Chapter 7
Can Grammatical Knowledge Predict Chinese Proficiency?

Liu Li

Abstract This study explored how to assess the explicit and implicit grammatical knowledge of learners of Chinese, and their relationship to learners' overall Chinese language proficiency. The participants were 85 learners of Chinese as a foreign language (CFL) at universities in the USA. A test battery included three parts: (1) a timed grammaticality judgment test (GJT) and an oral repetition task for implicit grammatical knowledge; (2) an untimed GJT and an error correction task for explicit grammatical knowledge; and (3) a general language proficiency test. A set of correlation coefficients were computed to explore the contributions of implicit and explicit grammatical knowledge to overall proficiency. The results showed that there was no statistically significant correlation between the CFL learners' implicit grammatical knowledge and their proficiency scores, but there was a strong relationship between their explicit grammatical knowledge and their general proficiency. Further multiple regression analyses demonstrated that explicit knowledge better predicted the CFL learners' general L2 proficiency. These findings are discussed in light of how the relationship of implicit and explicit grammatical knowledge with general proficiency might be influenced by learners' actual level of proficiency or learning stage and how general proficiency is tested. Pedagogical implications are also discussed.

Keywords Implicit grammatical knowledge · Explicit grammatical knowledge · Language proficiency · Assessment · Chinese as a foreign language

Introduction

Grammar is an integral component of Chinese as a Foreign Language (CFL) curriculum and pedagogy, and a large amount of instructional time is usually spent on grammar to promote CFL learners' grammatical competence (Xing 2006). Despite its

L. Li (✉)
Ball State University, Muncie, USA
e-mail: lli5@bsu.edu

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important status in Chinese teaching and learning, grammar has rarely become a direct and legitimate topic in Chinese assessment; there has been little attempt in the CFL community to study the assessment of grammatical knowledge (Jin et al. 2012).

To fill this gap in CFL assessment, we conducted a study that assessed CFL learners' grammatical knowledge and examined its relationship with learners' overall Chinese proficiency. There were two major objectives of the study. First, we aimed to develop and validate measures to assess CFL learners' grammatical knowledge. In alignment with the recent development of research on acquisition of second language (L2) grammar (N. Ellis 2008; R. Ellis 2005), we differentiated between implicit and explicit knowledge of grammar, and assessed both types. Second, previous studies on L2 grammatical knowledge have produced mixed findings about the relative importance of implicit and explicit knowledge to L2 proficiency (e.g., R. Ellis 2006; D. Zhang 2012). Therefore, it was also an objective of the present study to examine how implicit and explicit grammatical knowledge would (differentially) predict L2 proficiency with a focus on CFL learners.

Implicit and Explicit Knowledge of Grammar and L2 Proficiency

Grammatical knowledge consists of two types of knowledge, implicit and explicit. Many studies have found that implicit and explicit grammatical knowledge are different, and they play different roles in second language acquisition (SLA) (e.g., Elder and Ellis 2009; R. Ellis 2004, 2005, 2006; Green and Hecht 1992; Philp 2009). Implicit knowledge is the unconscious knowledge of knowing how to use a language, and speakers of the language cannot explain such knowledge with explicit statements (Cleeremans et al. 1998). Implicit knowledge, therefore, is unconscious and intuitive. R. Ellis (2004, 2006) argued that once implicit knowledge is absorbed into a learner's inter-language, it becomes highly systematic. L2 learners usually are unconsciously guided by this system while processing the language. In contrast to implicit knowledge, explicit knowledge is the knowledge that learners can explicitly explain with grammatical rules or statements (Dienes and Perner 1999). With explicit knowledge, learners consciously know some facts or information about the related L2 grammar aspects or features. But these explicit grammatical facts may not be systematically connected. Therefore, the knowledge of these facts may not constitute as stable system as implicit knowledge of proficient L2 users does. In this sense, explicit knowledge is less structured than implicit knowledge. Because of their differences, learners may use explicit and implicit knowledge differently when they deal with different grammar tasks (R. Ellis 2004). Consequently, how to measure L2 learners' implicit and explicit grammatical knowledge becomes an important topic in the field of L2 assessment, because such an understanding will have significant contributions to the development and assessment of general L2 proficiency (R. Ellis 2006).

