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Amount of practice and pragmatic development of request-making in L2 Chinese

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Chapter 3

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Abstract

This chapter focuses on the amount of pragmatics practice needed for promoting accurate and speedy recognition and production of request-making forms in L2 Chinese. Over four consecutive days, an input group (*n*=17) and an output group (*n*=17) practiced using target request-making forms via computerized input-based and output-based practice activities, respectively. Meanwhile, a control group (*n*=15) did Chinese reading comprehension exercises that did not contain the target pragmatic features. Two computerized instruments (a pragmatic listening judgment task and an oral discourse completion task) were administered to assess pragmatic development over time. The results showed that, regardless of practice

modality (input-based and output-based), four instances of processing target pragmatic features were sufficient to enhance pragmatic performance accuracy, yet more than eight instances were needed for the development of performance speed.

1. Technology in Pragmatics Instruction

Over the past three decades, the field of L2 pragmatics instruction has developed from the stage where researchers strived to prove whether L2 pragmatics can be taught to the current concern of how L2 pragmatics can be effectively taught. Meanwhile, researchers in this field have become increasingly informed by SLA theories for designing instructional methods (for a recent review, see Taguchi, 2011a). For example, L2 pragmatics instruction has been influenced by a range of SLA theories and constructs including: explicit and implicit learning (e.g., Alcón-Soler, 2007; Takimoto, 2008), input processing theory (e.g., Takimoto, 2009), the noticing hypothesis (e.g., Kondo, 2008; Takahashi, 2001), form-focused instruction (e.g., Fukuya & Zhang, 2002; Martinez-Flor & Fukuya, 2005), and skill acquisition theory (e.g., Li, 2012).

Recently, researchers have explored the utility of various forms of computer technologies for promoting L2 pragmatic development. Such technologies include computer assisted language learning (CALL) (e.g., Utashiro & Kawai, 2009), computer mediated communication (CMC) (e.g., Belz & Kinginger, 2003; Belz & Vyatkina, 2005; González-Lloret, 2008; Kagegawa, 2009; Sykes, 2005; Vyatkina & Belz, 2006), and internet-based applications such as websites providing learning resources (e.g., Cohen & Ishihara, 2005; Sykes & Cohen, 2006), social networking and virtual interactive space (e.g., Sykes, 2009, 2011). Collectively, this line of research has demonstrated that computer technology can create critical conditions (e.g., input, interaction, simulation) for promoting L2 pragmatic development (Taguchi, 2011a).

There are several advantages of using computers for teaching pragmatics. For one, technology enables the teaching of pragmatic features that cannot easily be incorporated in traditional classrooms. For example, reactive tokens (i.e., back-channeling) are important components of face-to-face communication, but it is difficult to teach them in the classroom because they are verbal and nonverbal responses occurring in natural conversations. To address this difficulty, Utashiro & Kawai (2009) created a CALL program for teaching Japanese reactive tokens (RTs) and examined its instructional effectiveness. The CALL program provided learners with video clips illustrating native speaker conversations with various RTs. The computer program also provided metapragmatic information and quizzes for the target RTs. The CALL program was implemented with other classroom-based activities. Results showed that the learners improved significantly in their ability to recognize and produce target RTs and the gains were retained on a delayed posttest administered one week after the instruction. These findings indicate the effectiveness of incorporating CALL into a blended instructional model for teaching L2 pragmatic features.

Another advantage of computer-delivered instruction is that it can offer an authentic learning environment where learners practice pragmatics while engaged in real-life communication. The instructional outcome is also assessed based on learners' real-life experiences. Following this advantage, several studies have utilized the CMC approach for teaching L2 pragmatics (e.g., Belz & Kinginger, 2003; Belz & Vyatkina, 2005; González-Lloret, 2008; Kagegawa, 2009; Sykes, 2005; Vyatkina & Belz, 2006). For instance, Kagekawa (2009) investigated the effects of explicit instruction on the acquisition of Japanese sentence-final particles (SFPs) as learners engaged in e-mail exchanges with Japanese native speakers. Over a period of 12 weeks, the learners corresponded with native speakers via e-mails and received two instructional treatments that used their e-mails as materials (e.g., highlighting SFPs in native speakers' e-mails and providing feedback to the learners' use of SFPs). To assess their learning, the learners' use of SFPs in their e-mails before and after the instruction was compared. Over time, the learners increased in both frequency and range of SFPs. As shown in this study, technology can help to create an environment where learners can apply their learnt pragmatic knowledge to real-life communication.

