

Editorial

The Acquisition of Chinese as a First and Second Language

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1. Background

The last two decades have witnessed a surge of interest in learning Chinese as a second language (L2 Chinese). The interest is reflected in multiple dimensions including education, Chinese language course enrollment, student body composites, and learning motivation. Chinese language programs and courses have mushroomed, especially in response to the College Board's decision that Advance Placement (AP) Chinese and Culture Examination was to be implemented in 2006 in the USA. Chinese language education was rapidly institutionalized at many American schools; e.g., from 2004 to 2008, there was a 195% increase in enrollment in Chinese language courses in K-12 U.S. public schools (ACTFL 2011).

In addition to an overall increase of interest in Chinese language, the diversity of Chinese language learners' ethnic backgrounds expanded. More than two decades ago, L2 learners were mostly Caucasians. In contrast, a recent large-scale survey found that Caucasians now comprise only 51% of the student body (Li et al. 2014). Chinese heritage students and those from Asian-American backgrounds make up more than 30%, and students from Latin American and African American backgrounds comprise a further 16%. One feature among heritage learners is their variety of linguistic backgrounds and experiences. Along with these significant changes in the student body, learners' goals for studying Chinese have also been evolving. Traditional targets such as going to graduate school and becoming a sinologist have been replaced by functional and instrumental use of the language, as well as competence in Chinese culture and language (Comanaru and Noels 2009; Sung 2013; Xie 2014; Wen 2011; Wen and Piao 2020).

In contrast to the rapid development of Chinese education, research on acquisition of Chinese as a first and additional language has lagged behind. In reviewing the current state of the literature on Chinese language motivation, Wen (2018) located only 16 empirical studies on the topic published up to 2017 after an exhaustive search. Only five Chinese Language Teachers Association (CLTA) monographs have been published since the CLTA was established six decades ago. Recent years have seen more development in L2 Chinese empirical research in books (Everson and Shen 2010; Han 2014; Tao 2016; Wen 2012; Wen and Jiang 2019) and journals. Articles in these books and journals present more rigorous research methodology and a broader scope of inquiries. However, research into Chinese language acquisition, particularly empirical studies, is sparse and lags behind the research development of general language acquisition.

The lack of research into Chinese language acquisition directly affects Chinese language teaching, a deficiency that hampers learning and underserves students. Instructors need to be updated on the current research findings in order to teach effectively. What determines the quality of classroom instruction is research-based knowledge of learners and learning processes. Well informed instructors are able to opt for appropriate pedagogical approaches and instructional conditions for their students.

The acute demands for understanding Chinese language acquisition call for more empirical studies on a wide range of topics to scrutinize the nature of Chinese language learning and learning

processes. The authors offer many thanks to *Languages*, a major peer-reviewed journal, which has recognized the important yet under-represented research in Chinese language acquisition. This special issue, *Acquisition of Chinese as a First and Second Language*, has collected eight empirical studies showcasing research advances in multiple domains. The studies are theoretically motivated and have adopted innovative methodological strategies to achieve a broader understanding of Chinese language acquisition.

The eight empirical studies in this volume encompass a wide range of topics arching from the L1 to L2 acquisition of syntax, semantics, phonetics, and discourse. Two Chapters by Chen, Narasimhan, Chan, W. Yang, & S. Yang, and by Chen & Wang focus on child acquisition of Chinese as a first language whereas chapters by Xu, Liao, Y. Liu, Wang & Chen, Y. Liu, and Yan examine adult acquisition of L2 Chinese. Within L2 acquisition, heritage learners converge, and very frequently, diverge from general L2 learners in the learning process. The last chapter by Yan explores heritage syntax-discourse interface properties. Additional themes examine language skill acquisition, including speaking, listening, and writing. The volume is distinctively featured with comparative studies analyzing learners (e.g., children versus adults; heritage versus general L2 or foreign language learners) across linguistic, cognitive, and research methodological domains (e.g., syntax versus discourse/pragmatics; perceptions versus productions, control versus experimental groups). Last but not least, the volume attempts to connect research to pedagogy. Several chapters built instructional interventions into their designs to scrutinize the effects of consciousness raising, metacognitive strategy training, and student-led versus teacher-led instruction. Implications of study findings bridge the gap between research and instruction in hope of helping teachers to understand their students and their learning processes.