Previous studies have found that both implicit and explicit knowledge play an important role in achieving L2 proficiency (e.g., N. Ellis 2008; R. Ellis 2006). Among these studies, Han and Ellis (1998) examined the relationship between explicit and implicit knowledge, and their relationship with general language proficiency among advanced adult learners of English from different backgrounds in the USA. The test included five tasks focusing on complement clauses in English. The three tasks to assess grammar knowledge were as follows: (1) an oral production test (OPT); (2) a grammaticality judgment test (GJT) given three times (first two were timed and the last one was not); and (3) an interview. The proficiency tasks included the Test of English as a Foreign Language (TOEFL) and the Secondary Level English Proficiency Test (SLEP). The measures resulting from grammar knowledge tests were grouped into a factor analysis that produced two significant factors, one for implicit knowledge and the other one for explicit knowledge. These two types of grammatical knowledge were positively correlated with each other as well as with the two measures of language proficiency (i.e., TOEFL and SLEP tests). The results demonstrated that both implicit and explicit L2 knowledge could play a role in general L2 proficiency.

R. Ellis (2006) further examined to what extent L2 proficiency can be properly explained by implicit and explicit grammatical knowledge. In this study, R. Ellis attempted to find out why some L2 grammatical structures are more difficult to learn than others. Using a battery of tests that were designed to measure implicit and explicit L2 grammatical knowledge of 17 grammatical structures, R. Ellis (2006) investigated the learning difficulty in relation to these two types of knowledge. The results showed that structures that were easy in terms of implicit knowledge were often difficult in terms of explicit knowledge and sometimes vice versa. Overall, there was no correlation between the rank orders of difficulty of the 17 grammatical structures for implicit and explicit knowledge. However, a correlational analysis showed when the structures varied as to whether it was implicit or explicit knowledge, they were correlated to a measure of general language proficiency. These findings indicated that there existed a correlation between grammar scores and general proficiency scores. A regression analysis demonstrated that both types of knowledge predicted general language proficiency. However, as far as the distinction was concerned, the implicit and the explicit measures of the same structure were not equally correlated with proficiency. In other words, the implicit measures of one set of structures and the explicit knowledge of another set were found to relate to the general language proficiency measures. He concluded that the distinction between implicit and explicit knowledge contributed to the level of learning difficulty in L2 grammar learning.

Elder and Ellis (2009) further investigated the extent to which implicit and explicit L2 knowledge of specific grammatical features related to general L2 proficiency. The same 17 grammatical structures used in R. Ellis's study (2006) were employed in this study. Four measures were used to measure the participants' implicit and explicit linguistic knowledge, including the elicited imitation test (EIT), timed grammatical judgment test (TGJT), untimed grammatical judgment test (UGJT), and metalinguistic knowledge test (MKT). Participants' scores from

the International English Language Testing System (IELTS) test measuring their L2 proficiency were also obtained. A key finding in this study was that both the implicit and explicit measures of the same structure were not related to proficiency. The results of a series of correlation and multiple regression analyses also displayed that the measures of both implicit and explicit knowledge predicted IELTS participants' total scores. Implicit knowledge was found to be a significant predictor of both speaking and writing, whereas explicit knowledge predicted both listening and reading.

With a large sample pool, D. Zhang (2012) was able to employ structural equation modeling analysis to examine the contribution of vocabulary and grammatical knowledge to second language reading comprehension among advanced Chinese EFL learners. In his study, the implicit grammatical knowledge was measured with a timed grammaticality judgment task. The explicit knowledge was measured with a grammatical error correction task. It was found that the two types of grammatical knowledge only showed a weak contribution to reading comprehension. Through further analysis, it was found that the learners' implicit knowledge of grammar had a stronger relationship to reading comprehension than explicit knowledge. Zhang's findings in this regard differed from Elder and Ellis's study (2009), in which explicit knowledge predicted reading.