A somewhat underexplored advantage of computer technology is its potential to measure the precise amount of instruction needed for pragmatic development. In fact, the issue of an optimal amount of instruction has rarely been discussed in the field. One exception is Jeon & Kaya's (2006) meta-analysis that examined the effects of length of instruction. They found that longer interventions (i.e., more than five hours) generally led to more pragmatic gains than shorter ones (i.e., less than five hours). This finding is expected. Since pragmatics is complex in that it involves making connections between forms, functions, and contexts (Schmidt, 1993), longer treatments can provide more opportunities for learners to process target form-function-context connections, which, in turn, leads to better learning outcomes. However, because almost no research has determined exact amount of instruction needed for development, more work is needed in this area. Computer-delivered instruction will certainly facilitate such investigation because systematic and controlled instruction will help us monitor the precise amount of instruction given to the learners.

2. Accuracy and Speed as Instructional Targets

An additional merit of computer-delivered instruction is that it enables us to measure learning over different dimensions of language abilities at once. In previous research, pragmatic performance has typically been conceptualized as *pragmatic performance accuracy*, i.e., the ability to produce meaning in a socially appropriate manner and to interpret meaning accurately based on contexts (Thomas, 1995). However, *pragmatic performance speed*, i.e., the efficiency of carrying out pragmatic tasks, has largely been neglected. Conceptually, accuracy and speed represent different dimensions of pragmatic performance. The accuracy dimension is primarily concerned about *pragmatic knowledge* of correct form-function-context mappings (i.e., what linguistic forms to be used in which contexts for performing what functions). In contrast, the speed dimension is about the promptness in the *use of pragmatic knowledge* in communication. Empirically, both accuracy and speed have been identified as distinct components of L2 pragmatic performance: they follow different developmental trajectories and interact with different social and cognitive variables (e.g., Taguchi, 2007, 2008a). This means that examining the development of performance speed, in addition to performance accuracy, could offer a unique perspective in understanding the effect of pragmatics instruction. Computer technology can facilitate this line of research because it allows researchers to record learners' response times when comprehending pragmatic meaning (e.g., Taguchi, this volume). It also enables fine-grained analysis of speed in pragmatic production (e.g., planning time, speech rates).

In the wider field of SLA, the development of speed and accuracy has been discussed within the theoretical framework of skill acquisition, notably Anderson's (1993) theory of Adaptive Control of Thought – Rational (ACT-R) and its application to SLA research (e.g., DeKeyser, 1998, 2007b). According to this theory, complex cognitive skills development (including language learning) starts with the conscious learning of declarative knowledge (knowledge that can be stated, such as rules of English past tense). With repeated practice, declarative knowledge can develop into procedural knowledge (knowledge that can only be performed, such as applying English past tense rules to speaking) through a process called proceduralization. During this process, both performance accuracy and speed gradually increase as a function of practice, although neither measure can reach expert standard yet. Finally, procedural knowledge can be fine-tuned to allow automatic processing after a large amount of practice. Highly automatic performance is fast, accurate, and less influenced by interference. This developmental trajectory predicted by the ACT-R has been supported by empirical SLA research (e.g., DeKeyser, 1996, 1997).

The ACT-R theory has also been incorporated into the design of effective L2 instruction. For instance, DeKeyser (1998, 2007a) and Ranta & Lyster (2007) both argued for a sequential instructional approach with respect to the acquisition of grammar. In this approach, instruction should first help learners develop concrete declarative knowledge of target language. After the declarative knowledge is deeply anchored in learners' consciousness and can be easily called upon, appropriate and sufficient practice is needed for proceduralization and automatization of declarative knowledge, which could in turn lead to increased accuracy and speed of performance.

In order to enhance accuracy and speed through proceduralization, DeKeyser (2007c) argued for the need of skill-specific practice with many examples of target behavior (e.g., repeatedly using a particular grammatical rule in production to express meaning) as well as immediate feedback upon making mistakes. Similarly, Gatbonton and Segalowitz (2005) contended that inherently repetitive tasks that enable learners to practice formulaic linguistic patterns in communicative environment can promote automaticity.