2. Characteristics of the Volume

2.1. Theoretically Motivated with Diverse Research Goals

Studies in this issue are theoretically motivated, reflecting a wide range of research purposes and current issues. Theories adopted encompass cognitive processing strategies, explicit learning, and consciousness raising in L2 acquisition (Gass and Selinker 2008), as Xu's study illustrates. Yanmei Liu's conceptual framework is based on metacognition and metacognitive awareness strategies (Vandergrift et al. 2006) to explore listening comprehension processes. Yu Liu's investigation drew upon the framework of speech production processes (Kormos 2014) to examine lexical accessibility in relation to speaking accuracy and complexity. Adopting the theoretical account of textual organizational devices, Liao analyzed metadiscourse strategies for discourse cohesion in learners' descriptive writing. These studies, motivated by theories on cognition and second language acquisition, investigate the learning process and the development of decoding and encoding skills.

Another group of studies is conducted under the psycholinguistic framework investigating Chinese language acquisition in syntax, semantics, phonetics, and discourse. Chen et al. adopted the theoretical framework of word order and information structure to compare the speech data of Mandarin-speaking children and adults, challenging the established "old-before-new" information structure. Chen and Wang examined the mapping of one form to multiple meanings/functions, testing the continuous derivational and restricted monosemy approaches. Yan drew on the linguistic account of semantic- and syntax-pragmatic interfaces to analyze the Chinese sentence-final particle *ba*, a multifunctional mark in discourse. Wang and Chen's study bore out the Perceptual Assimilation Model (PAM) after testing both Speech Learning Model (SLM) and PAM via their study of the relationship between perception and production of Mandarin consonants by English speaking college students in the USA.

In addition, two studies (Xu, Yanmei Liu) situated in a complex setting, the classroom, analyzed the effects of instructional intervention in the conceptual framework of the declarative/procedural model and input, interaction, and output model. Other studies (Chen et al., Chen & Wang, Wang & Chen) tested theoretical models and perspectives to support or challenge current theoretical accounts.

In summary, all the studies are theoretically driven, examining current acquisition and learning issues from cognitive, linguistic, and first/second language acquisition perspectives.

2.2. Cognitive Approach to Research on Acquisition of Chinese as an Additional Language

There are a number of studies investigating L2 Chinese acquisition of verb-suffix *-le*, a notoriously difficult but frequently used perfective marker. There are gaps between research and teachers' understanding of the learning task for *-le*. Yi Xu's study connects the research to classroom instruction. The study examines effects of consciousness raising through explicit knowledge construction within the framework of form-focused instruction. It adopted both quantitative and qualitative designs with two learner groups [experimental (E) and control (C) groups] to compare their performance in interactive role-play and written editing in a post-test. The study has revealed several findings. First, underuse of *-le* occurs more than overuse with learners at the elementary proficiency level. Second, form-focused consciousness raising via learning materials but without the instructor's interaction is effective; more importantly, the E group showed knowledge on procedure skills. They demonstrated a more accurate understanding of *-le* rule induction than the C group. Third, given the opportunity for interactive group work and explicit instructional written input, learners were able to notice, categorize, and contrast the linguistic constraints of *-le*. Fourth, learner individual differences were observed particularly in the process of rule induction, as some groups were more competent in metacognitive skills than others. Some learners seemed to be more able to conceptualize the forbidden versus obligatory environments of *-le* leading to explicit rule construction.