A few studies also attempted to explore the relationship between explicit grammatical knowledge and general language proficiency in languages other than English. For example, Elder and Manwaring (2004) found that although explicit knowledge of the Chinese grammatical system was a good predictor of overall course performance, it was associated with better performance in a Chinese language course for some of the groups, but not for others. Their findings also revealed that some aspects of this knowledge are more critical than others, and the relationship between explicit grammar knowledge and proficiency varied in strength according to the nature of the assessment task and learners' prior experience of language study. Roehr (2008) examined the relationship between explicit knowledge of L2 German and L2 proficiency measured as knowledge of grammar and vocabulary, and found a strong positive correlation between the two. However, neither study looked into the relationship between implicit knowledge and the general L2 proficiency.

Although the findings of the reviewed studies overall supported the viewpoint that general L2 proficiency is associated with implicit and/or explicit L2 knowledge, they only afforded limited empirical support for it. First, most of those studies focused on European languages, especially English as a second/foreign language (ESL/EFL). Little effort was made to examine less commonly taught languages. Second, some studies examined only explicit grammar knowledge and its relationship with overall proficiency. Implicit knowledge was not in the picture. Third, the findings sometimes showed some discrepancies. For example, Elder and Ellis's study (2009) found that explicit knowledge predicted reading, whereas in D. Zhang's study (2012), it was found that the learners' implicit knowledge of grammar had a stronger relationship to reading comprehension.

These problems indicate that more research is needed on how the two different types of grammatical knowledge could be assessed in various languages and how they might contribute differentially to L2 proficiency in these languages. Particularly, since most empirical studies done so far have focused on English as a second/foreign Language, the relationship between implicit/explicit L2 knowledge and general L2 proficiency among less commonly taught languages urgently needs further empirical investigation.

To this end, we conducted the present study with a focus on adult CFL learners to further explore the nature of L2 grammatical knowledge, the relationship between implicit and explicit knowledge, and the relationship of the two types of knowledge with general L2 proficiency. It is hoped that the study will be illuminating for both SLA research and the teaching and testing practice of L2 Chinese grammatical knowledge.

Acquisition of L2 Chinese Grammar

In contrast to the importance attached to the teaching and learning of grammar in any Chinese program, there is a disappointing fact that little attention has been given to the assessment of grammatical knowledge in L2 Chinese. This is evident not only from a lack of direct assessment of grammatical knowledge in major standardized tests but also from the little empirical effort of scholars to address issues of grammar in research on Chinese assessment. So far, most of the research on explicit and implicit grammatical knowledge has been done among learners of English, Spanish, or other European languages (e.g., R. Ellis 2005, 2006; Mirzaei et al. 2011). Little attention has been paid to less commonly taught languages such as Chinese. According to the report released by the Modern Language Association on enrollments in languages other than English in United States' Institutions of Higher Education (Furman et al. 2010), there has been an increasing number of learners studying Chinese in recent years. It is thus worth examining how CFL learners develop grammatical knowledge and how their grammatical knowledge is related to their overall Chinese proficiency development.

Chinese language is typologically different from English in terms of grammar (Jiang 2009; Xing 2006). From a grammatical perspective, there are some specific challenges to learners of Chinese, who usually have a different path of development for different grammatical features. For example, Y. Zhang (2001) has developed a sequential hierarchy of eight Chinese morphemes in L2 acquisition of the language based on the Processability Theory, which are as follows:

1. Adjective marker—de 的 (e.g., 漂亮的 pretty),
2. Possessive marker—de 的 (e.g., 我的 mine),
3. Attributive marker—de 的 (e.g., 北京的天气 weather in Beijing),
4. Experiential marker—guo 过 (e.g., 看过 has/have seen),

5. Progressive marker—zhe 着 (e.g., 躺着 be lying),
6. V-complement marker—de 得 (e.g., 走得很慢 walk slowly)
7. Classifier (e.g.,一张纸 a piece of paper)
8. Relative clause marker—de 的 (妈妈做的饭很好吃 The meal that mom cooked was delicious).

Following Y. Zhang's (2001) research, Gao (2005) conducted a similar study between two groups of Chinese L2 learners. She identified similar findings with Y. Zhang's (2001) and also found several grammatical structures at the syntactic level that were challenging to L2 learners, such as the *ba* 把 structure and topicalization in Chinese. In Y. Zhang (2008), the proposed hierarchy of processing in L2 Chinese in Zhang (2001) was extended to the following syntactic aspects:

1. Topicalization: OSV, SOV

e.g., 1）机票　　我 买好了。
　　Flight tickets I already bought.
　2）我什么水果都吃。
　　I　any fruit all eat.

