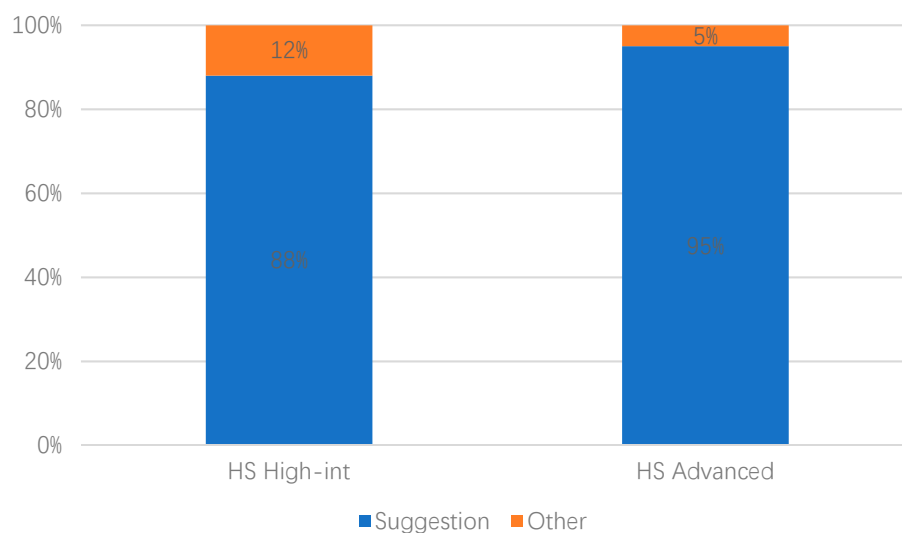


Figure 2. Percentages of heritage speakers who translate the suggestion SFP *ba* sentence into an English suggestion and heritage speakers who translate it into other types of sentences in English.

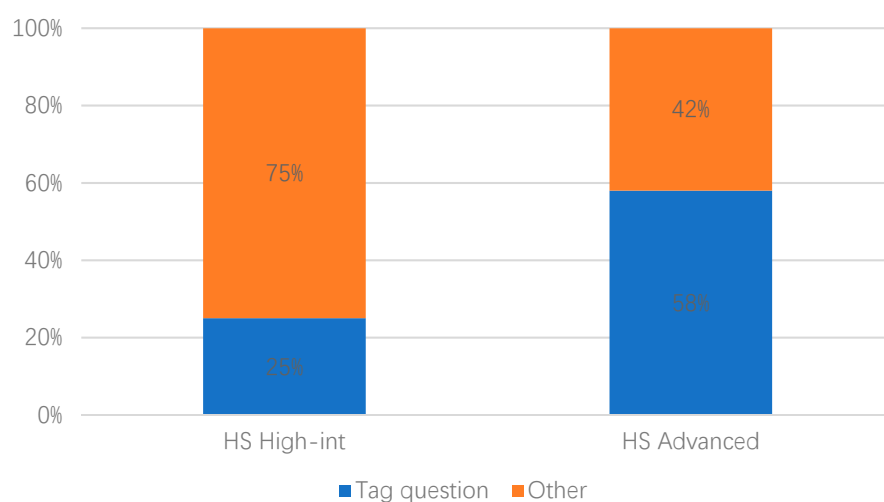


Figure 3. Percentages of heritage speakers who translate the question SFP *ba* sentence into an English tag question and heritage speakers who translate it into other types of sentences in English.

For the suggestion SFP *ba*, as shown in Figure 2, more than 87% of the heritage speakers translated the sentences containing the suggestion SFP *ba* into suggestion sentences in English (e.g., *Let's go and study Chinese together*), which indicates that in the heritage speakers' Chinese grammars, suggestion SFP *ba* sentences are treated as suggestions in their dominant language, i.e., English. This further suggests that the heritage speakers have established the mapping between Chinese suggestion SFP *ba* sentences and English suggestion sentences.