According to the ACT-R theory, skill-specific practice is the driving force for promoting performance accuracy and speed in different skill domains (e.g., comprehension and production). Hence, implications of the theory for pragmatics instruction are to understand the role of different amounts and types of practice needed for pragmatic development. Following this premise, Li (2012) investigated the effects of different amounts of input-based practice on the learning of request-making forms among L2 Chinese learners. After a metapragmatic instruction session that taught target declarative pragmatic knowledge, an intensive training (IT) group and a regular training (RT) group both received computerized input-based practice over two consecutive days. The amount of practice was operationalized as number of instances for processing target pragmatic features in input-based activities (e.g., choosing a pragmatically appropriate and grammatically accurate request sentence). The IT group practiced twice as much as the RT group. A control group did not practice the target features. A Pragmatic Listening Judgment Task (PLJT) and an Oral Discourse Completion Task (ODCT) assessed the effects of practice. The results showed that the IT group improved on PLJT speed but not on PLJT accuracy. The IT group made significant gains in ODCT accuracy but not in ODCT speed. The RT group did not show any significant gains except for a trend of gain in

ODCT accuracy. The control group did not improve at all. Overall, these results showed that greater amount of practice led to more accurate and speedy pragmatic performance, although the effects were slightly stronger for accuracy than for speed.

Li's study left several issues for future research. First, since only input-based practice was given, it would be interesting to see if the results are generalizable to output practice condition. Juxtaposing input and output practice is theoretically interesting because comprehension and production require very different cognitive processes from a skill acquisition perspective, and no study in L2 pragmatics has examined the effects of these two types of practice at the same time. Moreover, it would also be interesting to examine how much practice (input-based and output-based) is needed to promote different dimensions of pragmatic performance (i.e., accuracy and speed). These issues were addressed in the present study, which asked:

1. Is input-based practice effective in promoting accuracy and speed in recognizing target request-making forms over time? If yes, how much practice can enable L2 Chinese learners to make significant gains in accurate and speedy recognition?
2. Is output-based practice effective in promoting accuracy and speed in producing target request-making forms over time? If yes, how

much practice can enable L2 Chinese learners to make significant gains in accurate and speedy production?

3. Methods

3.1 Target Pragmatic Features

There are four semi-fixed linguistic patterns in Chinese that can be used to produce request head acts in certain request-making situations (Table 1). A request head act is the minimum unit of a request sequence that can realize the request intention independently (Blum-Kulka, House & Kasper, 1989). Also embedded in these head act frames were five lexical items (i.e., the underlined components in Table 1), which serve as internal modifications for mitigating the illocutionary force of a request head act. Because previous research showed that conventionality of linguistic forms can enhance accuracy and speed in using the forms (e.g., Taguchi, 2008b, 2011b), the target head act frames and internal modifications in this study were taught as conventionalized slot-and-frame patterns for making requests. These target pragmatic features were selected based on the data this author collected in an earlier study (Li, 2007). A detailed description of the selection procedure was reported in Li (2011).

Table 1. Target Form-function-context mappings

Linguistic forms	Function	Context
1. (bang^{1}mang^2 / bang^{1}wo^3) + *verb* + yi^{2}xia^4 + (*object*) + ba * (help / help me) + *verb* + a little bit + *object* + *particle* 2. (bang^{1}mang^2 / bang^{1}wo^3) + ba^3 +*object* + *verb* + yi^{2}xia^{4}ba (help/help me) + *prep.* + *object* + *verb* + a little bit *particle*	Direct request with mitigated tone	Making small requests to good friends (FS situation)
3. nin^{2}kan^4 + (*subject*) + neng^2 + *verb* + yi^{2}xia^4 + *object* + ma? You see + (*subject*) + can + *verb* + a little bit + *object* + *particle*? 4. nin^{2}kan^4+ (*subject*) + neng^{2}bu^{4}neng^2 + *verb* + yi^{2}xia^4 + *object*? You see + (*subject*) + can or cannot + *verb* + a little bit + *object*?	Indirect request with mitigated tone	Making big requests to a professor that one knows well (PB situation)

* The components in the parentheses are optional.

3.2 Participants

Fifty American learners of Chinese were recruited on a voluntary basis from six study abroad programs in China (five in Shanghai and one in Beijing). These programs all focused on teaching grammar and vocabulary, and did not cover the target pragmatic features. The students received 15 to 19 hours of formal instruction in Chinese each week. All programs included some extracurricular activities such as weekend excursions.