2. Adv-fronting and subordinate clause: XP SV(O)/S XP VO

e.g., 慢慢地 他 走　　进了　　教室。
　Slowly　he walked into the classroom.

3. Canonical SV(O): declaratives and interrogatives (y/n, wh-question, and intonation).

e.g., 1) 我 学　　中文。
　　I study Chinese.
　2) 你　学　　什么？
　　You study what?

However, Y. Zhang's (2008) data came from elicitation tasks, which seemed less natural than spontaneous conversation. In addition, her research participants had been taught the aspects of grammar through a sequence that followed the processing hierarchy she proposed. Therefore, we cannot rule out the possibility that learners might reveal different acquisition sequences if they were taught grammar structures in different orders.

In order to develop a set of stages that L2 learners follow in acquisition of Chinese grammar and with the gaps of previous studies discussed above addressed, Wang (2013) extended and tested the processing hierarchy (Gao 2005; Y. Zhang 2001, 2008) in a different group of Chinese L2 learners. Wang's study attempted to demonstrate the emergence sequence of a number of core structures in L2 Chinese. Previously, most studies on L2 Chinese focused on a single structure or a very limited set of them. Wang's study had a much wider scope and covered both morphological level and syntactical level. Therefore, it can be used to serve as a good base for future experimental designs. Wang collected spontaneous and prompted oral data through semi-structured interviews at an interval of 2 or

Table 7.1 Learning stages in Chinese grammar (Wang 2013)

Stages	Processing procedure	Information exchange	Morpheme	Syntax
5	S-bar procedure	Main and sub-clause	/	ba structure
4	S-procedure	Inter-phrasal information	Relative clause marker de	Topicalization: OSV, SOV
3	Phrasal procedure	Phrasal information	Classifier V-Comp marker —de	XP SV(O)/S XP VO: adv-fronting, subordinate clause
2	Category procedure	Lexical morphology	Possessive marker —de Adjective marker —de Attributive marker —de Progressive marker zhengzai Experiential marker—guo	Canonical SV(O): declaratives, interrogatives (y/n, wh-, intonation)
1	Word	Words	Invariant forms: Single words/constituents	Formulaic expressions

3 weeks over 38 weeks from 8 undergraduate students, who had diverse language learning experiences and backgrounds. The speech data were transcribed into text, resulting in a 30,000-word corpus for the study. Overall, Wang's (2013) study confirmed the previous findings by Y. Zhang (2001, 2008) and Gao (2005) that L2 learners do tend to follow a set of stages in their acquisition of Chinese grammar. She summarized CFL learners' grammar acquisition order in the following table.

Table 7.1 provides a relatively complete picture of the acquisition sequence of grammar for Chinese L2 learners. The hierarchy provides teachers with a useful framework to understand the typical developmental path and direction that learners with typologically different L1 backgrounds go through in acquiring L2 Chinese grammar. It also offers us a practical framework to sample grammatical features for assessing L2 learners' Chinese grammatical competence in the present study.

Research Questions

As mentioned previously, most existing studies on implicit and explicit grammatical knowledge (and their relationships with L2 proficiency) focused on English, Spanish, or other commonly taught languages. There has been little research to study the two dimensions of grammatical knowledge among learners of Chinese. Previously, a number of tasks have been developed and implemented to examine L2

learners' implicit and explicit grammatical knowledge. Therefore, an objective of the present study was to find out whether these tasks would also be reliable and valid measures of grammatical knowledge in L2 Chinese. Specifically, the study aimed to address the following research questions:

1. Is there any significant correlation between implicit and explicit grammatical knowledge of CFL learners and their general L2 proficiency?
2. Which type of grammatical knowledge, implicit or explicit, better predicts the general L2 proficiency of CFL learners?