In terms of the question SFP *ba*, before analysis of the data, participants were first screened by their acceptance of experimental sentence A in (12a), similar to the rationale in the DCT (see Section 5.2.2). Since all participants met the screening criterion, no participant was excluded. Figure 3 presents the percentages of the heritage speakers' translation of the question SFP *ba* sentences into English structures. It shows that only 25% of the high-intermediate heritage speakers translated the question

SFP *ba* sentences into tag questions in English (e.g., *Xiǎohóng likes travelling, doesn't she/right/yeah?*). There was an increase at advanced levels (58%). However, more than 41% of the heritage speakers at both high-intermediate and advanced proficiency levels translated the question SFP *ba* sentences into other structures in English. A closer examination shows that all these translations were general yes-no questions in English (i.e., *Does Xiǎohóng like travelling?*). This indicates that heritage speakers have problems with interpreting Chinese question SFP *ba* sentences as tag questions in English (instead, they interpret them as yes-no questions, similar to the English equivalent of the SFP *ma*), even at advanced levels. This converges with the findings in DCT.

6. Discussion

6.1. Comparing Heritage Speakers and L2 Learners in the Acquisition of the Same Features: Addressing Question (1)

Representations of the features of the SFPs *ba* in Chinese heritage speakers' grammars are different from those in English-speaking L2 learners' Chinese grammars. Recall that [Yan and Yuan \(2020\)](#) investigated the same features of the SFPs *ba* in L2 grammars using a similar research design, finding that L2 learners have no problem with the discourse [suggestion] feature of the suggestion SFP *ba* and the syntactic [-wh] feature of the question SFP *ba*, but they do have difficulties with the syntactic [Q] feature and the discourse [confirmation seeking] feature of the question SFP *ba*. However, the findings in this study show that in the heritage speakers' Chinese grammars, the [Q] feature of the question SFP *ba* was successfully reconfigured, which suggests an advantage of heritage speakers over L2 learners in terms of acquiring this syntactic feature. Heritage speakers at high-intermediate levels are indeterminate in reconfiguring the [-wh] feature of the question SFP *ba*, which seems like a lower level of competence in comparison with L2 learners in terms of acquiring this syntactic feature. However, at advanced levels both heritage and L2 learners have no problem with this feature. We argue that this optionality in acquiring the [-wh] feature is probably a temporary confusion with wh-phrases in Chinese⁹, which does not lead to permanent representational problems in heritage grammars. This confirms the argument of [Montrul \(2012\)](#) that heritage speakers have a better mastery of the syntactic features in comparison with L2 learners.

With respect to the [confirmation seeking] feature, though both heritage speakers and L2 learners have substantial problems in successfully reconfiguring it (as shown in the DCT and the TT), which is in line with [Keating et al. \(2011\)](#) and [Montrul \(2012\)](#), the English-speaking L2 learners outperformed the heritage speakers, since L2 advanced learners were found to be able to reconfigure this discourse feature successfully by [Yan and Yuan \(2020\)](#). As for the discourse [suggestion] feature of the suggestion SFP *ba*, similar to its behavior in the grammars of L2 learners, it is also successfully represented in the grammars of Chinese heritage speakers. Therefore, it seems that not all discourse features pose difficulties to heritage speakers and L2 learners.

Furthermore, the heritage speakers do not always have advantages over L2 learners regarding the acquisition of properties at the (syntax-)discourse level, i.e., in terms of the [confirmation seeking] discourse feature ([Wen \(2019\)](#) reports a similar finding). [Montrul \(2012\)](#) has summarized that there is a vulnerability in the syntax-discourse domain for heritage language grammars, but the findings of this study show that this may not be across the board as the heritage speakers seem to have no problem at all with the [suggestion] discourse feature. In terms of the Vulnerability Hypothesis ([de Prada Pérez 2019](#)), it seems that the discourse [confirmation seeking] feature, which may have a more variable

⁹ In Chinese, some non-interrogative wh-phrases are able to appear in SFP *ba* questions, for example,
 Tā zài chī shenme ba?
 3SG PROG eat something BA
 'He(She) is eating something, isn't /is he(he)?/right?'

distribution, i.e., more than one form can be used in the target Chinese, causes the most mapping and reconfiguration difficulties for heritage speakers. However, the discourse [suggestion] feature and the syntactic [Q] and [-wh] features, which may be categorical, seem to impose little difficulty for heritage speakers. Nevertheless, since this study did not intentionally test the Vulnerability Hypothesis since the frequency/distribution of the features of the SFPs *ba* are not calculated, more research is called for to further test this speculation. If this is on the right track, however, it seems that the Vulnerability Hypothesis may have more explanatory power than the Interface Hypothesis in heritage and bilingual acquisition.