Among the 50 participants, 11 were males and 39 were females. The mean age was 20.56 years (*SD*=1.76). The participants were all native English speakers enrolled in undergraduate or graduate programs in U.S. universities/colleges. There were four African Americans, 25 Caucasians, 12 Chinese, three Japanese, and six Koreans. Before studying abroad, these learners had two to four semesters of formal Chinese study.

The participants were randomly assigned to an input-based practice group (hereafter "input group"), an output-based practice group (hereafter "output group"), and a control group. A Chinese language test adapted from the C. Test (HSK Center, 2009), which is a standardized Chinese proficiency test, was administered to check the comparability of the learners for proficiency. No significant proficiency difference was found between the six programs, χ^2 (5, N = 50) = 3.87, p > .05, or between the input, output, and control groups, χ^2 (2, N = 50) = 1.22, p > .05. One participant from the control group was excluded due to equipment failure. Hence, the total number of participants remained for data analysis was 49, with 17 in the input group, 17 in the output group, and 15 in the control group. The participants were paid $7 for each hour of participation. Their practice and assessment activities (described below) were carried out in a quiet room on the university campus and were monitored by this author closely throughout this study.

3.3 Computerized Instruction and Practice

The instructional materials were computerized by using the software named Revolution (Media Version) (2009). Following skill acquisition theory, the instruction started with explicit teaching of declarative pragmatic knowledge, followed by input-based and output-based practice activities aimed at developing procedural pragmatic knowledge in receptive and productive tasks. As described below, these computer-delivered skill-specific activities offered multiple opportunities for the learners to repeatedly practice the target pragmatic features in similar request-making situations, with the goal of promoting accuracy and speed of pragmatic performance in respective skill domains.

3.3.1 Metapragmatic instruction.

The target request-making forms were taught explicitly in one metapragmatic instruction session that lasted for about 40 minutes. During this session, the participants read the materials presented on computer screens. The session introduced direct and conventionally indirect request strategies, the contextual factors that can influence the choice of request strategies (i.e., power, social distance, and imposition as outlined by

Brown & Levinson, 1987), as well as the target linguistic forms with some examples (see Table 1).

In order to assess the participants' initial knowledge, a Discourse Completion Task – Version 1 (DCT-1) was administered before they received the metapragmatic instruction. The DCT-1 had two friend – small request situations (i.e., FS situation) and two professor – big request situations (i.e., PB situations). The participants wrote down in Chinese characters or in *Pinyin* (a Chinese transliteration system) what they would say in each situation. A comparable DCT-2 was also administered after the participants completed the metapragmatic instruction session in order to confirm that they had acquired the declarative knowledge (i.e., the mappings in Table 1).

The DCT-1 data at the pre-instruction stage revealed an accuracy rate of 21.42% (i.e., 42 of the 196 utterances) with the target request head act; the accuracy rate for using the target internal modification was 9.18%. However, the DCT-2 data showed that, after receiving metapragmatic information, the accuracy rate for using the target request head act and internal modification increased to 92.35% and 90.31%, respectively. After the DCT-2, this author went over the responses with individual participants (e.g., explained why certain linguistic forms were not appropriate for certain request situations) to ensure that they fully understood the target features.

3.3.2 Input-based practice.

The input group received computerized input-based practice which lasted for four sessions (20-25 minutes each) over four consecutive days. Each practice session contained learning materials for four request making situations: two FS (friend – small request) situations followed by two PB (professor – big request) situations. Each practice session followed the same procedure, which started with a metapragmatic warming-up phase, followed by grammaticality judgment tasks and dialogue reading tasks.

In the metapragmatic warming-up phase, participants read a paragraph written in English summarizing the target form-function-context mappings. Afterwards, the participants read a request scenario in English. They then completed a grammaticality judgment task in which they judged the grammaticality of two requests by clicking the "Yes" or "No" button on the screen. Following their choice(s), explicit feedback on the target linguistic structures appeared on the computer screen.