Methods

Participants

The participants in this study were adult CFL learners studying Chinese at two universities in Indiana, USA. The two universities used the same textbooks (*Integrated Chinese*). The pace of instruction and the benchmark set for each proficiency level (beginning, intermediate, and advanced) were similar. At each university, one class of students was randomly chosen from all the classes at the beginning, intermediate, and advanced level, respectively. Altogether, there were six classes of students; in each class, only native English speakers were recruited. In the final pool of participants, there were 85 students (47 males and 38 females) with an average age of 20.5 years. They had studied Chinese for 1–3 years in correspondence to the level of their Chinese class.

Instruments and Procedures

The participants first completed a language background questionnaire. The questionnaire provided personal information about the participants, as well as the information about their language background and exposure to Chinese language.

There were five tests for participants to take in order to assess their grammatical knowledge and general Chinese proficiency. Based on previous research (R. Ellis 2005; Mirzaei et al. 2011), a timed GJT and an oral repetition task were administered to measure the participants' implicit grammatical knowledge, whereas an untimed GJT and an error correction task were used as measures of explicit knowledge. A fifth test was administered to measure the overall Chinese proficiency of the participants.

The timed GJT included 40 sentences, 20 grammatical ones and 20 ungrammatical ones. For example, both Sentences (1) and (2) below use the—ba structure. The second one is grammatically correct; the first is not because the aspectual marker—le is missing.

(1) Gāo Wénzhōng bǎ dàngāo chī.
高 文中 把 蛋糕 吃。
(2) Wáng Péng bǎ gōngkè zuò le.
王 朋 把 功课 做 了。

All 40 sentences were presented on PowerPoint with both characters and pinyin and played automatically to learners with an interval of 10 s. This task was group administered to learners in their regular Chinese classes. The timed GJT was designed following R. Ellis's (2004, 2005, 2006) guidelines. The participants were required to select the correct sentence from among the two parallel grammatical and ungrammatical sentences within the time limit of 10 s for each slide. The participants were reminded of the speeded nature of the test and were instructed to indicate whether the sentences were grammatical or ungrammatical on an answer sheet as fast as they could. The reliability of the test was estimated through Cronbach's alpha, which was found to be 0.69, suggesting that the test was acceptable in reliability.

The oral repetition task was administered individually. The participants listened to a recording of 20 sentences and repeated each one of them one by one, for example:

(3) Dàngāo bèi shāfā yā huài le.
蛋糕 被 沙发 压 坏 了。
The cake was crushed by the couch.

Students' repetition was recorded for analysis. A repeated sentence was scored as correct only if all sentence elements were repeated in a correct order; pronunciation errors were not considered. Cronbach's alpha of this task was 0.78, suggesting that it was also acceptable in reliability.

The untimed GJT asked the learners to indicate if a Chinese sentence was grammatically correct. Like the timed GJT, it also included 20 pairs of short Chinese sentences (one grammatical and the other ungrammatical, altogether 40 sentences) printed on paper with both characters and pinyin. But there was no time limit to complete it. The reliability of this task was 0.74, suggesting that it was acceptable.

The error correction task contained 20 ungrammatical sentences covering the same grammatical structures as the GJTs. The error correction task was also printed on paper with both characters and pinyin, each of which had four underlined places with one containing a grammatical error. The learners needed to first identify the place with an error and then correct that error. For example, in Sentence (4) below, there is an error in A. Learners should first identify A, and then correct it as "请你吃饭的" to make it a grammatically appropriate modifier of 男人. The reliability of this task was 0.67, suggesting that it was acceptable.

(4) qǐng nǐ chī fàn nán rén shì shuí?
请 你 吃 饭 男 人 是 谁？
A B C D

In addition to the four grammatical knowledge measures, the learners also took a researcher-developed Chinese proficiency test. This test was a simulation of the standardized measure of L2 Chinese proficiency HSK, which is an official proficiency test for Chinese as an L2 developed by China's Hanban (see Teng, this volume). It consisted of three sections that covered listening, reading, and writing, respectively. In the listening section, the learners were to listen to two audio files and then respond to 10 multiple-choice comprehension questions for each file. Among the two audio files, one contained 10 mini-dialogues between a man and a woman; the other was a narrative. The reading section contained two passages for each of which the learners had to answer 10 multiple-choice questions regarding their comprehension of the passage. The writing section asked the learners to write a short essay in response to one of the two given topics. The total score was 50 points. The proficiency test was group administered in several Chinese classes after the learners completed the grammatical knowledge tasks. Data collection was completed in about a month. Cronbach's alpha of the proficiency test was 0.80, which means that it was a very reliable test.