This study yields important results that benefit L2 Chinese language teachers. Consistent with previous studies (Duff and Li 2002; Wen 1995), Xu's study revealed that learners underproduced *-le*, particularly in the obligatory resultative verb complement (RVC) environment. Perhaps, learners may consider the resultative complement as an "indicator of completion," thus allowing *-le* to be legally omitted (Wen 1995). Furthermore, since the study was conducted in the classroom as a part of regular instruction, the materials used and the data collected, as well as the instructional intervention, can serve as an exemplary application for task-based instruction to facilitate the acquisition of explicit knowledge. It should be noted that this study is unique in its research design where participants conducted consciousness-raising activities by themselves. The process maximized the student agency role and learning autonomy. It would, however, be interesting to have another experimental group interacting with the instructor. Comparisons then can be made between the effectiveness of self-learning indirectly guided by a teacher versus the teacher's direct interaction with learners.

Diverging from grammar acquisition, Yanmei Liu's study focused on the effects of metacognitive strategies on listening performance, and two instructional methods on metacognition training. Comprehension is a primary step for language acquisition. It is a complex process, involving attention, perception, memory, information processing, problem-solving, and linguistic parsing. In this longitudinal study, instructional intervention was implemented on two experimental groups: teacher-led with teacher's interaction, and student-directed without teacher's interaction but with instructional materials provided to students. In addition to the pre- and post-intervention measures of listening comprehension, the *Metacognitive Awareness Listening Questionnaire* (MALQ) was used to examine five factors: problem-solving, mental translation, person knowledge (learners' self-efficacy beliefs), planning and evaluation, and directed attention. The study produced several findings. The student-directed group showed higher scores on planning and evaluation and on self-efficacy beliefs than the teacher-led and the control groups. Furthermore, the two experimental groups clearly demonstrated more strategy awareness than the control group. Except for the problem-solving factor, the other four factors measured by MALQ showed higher means for the two experimental groups than for the control group. Therefore, the results indicated that the metacognitive intervention had a positive effect on metacognitive awareness development, particularly the significant gains on directed attention for the teacher-led group.

There is a lack of statistically significant effects of metacognitive awareness development on listening performance gains across the three groups. It is not clear if the instructional intervention is sufficiently rigorous; the intervention only included metacognitive strategy training. The metacognitive strategies, however, reflect only a part of listening competence. It is necessary to include other strategies, particularly the cognitive skills, in order to see a fuller picture of comprehension processing. Comprehension, after all, is a process engaging both metacognitive and cognitive strategies including problem solving skills. Future research may benefit from a broader approach to scrutinize the comprehension process.

Jianling Liao's study also explores the cognitive aspect of L2 learning with a focus on descriptive writing in a study abroad setting. Writing is a highly integrative and complex skill. It not only requires linguistic accuracy (words and sentences), cognitive clarity (ideas and logic sequencing, encoding processing), but also writing strategies (textual organization, content cohesion, structure coherence). Liao's research investigated metadiscourse devices used to form text dynamics and textual organization. In addition, the study examined the interrelations among textual organizational features for the two dimensions, interactive metadiscourse (local, global, and text cohesion) and interactional metadiscourse (self-mention and engagement). In addition, the study analyzed correlations between textual organizational features and linguistic competence.

The results demonstrated three ways in which the higher proficiency group was able to write more effectively than the lower-proficiency group. First, the more advanced group was able to use textual organizational devices (cohesion and coherence at three levels: local, global, and textual) to signal their topics/subtopics more effectively and accurately than the lower proficiency group. Second, they were able to apply a higher number of distinctive markers and conjunctions to express ideas, hypothetical meaning, and smooth transitions or contrasts. Third, they were able to engage the reader more frequently and more actively. In addition, participants' linguistic competence in using more diversified lexis was positively associated with their abilities to use more accurate textual organizational devices. Their ability to produce lengthier clauses also highly correlated with their skills in marking organizational features. It should be noted that this study examined finished written products. It is important to further investigate the writing process by developing process-oriented research to track down the complete process and major factors influencing it.