6.2. Possible Factors Affecting the Acquisition of Features of the Question SFP *ba*: Addressing Question (2)

The role of dominant language transfer: as shown by Lee (2016), Montrul (2010), and Montrul and Ionin (2012), dominant language transfer has been found at both semantic and syntax-semantic/pragmatic interfaces, affecting the restructuring of heritage grammars. Difficulties in reconfiguring the [confirmation seeking] feature of the question SFP *ba* in Chinese heritage grammars may be also due to the same reason. Recall that this feature has different realizations in Chinese and English (see Section 2.2 for details), whereby it is attached to the question SFP *ba* in one single CP, but it is on the C of the internal CP in the English tag questions. Therefore, it is probable that this different syntactic structural realization prevents a smooth and successful reconfiguration of the [confirmation seeking] feature of the question SFP *ba* in heritage grammars. In other words, the dominant language, English, which has a different realization of the [confirmation seeking] feature, has led to difficulty in acquiring this feature among Chinese heritage speakers.

Even worse, as demonstrated in Section 2.2, there are canonical tag questions in Chinese (i.e., using *shì ma*, ‘will you’; *duìbuduì*, ‘right’ as tags), which are syntactically the same as those used in English, and these might further ‘enhance’ heritage speakers’ confidence that the question SFP *ba* sentences are different from the tag questions in English. This is in line with the findings of Yan and Yuan (2020), who have also found that English-speaking L2 learners of Chinese have substantive difficulties in acquiring the [confirmation seeking] feature of the question SFP *ba*. However, Yan and Yuan (2020) further shows that even though it is difficult, advanced English-speaking L2 learners do finally reconfigure this feature of the question SFP *ba*. Why, then, do heritage speakers, especially those with more and earlier Chinese input, have problems even at advanced levels? This may be explained as follows.

Input as a possible factor: Polinsky and Scontras (2020) have concluded that the unique representations of heritage speakers (i.e., their deviations from either/both heritage baseline and dominant language baseline) are probably due to the input that they have gained. In particular, the quantity (i.e., their exposure to and recency of the heritage language) and the quality (the community size) of their input all contributes to their final achievements in heritage language acquisition. In this study, though the majority of heritage speakers have early and frequent exposure to Chinese, this was up to the age of 7 (we only obtained information about participants’ language backgrounds until that age in this research). That is, in the absence of evidence about their Chinese exposure after this age, we cannot exclude the possibility that it might be the lower exposure and lack of recency of Chinese (in contrast with their dominant language English) that has resulted in their problems with reconfiguring the [confirmation seeking] feature of the question SFP *ba*.

Effects of limited processing resources: it has been argued that limitations in processing resources, as well as the additional cost of handling a less proficient language, may be factors affecting the acquisition of heritage languages (Polinsky and Scontras 2020; Ronai 2018; Scontras et al. 2017; among others). Under such processing pressures, heritage speakers tend to adopt a simplified structure and a one-to-one surface mapping from structure to interpretation. Dekeyser (2005), Wen (2014), Wen (2019) and Yan and Yuan (2020) all show that the optionality of a form and meaning connection leads to a lack of transparency, and thus increases acquisition difficulties. Therefore, as demonstrated in this study, because of the similarity in structure, Chinese heritage speakers prefer the mapping of Chinese SFP *ba*

questions onto English yes-no questions (i.e., similar to the SFP *ma* question being the equivalent of the English yes-no question). They adopt this preference instead of treating them as tag questions in English, which requires the recognition of an additional mapping besides the canonical ones.