Scoring Procedures

The responses to the timed and the untimed GJTs were scored in terms of correct and incorrect answers. Each correct response received 1 point, and an incorrect or unanswered response received 0 points. The total score for each task was 20 points (one point for each item). The oral repetition task was also scored in terms of correct or incorrect answers. The total score was 20 points (one point for each item). The total score of the error correction task was also 20 points. If a student identified an error and corrected it, he/she received one point. If an error was only identified, but failed to be corrected, he/she would receive a half point.

The listening and reading sections of the general proficiency test were scored on the basis of correct or incorrect responses depending on whether the learners correctly answered the multiple-choice questions. A correct answer to a question received one point; a wrong answer or no choice made did not receive any points. The total score for both the listening and the reading section was 20. The writing section of this test received a holistic score (0–10) with consideration of topic content, text organization, language use (vocabulary and grammar), as well as mechanics. Two college professors of Chinese with more than 10 years of experience of teaching Chinese in a university setting independently rated the essays of the participants. Inter-rater agreement was 93.02%, and all disagreements were resolved through discussions. The maximum score possible for the general proficiency test was 50 points.

Results

Table 7.2 shows the descriptive statistics of the five tests. Following R. Ellis (2005), we first conducted exploratory factor analysis on the total scores of the four tasks of grammatical knowledge to examine the factor structure of L2 Chinese grammar before we examined their relationships with general L2 proficiency. Two factors were extracted. As shown in Table 7.3, the timed GJT and the oral repetition task were loaded on a factor of implicit knowledge; and the untimed GJT and the error correction task on that of explicit knowledge. Detailed results of this analysis are shown in Table 7.3. This two-factor solution lends support to the claim that these tests provided relatively separate measures of implicit and explicit knowledge in L2 Chinese as they did in L2 English.

To answer the first research question, the relationship between the participants' implicit and explicit grammatical knowledge and their general L2 proficiency was examined through the bivariate correlations using the IBM SPSS software. Implicit knowledge was represented by the total scores of the timed GJT and the oral repetition task, and explicit knowledge by those of the untimed GJT and the error correction task. The correlations are shown in Table 7.4. There was no significant correlation between the scores of the CFL learners' implicit knowledge and their general L2 proficiency scores, $r = 0.21$; but the correlation between the scores of

Table 7.2 Descriptive statistics of the test scores

Knowledge	Task	Mean score	SD
Implicit knowledge	Timed GJT	10.6	2.98
	Oral repetition task	9.7	4.88
Explicit knowledge	Untimed GJT	15.8	3.76
	Error correction task	11.3	5.09
General proficiency		37.8	14.9
	Listening	13.2	4.96
	Reading	18.5	3.43
	Writing	6.1	2.82

Table 7.3 Results of exploratory factor analysis on grammatical knowledge tests

Components	Total	% of variance	Cumulative %
1	3.881	58.389	58.386
2	1.014	32.813	33.920
Test		Component 1	Component 2
Repetition task		0.725	
Timed GJT		0.792	
Untimed GJT			0.801
Error correction			0.787

Table 7.4 Correlations between implicit/explicit knowledge and general L2 proficiency

Correlations	*r*	*p*	*N*
Implicit and General proficiency	0.210	0.398	85
Explicit and General proficiency	0.515***	0.000	85

***$p < 0.001$

Table 7.5 Correlations between implicit and explicit grammatical knowledge and the sub-components of the general language proficiency test

Sub-components	Implicit Knowledge		Explicit knowledge		*N*
	r	*p*	*r*	*p*	
Listening	0.076	0.328	0.321***	0.000	85
Reading	0.053	0.271	0.406***	0.000	85
Writing	0.009	0.862	0.198*	0.026	85

*$p < 0.05$ *** $p < 0.001$

Table 7.6 Standard multiple regression analysis predicting general L2 proficiency

Model	*R*	*R* squared	Adjusted *R* squared	Std. error of the estimate
1	0.541	0.298	0.291	13.98

the CFL learners' explicit knowledge test scores and their general L2 proficiency scores was significant ($r = 0.515$, $p < 0.001$).