Yu Liu's study explores the process of encoding with a focus on the relationship between lexical access and speaking performance. Yu Liu's study narrowed the scope of the vocabulary within specific tasks to capture a closer look at how lexical access interacts with L2 speaking performance. Lexical access, operationally defined as vocabulary size and lexical retrieval speed, was measured via a timed vocabulary test. Speaking performance, referring to speaking fluency, accuracy, and complexity, was measured within categories including speech rate, syntactic and lexical accuracy, and lexical and syntactic diversities. The speaking tasks required four communicative functions: instructive, descriptive, explanatory, and argumentative. The results demonstrated that participants' vocabulary size significantly correlates with their lexical diversity, word difficulty, and speech rate. Furthermore, lexical retrieval speed also significantly correlates with their speaking accuracy and lexical complexity. The more words that learners know and the faster they can retrieve, the more diverse and advanced words they use in their speaking tasks. The results revealed no significant correlation between lexical retrieval speed and syntactic accuracy and complexity. Further research is needed on the issue, particularly with a larger sample size.

2.3. Linguistic Approach to Acquisition of Chinese as a First and an Additional Language

Linguistic sequential order reflects the prominence of the information deeply rooted in our psycholinguistic concept. A language-general bias stems from conceptual prominence, e.g., mentioning old information before new information. Adults generally produce the old-before-new word order in communication, with a preference for accessing the easily retrievable information first (Chen and Narasimhan 2018). Findings on child language have not reached a consensus. Mandarin

Chinese is distinctively featured with a topic-comment word order where topic represents the old and comment represents the new information in discourse (Li and Thompson 1981). If children's ordering preference is influenced by the language-specific discourse properties of the target language, Mandarin-speaking children may produce "old-before-new", similar to the adult language. If they produce the "new-before-old" word order, it would provide the crosslinguistic evidence for cognitive salience of a new information preference in child language.

Jidong Chen, Bhuvana Narasimhan, Angel Chan, Wenchun Yang, and Shu Yang investigated Mandarin-speaking children's L1 acquisition of information structure and word order preference. They compared two groups, child and adult, to examine word order preference when given two referents in a linear sequence. The order of the "old" and "new" information produced by the two groups revealed differences in word order preference and similarities in using indefinite classifier NPs. First, the adult group differed significantly from the child group in preferring the "old-before-new" word order, suggesting their distinctive conceptual prominence: the easily retrievable information first from adults and the highlighting of novel information from children. Second, children and adults share similarities at the lexical and syntactic level. Both groups predominantly produced bare NPs with no difference in distinguishing the old and the new referents; neither used classifiers to distinguish the old and the new referents. However, if only one classifier phrase was used in the task, both groups tended to use it to refer to the new information, a choice suggesting early sensitivity to language-specific syntactic devices and children's use of these devices to mark the information structure. Mandarin-speaking children's "new-before-old" preference adds crosslinguistic evidence to corroborate language independence in terms of word order preference related to information structure.

One fundamental research topic on language acquisition is form-meaning mapping. Mapping becomes more complex when multiple meanings of a word are represented by an identical form. Jidong Chen and Xincun Wang's study focused on the semantic development of the polysemous word 打 *dǎ* (to hit), one of the earliest verbs in Mandarin child speech. They examined the longitudinal corpus data at the age of 1;05–3;10, and another corpus from a child and his caregiver to examine the influence of an adult's input on child production. The study showed several findings. First, children acquired the core meaning of 打 *dǎ*, a physical action involving hand contact, at an early stage. Second, multiple senses of the verb 打 *dǎ*, e.g., *hit open* (V.+ *resultative complement*) and *play (games)*, emerged in child's production at the same time, with the majority of usages of the verb 打 *dǎ* polysemous. The earliest emergent senses involved a limited set of specific hand contact actions, suggesting that children predominantly produced the verb for multiple senses closely connected to the prototypical meaning. Third, it was at a later stage when the metaphoric meanings with hand action emerged. The study, with the Mandarin-speaking children's data, confirmed that the concrete concepts are produced earlier than less concrete or metaphorical meanings. Fourth, the syntactic and semantic contexts are important because they are inherent to the meaning of the specific senses (e.g., an open event typically involves an animate agent and an inanimate patient). Fifth, the comparison between the individual child and his caregiver's speech showed that the child prevalently produced the prototypical senses of the verb 打 *dǎ*, whereas the adult's usage was more evenly distributed across wider syntactic and semantic contexts. Nevertheless, the child data largely approximated that of the adult, with 打 *dǎ* in a verb compound being the most frequent, followed by the transitive frame. The acquisition of the Chinese verb 打 *dǎ* reveals an early preference for initial one-to-one unambiguous form-meaning mapping, followed later by expansion to other senses associated with the verb and its arguments. These findings, from children's Mandarin speech production, add support for a continuous derivational and restricted monosemy approach. One remaining question is whether the acquisition of the polysemous verb 打 *dǎ* represents a typical learning process. Further studies on multiple polysemous verbs/nouns are needed to check whether children initially extract a core feature of a polysemous word, but only use it in a restricted way with a small number of senses in a set of syntactic frames and semantic arguments.