However, this study to some extent contradicts the findings of [Anderssen et al. \(2018\)](#), who found that heritage speakers inhibited similar structures between the target and their dominant languages. We propose that this may be due to the fact that the form-meaning mappings in this study are more complex as compared to [Anderssen et al. \(2018\)](#), requiring recognition of the sequential order of N and possessives. In addition, heritage speakers' preferences for one-to-one form and meaning mappings may also explain the effects of successful reconfiguration in terms of different discourse features of the question SFP *ba* and the suggestion SFP *ba* in heritage grammars. Recall that the [suggestion] discourse feature of the suggestion SFP *ba*, which requires a one-to-many mapping between Chinese and English, was readily acquired by heritage speakers in this study, but the [confirmation seeking] feature of the question SFP *ba*, which requires a many-to-one mapping between Chinese and English, imposes substantive difficulties. We propose that this is probably a manifestation of the fact that the one-to-many form and meaning connection between the target heritage language (i.e., Chinese) and the dominant language (i.e., English) is easier than many-to-one form and meaning connections in heritage language acquisition. This lends further support to the findings in [Yan and Yuan \(2020\)](#) in terms of the form-meaning mappings in L2 Chinese.

6.3. Pedagogical Implications

The findings of this study suggest that the successful acquisition of features of the SFPs *ba* (especially discourse features of the question SFP *ba*) by heritage speakers requires disentangling similar particles and structures, distinguishing different feature realizations, and obtaining enough input. [Kupisch and Rothman \(2018\)](#) have argued that formal training between later childhood and early adulthood can facilitate the acquisition of heritage languages. Therefore, pedagogical measures may have influential effects on the successful acquisition of the features of the SFPs *ba*. However, current textbooks and formal teaching do not explicitly highlight the relationship between question SFP *ba* sentences and English tag questions. Awareness of the differences between the question SFP *ba* and its English counterparts, as well as its relationship with Chinese canonical tag questions, will enhance heritage speakers' ability to notice relevant evidence from the target input. Furthermore, differences between similar features of similar particles, i.e., the yes-no question particle *ma* and the question SFP *ba*, should also be highlighted and explicitly compared in formal teaching. In addition, since both suggestion and question SFPs *ba* are discourse particles, robust input, especially from spoken Chinese and from a variety of native speakers, should also be incorporated in formal teaching.

6.4. Limitations and Future Directions

Although this study has provided insightful findings concerning the acquisition of syntactic and discourse features by Chinese heritage speakers, there are a number of limitations. First, several methods have been adopted to investigate the relevant features attached to the suggestion and question SFPs *ba*, but it is necessary to add more methods from different dimensions to gain more evidence and further triangulate the data. Though AJT in this study provided us with understanding of relevant syntactic features, data from online processing tasks (such as reaction time studies or eye-tracking studies) would provide us with more knowledge about the implicit representations of syntactic features. Moreover, though the DCT is a valid method to obtain insights about the nature of discourse features, production tasks involving natural contexts and discourses could provide more in-depth data. Furthermore, besides the TT task, qualitative methods such as interviews should be incorporated in future studies to better explore the underlying mechanisms behind the performance of heritage speakers.

Second, although we tried to control for the language backgrounds of the heritage speakers in this research, it would be better to collect data from one unified Chinese language group (either Mandarin

or a single dialect). This would give more confidence to conclude that the findings are influenced by the factors under investigation, rather than being artifacts of different Chinese dialects. Third, as Kupisch and Rothman (2018) have highlighted, knowledge of heritage speakers in terms of their heritage language should be considered native, and thus future investigation of heritage speakers could compare their grammars with matched bilingual native groups to provide more insights.

7. Conclusions

This study investigated the representations of features of suggestion and question SFPs *ba* in the grammars of English-dominant Chinese heritage speakers. The results show that the features of the suggestion SFP *ba* and the syntactic features of the question SFP *ba* are properly represented, but the discourse feature of the question SFP *ba* poses a difficulty for Chinese heritage speakers. We argue that not all syntactic and discourse features are problematic in heritage language acquisition, and a transfer effect from the dominant language, the effect of input, as well as limitations in processing resources may all have contributed to the deviation in the heritage speakers' performance. Future studies are invited to particularly examine the quantity and quality of input that heritage speakers obtain in acquiring a heritage language, as well as their online instant processing of relevant feature properties.

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