Table 7.5 shows the bivariate correlations between CFL learners' implicit and explicit grammatical knowledge and the three sub-components of their general L2 proficiency (i.e., listening, reading, and writing). As shown in the table, none of the sub-components of CFL learners' overall proficiency was significantly correlated with their implicit grammatical knowledge: listening comprehension ($r = 0.076$, $p = 0.328$), reading comprehension ($r = 0.053$, $p = 0.271$), and writing ($r = 0.009$, $p = 0.862$). In contrast, the correlational relationships between explicit knowledge and all three sub-components of the proficiency test were significant. Specifically, the correlations between explicit knowledge and listening comprehension, reading comprehension, and writing were $r = 0.321$ ($p < 0.001$), $r = 0.406$ ($p < 0.001$), and $r = 0.198$ ($p < 0.05$), respectively.

To answer the second research question, a multiple regression analysis was conducted to examine how implicit and explicit grammatical knowledge as two independent variables predicted learners' general L2 proficiency. It was found that the two types of grammatical knowledge together explained about 29% of the variance in the learners' general Chinese proficiency; such a predictive effect was significant, $F\ (2,\ 84) = 18.40$, $p < 0.001$. Table 7.6 shows the results of model summary of standard multiple regression analysis.

Further hierarchical regression analyses were conducted to examine how explicit and implicit grammatical knowledge independently or uniquely contributed to general L2 proficiency. It was found that CFL learners' implicit grammatical

Table 7.7 Hierarchical regression analysis predicting general L2 proficiency

Model	Unstandardized coefficients		Standardized coefficients	*t*	Sig.	Collinearity statistics			
	B	Std. error	Beta			Partial	Part	Tolerance	VIF
(Constant)	9.985	7.097		1.981	0.209				
Implicit knowledge	0.698	0.541	0.102	1.573	0.114	0.177	0.152	0.231	0.086
Explicit knowledge	1.791	0.296	0.473	6.704	0.000	0.563	0.548	0.997	1.003

knowledge, as the first variable entered into the regression equation, did not significantly predict their general L2 proficiency. Over and above implicit knowledge, learners' explicit grammatical knowledge stood as a unique and significant predictor of their general proficiency. Table 7.7 shows the results of hierarchical regression analysis.

In the above model, the regression coefficients or standard betas of implicit and explicit knowledge were 0.102 and 0.473 ($p < 0.001$), respectively, which suggests that the participants' explicit grammatical knowledge made a significantly higher contribution to their general proficiency. We also switched the order of entry of the two grammatical knowledge predictors in the regression equation. This time, explicit knowledge was entered first, followed by the implicit knowledge. The overall pattern remained the same showing a significant and stronger predictive effect of explicit knowledge.

Discussion

The study reported a significant correlation between the CFL learners' explicit grammatical knowledge and general Chinese proficiency, and the former was also a significant predictor of the latter. On the other hand, the implicit grammatical knowledge of CFL learners was not a significant correlate of their general Chinese proficiency (and its sub-components; see Tables 7.4 and 7.5). In addition, explicit knowledge was found to have a larger predictive effect on learners' general proficiency.

An explanation for the above pattern of relationships between implicit and explicit grammatical knowledge and L2 proficiency found on Chinese learners might pertain to how Chinese is typically learned in the USA or the type of exposure that the learners in the study had to the target language. Chinese is a less commonly taught language in the USA; and there is not a big Chinese community in Indiana where the learners were sampled. The students in this study, all of whom were native English speakers, learned Chinese almost exclusively in the classroom context through explicit instruction on language structures and rules and had very little exposure to and practice of Chinese (written or spoken) outside of the

classroom to enhance their implicit knowledge of Chinese grammar. Consequently, it seemed reasonable that the Chinese learners relied primarily on their explicit knowledge when they worked on the general proficiency tasks. The fairly strong relationship between L2 Chinese explicit grammatical knowledge and Chinese proficiency seemed to corroborate previous research findings on ESL/EFL learners (e.g., Elder and Ellis 2009; R. Ellis 2006).