In a separate study on sound perception and production, Xincun Wang and Jidong Chen examined Mandarin consonants that pose difficulties for English-speaking learners. The study

tested the Perceptual Assimilation Model (PAM) and the Speech Learning Model (SLM). Twenty-five English-speaking learners read the eight Mandarin consonants (j/tʃ/, q/tʃʰ/, x/ç/, zh/ʈʂ/, ch/ʈʂʰ/, sh/ʃ/, z/ʈʂ/, and c/ʈʂʰ/) in sentences in addition to identifying the target sounds in a forced-choice task. Findings show that the Mandarin retroflex, palatal, dental fricatives and affricates posed different levels of challenge to learners for listening perception. The misperceived retroflex and palatal sounds were substituted with each other in perception, but mis-produced palatal sounds were substituted with each other, not with retroflex sounds. Specifically, perception data showed that learners had different degrees of difficulties with zh/ʈʂ/, q/tʃʰ/, and x/ç/. The production data demonstrated that learners had difficulties with the c/ʈʂʰ/, zh/ʈʂ/, and q/tʃʰ/ consonants. The perceived phonetic distances between Mandarin and English consonants predicted the learners' perceptual difficulties, a prediction that lent support to the PAM. On the other hand, reorganizing to establish new Mandarin phonetic categories for the retroflex, palatal, and dental sounds is a learning process whereby learners distinguish the differences between c/ʈʂʰ/, x/ç/, z/ʈʂ/, and q/tʃʰ/ in order to establish these categories. As such, the SLM also plays a role in the learning process, as the authors proposed.

Correlation analysis showed the weak relationship between perception and production for the majority of the consonants investigated, suggesting that the relationship between Mandarin consonant perception and production is not straightforward. Extended studies, examining the mechanisms that English-speaking learners engage for Mandarin consonant perception and production, would be beneficial, particularly for teachers who need to know whether accurate perception precedes or facilitates accurate production.

Yan's study investigated linguistic interfaces of grammatical, discourse, and pragmatic features. The author chose to examine the acquisition of Chinese sentence-final particles, the interrogative 吧 *ba* and the suggestive 嘛 *ma*. What makes learning even more difficult is that interrogative and suggestive meanings share one identical form and sound: 吧 *ba*. Syntactically, both are at the end of a sentence. The function, however, is distinctly different, with the former as a pre-assumptive confirmation question marker and the latter as a polite marker for a suggestive request. Learners must reconfigure the meaning and function in the process. Thirty-five Chinese heritage (CH) speakers at two proficiency levels participated in the study. They can speak or at least understand oral Chinese, since one or both of their parents frequently speak Chinese to them. This influence suggests that they are exposed to authentic communication with rich discourse and pragmatics. As a result, their pragmatic and discourse competence may be more developed than nonheritage learners at the same proficiency level.