In addition to the nature of L2 Chinese learning, we need to consider the learning experiences of the students in this study as well. The lack of a significant relationship between implicit knowledge and L2 proficiency seemed to contradict those findings of some previous studies (e.g., Elder and Ellis 2009) that often showed a close relationship between ESL/EFL learners' implicit knowledge and general English proficiency or a sub-component of that proficiency. We speculate this might be due to the limited experience (and hence limited proficiency) of the participants in this study. The participants of the current study had studied Chinese for only 1–3 years (with an average of about 1.9 years). Such a short period of time of studying Chinese indicates that the actual proficiency level of the learners could be very low. Chinese is one of the most difficult languages for native English speakers to learn. The American Council on the Teaching of Foreign Language (ACTFL) has found that English speakers can reach ACTFL Oral Proficiency Interview (OPI) (see Liu, this volume, for more information about the OPI) intermediate-low or intermediate-mid level after about 240 class hours of learning a European language. However, it takes native English speakers 480–720 class hours to reach the same proficiency level in Chinese. According to the list created by the Foreign Service Institute on the approximate time, an English speaker needs to learn a specific language, learners of Spanish, after spending 575–600 h, could reach "Speaking 3: General Professional Proficiency in Speaking" and "Reading 3: General Professional Proficiency in Reading." However, learners of Chinese would have to spend approximately 2200 h. Therefore, the actual (low) proficiency level of the students in this study might have led to a limited involvement of implicit knowledge in the general proficiency test. In other words, learners' actual proficiency or stage of learning might moderate how implicit knowledge (and explicit knowledge) would be related to L2 listening, reading, and/or writing. In the present study, given the small number of participants at each Chinese course level (i.e., beginning, intermediate, and advanced), we did not compare how the relational patterns might differ across these levels. It would certainly be interesting in future research to further explore such an issue with learners at diverse stages of their Chinese learning.

Another possible explanation for the pattern of the findings of this study (especially the lack of significant relationship of implicit knowledge with Chinese proficiency) and its difference from previous studies on English might be related to how the L2 proficiency test was conducted. It is worth noting that in some, if not all, previous studies (e.g., R. Ellis 2006), learners' L2 proficiency data were drawn from a testing context where learners tended to have a pressure to complete their test within a stipulated period of time; therefore, it seems reasonable that implicit knowledge, which implies efficiency of language processing, emerged as a

significant and more important predictor of the performance on a proficiency test. To mark a contrast, the proficiency test was conducted in the learners' natural Chinese classes in this study instead of a real testing situation. This seemed to have allowed for more active involvement of explicit knowledge of grammatical rules for monitoring their work on the proficiency test.

Conclusions and Implications

With a focus on learners studying in a university context and using researcher-developed tasks, this study tested CFL learners' implicit as well as explicit grammatical knowledge and explored the relationship of these two dimensions of grammatical knowledge and their general Chinese proficiency development. It was found that implicit knowledge was not significantly correlated with general proficiency (and its sub-components). However, a significant, positive correlation was found of explicit knowledge and general proficiency. As a result of these correlational patterns, it was not surprising that hierarchical regression analysis revealed explicit knowledge as a significant and better predictor of CFL general proficiency.

Previous findings about the relationships of different types of grammatical knowledge to L2 proficiency came largely from research on ESL learners. With a focus on Chinese, a less commonly taught language, the present study enriches our understanding about the role of grammar in L2 proficiency development. Pedagogically, the findings recognize the importance of explicit knowledge in language learning, especially in CFL settings. While a significant relationship of implicit knowledge with Chinese proficiency development did not emerge, it does not necessarily follow that implicit knowledge is not important. As explained earlier, such a pattern might be due to the sensitivity of the relationship to developmental stage or testing condition. The most important insight that can be gained from this study is perhaps that a balanced approach needs to be adopted by L2 teachers in Chinese classrooms between the time devoted to the development of L2 learners' explicit grammatical knowledge through teaching explicit rules and the time specialized to the real communicative use of L2, which can help with the development of both CFL learners' implicit knowledge and their general L2 proficiency.

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