Participants completed three tasks: acceptability judgment, discourse completion, and translation. The results demonstrate that the CH learners mixed the presumptive confirmation question marker 吧 *ba* with the grammatical question marker 吗 *ma* in the discourse completion task (DCT). They overproduced the regular interrogative marker 吗 *ma* and underproduced the presumptive confirmation interrogative 吧 *ba*. However, participants, particularly at the advanced level, had little difficulty in accepting grammatical and rejecting ungrammatical sentences with the pre-assumptive confirmation interrogative 吧 *ba*. Furthermore, they correctly translated the suggestive particle 嘛 *ma* of a request into an English suggestion. The findings indicate that it is easier for CH learners to acquire the syntactic features than the interface between syntactic and discourse features. Such findings are consistent with previous research (Keating et al. 2011; Polinsky and Scontras 2019; Wen and Jiang 2019) in which the heritage learners did not outperform their counter-group, nonheritage learners, in terms of interface between syntax and discourse/pragmatics. Particularly, heritage learners tended to apply economical strategies including avoidance of ambiguity, resistance to irregularity, and preference for brevity and safety.

2.4. Innovative Research Design and Methodology

Research methods and data collection are central to language acquisition research, largely due to its interdisciplinary nature intersecting with linguistics, psychology, sociology, and education. Chinese language acquisition is exemplified by various linguistic and non-linguistic means drawn

from complex communicative patterns. We need various methods, including quantitative, qualitative, and mixed-methods perspectives, to capture the complex aspects of Chinese acquisition.

Research designs in this volume demonstrate an array of novel concepts. The studies have expanded traditional methods by integrating measures to achieve in-depth analysis of learners' linguistic preference, acquisition stages, cognitive skills, metacognitive strategies, and language use in social interactions. The novelty includes methods such as evaluating learner agency roles by providing instructional intervention without the teachers' interaction. Examples include learner group work for rule induction (Xu's study) and student self-directed activities (Yanmei Liu's study). Instead of using a traditional vocabulary test, Yu Liu developed a task-specific and native-referenced vocabulary assessment for research validity. Despite the focus on child language, Chen et al. and Chen and Wang's studies included Chinese native speakers (NSs) to explore the relationship between age and the linguistic encoding of information structure, and the role of input including syntactic, semantic, and contextual cues in children's polysemous verb development. Table 1 presents a summary of methodology adopted in the studies investigating acquisition of Chinese as an additional language through a cognitive approach.

Table 1. Summary of studies adopting cognitive and L2 acquisition approaches.

Authors	Research Purposes and Focus	Sample	Task Types/Materials	Measurements
Xu, Y.	The role of consciousness-raising Experimental design w/pre- and post-tests. Instruct intervention. Treatment: 1. Role-play sheets with explicit form markings of <i>-le</i> , 2. Interactive group work for rule induction	25 elementary CSL Two groups: E and C	1. Grammaticality judgment and error correction, 2. Role-play, 3. Rule induction task among E group 4. Written editing task.	Both quantitative and qualitative analyses 1. Paired sample <i>t</i> -tests 2. Coding categories for rule induction of <i>-le</i> via cognitive processes
Liu, YM	Effects of Metacognitive Strategy training on listening proficiency Longitudinal study with quantitative quasi-experimental design Intervention treatment: Metacognitive Strategy Training	80 interm. CSL Three groups: Self-direct Teach-direct Control group	1. MALQ Metacogntv Awareness Listening 2. Intervention: MST Metacogntv Strategy Training 3. A listening test 4. A proficiency test 5. Metacognitive awareness worksheet	Quantitative analysis 1. ANOVA for inter vention training effects 2. ANOVA for group differences in listening performance 3. ANCOVA and correlations for group differences in listening proficiency
Liao, J.	Relationship between metadiscourse devices and written discourse, and linguistic performance across three proficiency levels Text analysis on content cohesion and structure coherence features	62 CSL studying abroad In three group levels: elem., interm., adv.	Descriptive essay to introduce one's home university	Quantitative analysis 1. MANOVA: Compare 3 proficiencies 2. Coding categories for metadiscourse mrkrs and linguistic devices 3. Correlation for textual organizational devices 4. Correlation between linguistic and textual organization devices
Liu, Yu	Relationship between vocabulary size, retrieval speed and speaking fluency, accuracy and complexity Correlation study	15 interm-high CSL	1. Native-referenced vocabulary test 2. Four types of speaking tasks: instructive, descriptive explanatory, and argumentative	Correlation analysis 1. Coding categories for fluency, accuracy, & complexity 2. Descriptive analysis 3. Pearson correlation 4. Multiple regression

In addition to traditional tasks and materials for data collection, this volume displays a wide spectrum of innovations, such as combining grammaticality judgment with role-play, rule induction activity via learner groupwork (Xu), with DCT plus translation tasks (Yan), as well as longitudinal corpora from both children and an adult (Chen & Wang). Apart from survey questionnaires,

the qualitative approach was also adopted, including learners' text analysis (Liao; Yu Liu), discourse analyses (Yan), and semantic analyses (Chen & Wang). The statistical analyses spanned a wide range from relationship studies (e.g., Pearson correlation coefficient, various types of regression) to comparison studies (e.g., various types of *t*-tests, ANOVA, MANOVA, ANCOVA), as well as linear mixed-effects models. Table 2 presents a summary of the methodology adopted in the studies investigating L1 and L2 acquisition by Chinese children, CSL learners, and CH learners through a linguistic approach.

Table 2. Summary of studies on L1 and L2 Chinese acquisition adopting a linguistic approach.

	Research Purposes and Focus	Sample	Task Types/Stimuli	Measurements
Chen, J. Narasimhan, B. Chan, A. Yang, W. Yang, S.	Information structure and word order preference cross-linguistically; between Chinese children and adults Age effects on the linguistic encoding of information structure /word order	24 children 4;6 25 NS adults	Elicited production 12 target pairs of objects	Word order comparison between adults' "old-before-new" and children's "new-before-old" 1. Logistic regression: age predicts word order 2. Chi ² test 3. Independent <i>t</i> -test
Chen, J & Wang, X.	Form-meaning mapping for the Polysemous Verb 打 The role of input: syntactic, semantic, and contextual cues	9 children (1;05–3;10) 1 caregiver	Corpus longitudinal data Corpus child's and caregiver's data	1. Semantic category coding, syntactic constructs 2. Descriptive analysis 3. Comparison: child and adult
Wang, X. & Chen, J.	Relationship between perception and production Difficult consonants for English-speaking learners	25 beginning CSL	1. Identification task: ten consonants 2. Read eight consonants in sentences	1. Descriptive analysis 2. Separate ANOVA for perception & production 3. Pearson coefficients for perception and production
Yan, S.	Interface of syntactic, pragmatic, and discourse features	CH learners 16 interm. 19 adv. 18 NSs	1. Acceptability judgment 2. Discourse completion 3. Translation	1. Descriptive analysis 2. Linear mixed-effects model 3. Generalized linear mixed-effects models

In summary, this volume presents a variety of research designs and methodological strategies from both quantitative and qualitative perspectives. Cross-sectional and longitudinal studies examine the development of Chinese as a first and additional language; furthermore, they represent the extent of Chinese language acquisition research in conjunction with general language acquisition theories and research.

3. Future Research Direction

The studies in this volume, by incorporating an array of variables and operationalizing them, investigate the effects of cross-linguistic similarities, processing and production strategies, and linguistic constraints. The book reveals insights on learning processes involved in acquiring various Chinese linguistic features, cognitive skills, and metacognitive strategies. These studies provoke additional research questions awaiting future studies. There are several implications for future directions. I will, however, focus on two points: (1) the need for more empirical research to validate the current Chinese

language acquisition research and expand the scope, and (2) the need for innovative research designs with rigorous methodology.

4. Validate the Research and Expand the Scope

Further research is warranted to validate the current findings. This is not only because replication studies in Chinese acquisition research are scarce, but also because they are essential to clarify confounding data and to address a mix of findings across studies. Since research is conducted under varied theoretical approaches and methodologies, and in different contexts, empirical findings may yield inconsistency. Research with similar designs but targeting a variety of linguistic or cognitive agendas, as well as with the same linguistic and cognitive topics but conducted from different perspectives and methodology, is needed to build up a body of knowledge that broadens and validates our understanding of the acquisition of Chinese as a first and additional language. With research scope further expanded and different types of data verified, empirical findings should ultimately achieve better consistency.

Studies in this volume discussed further inquiries based on their findings and research limitations, discussions provoking a series of future research agendas. For example, in Liao's study, the relationship between linguistic accuracy and metadiscourse skill development remains intriguing. It is important to examine the learning process to determine if these skills develop simultaneously in parallel, independently, or in an interrelated way. A few studies reported results inconsistent with previous research from other languages. The inconsistencies may be from language specific features, different research settings, and/or variables related to data and data collection. For example, Yanmei Liu's study about the effects of metacognitive strategy on listening performance gains revealed that there was no significant relationship between metacognitive development and listening proficiency. It is necessary to further the inquiry by strengthening the intervention training on cognitive skills in addition to metacognitive strategies.

5. Need for Innovative Design with a Rigorous Methodology

Research design and data collection are vital. Robust research methodology and careful design promise more valid studies and reliable results. Drawing on the psycholinguistic framework, this volume may be biased towards the quantitative paradigm, as is true of the majority of research published in journals and books on psycholinguistics. We need to expand traditional methods by integrating a variety of measures. The mixed-methods approach, with both quantitative and qualitative data analyses, is rigorous in terms of data validation. Quantitative methods offer an efficient tool that conceptualizes variables and collects a large amount of data (e.g., via a survey questionnaire) to allow researchers to gain a wider perspective and make generalizations. Qualitative methods provide detailed examinations in context that capture learners' changes in the process. A mixed-methods design, thus, provides a way for a researcher to examine different types of data in order to increase the overall research reliability and validity. In this special issue, qualitative methods are rarely adopted. The majority of the studies, particularly those that adopted only quantitative measures, could have benefited from incorporating various forms of qualitative data to scrutinize the issues and consolidate the study.

One design that deserves more attention is the longitudinal study spanning a substantial length of time. It is a comprehensive tool that keeps track of learners' developments and examines the interactions between learners and their environment. When research is focused on the language development of a group of learners, a longitudinal design, by incorporating multiple factors into the analysis, serves the purpose. It is a "learner focused" design; learners are the "agents" who initiate interactions, which can either positively or negatively influence learning (Ortega and Ibarra-Shea 2005; Ushioda and Dörnyei 2012). There is a dearth of longitudinal studies in Chinese language acquisition research. Most studies in this volume employed the cross-sectional design, frequently with a native-speaker group providing the baseline data for comparison.

There are potential improvements in terms of research design and methodology in this volume. Sampling is a first concern. A few studies had small sample sizes upon which, however, rigorous statistical tests were conducted. Even when the sample size is relatively large, if participants are divided into subgroups, the number in each subgroup may be too small for rigorous parametric analysis. Data elicitation methods have been a primary concern. Studies in this volume have illustrated how Chinese-specific features can be identified, elicited, and analyzed to infer learners' linguistic competence. However, qualitative data, such as interviews and portfolio, are sparse. Furthermore, in addition to the learner's production, it is important to conduct process-oriented research to probe into the nature of the learning task and details of the process. Recent years have seen advanced methods of data collection utilizing digital media to capture the accuracy and fluency of learners' performance. Studies should continue to explore innovative data collection and analysis methods that reveal language use "from the point of view of users, especially of the choices they make, the constraints they encounter in using language in social interaction, and the effects their use of language has on other participants in the act of communication." (Crystal 1997, p. 30). All these concerns and issues confronting us promote more robust research designs and innovative research methodology to achieve a broader and more accurate understanding of the acquisition of Chinese as a first and additional language.

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