The participants then completed the dialogue reading task. The purpose of this task was to strengthen the participants' knowledge of the relationship between the request-making forms and their contextual requirements. The participants first read the description of a request situation in English. They then judged whether the favor asked in that situation was small or big by clicking on corresponding buttons. Explicit feedback on the correctness of their choices then popped up. After making the correct choice, the participants move on to the next screen showing a dialogue based on the same request situation. There were two underlined parts in the dialogue where the participants were asked to choose the best request utterance out of three options: (1) a pragmatically appropriate and grammatically accurate utterance (e.g., *Chen*^{2} *lao*^{3} *shi*^{1}*, nin*^{2} *kan*^{4} *wo*^{3} *neng*^{2} *yong*^{4} *yi*^{2} *xia*^{4} *nin*^{2} *de dian*^{4} *nao*^{3} *ma?* Professor Chen, do you think I can use your computer a little bit?), (2) a pragmatically appropriate and grammatically inaccurate utterance (e.g., *Chen*^{2} *lao*^{3} *shi*^{1}*, nin*^{2} *kan*^{4} *wo*^{3} *neng*^{2} *yong*^{4} *nin*^{2} *de dian*^{4} *nao*^{3} *yi*^{2} *xia*^{4} *ma?*[1] Professor Chen, do you think I can use your computer a little bit?), and (3) a pragmatically inappropriate and grammatically accurate utterance (e.g., *Chen*^{2} *lao*^{3} *shi*^{1}*, ba*^{3} *nin*^{2} *de dian*^{4} *nao*^{3} *gei*^{3} *wo*^{3} *yong*^{4} *yi*^{2} *xia*^{4} *ba.*[2] Professor Chen, let me use your computer a little bit.). The order of these three options was randomized. Following the participants' choices, explicit metapragmatic feedback popped up on the screen. The participants were not able to proceed to the next section until they made a correct choice. After this section, the participants moved on to the next section which showed the dialogue with situationally appropriate and grammatically accurate request utterances (underlined and in bold font). Finally, the participants listened to the dialogue twice. Figure 1 is a screenshot of sample input-based practice activity.

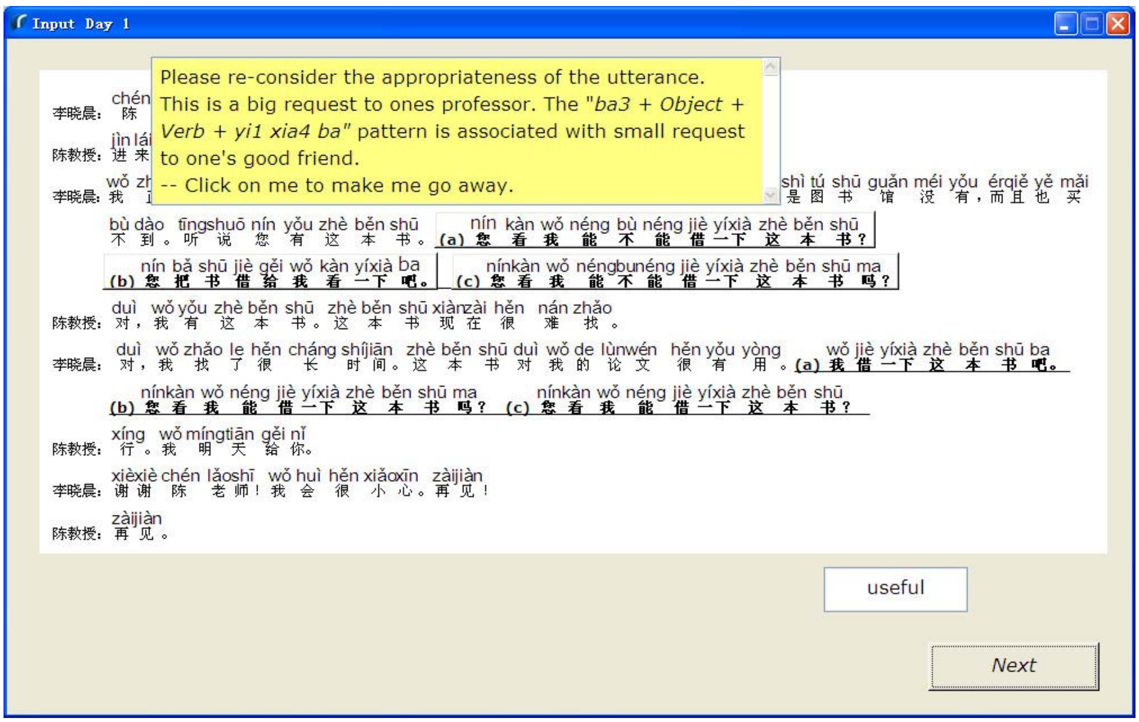

Figure 1. Sample input-based practice activity

3.3.3 Output-based practice.

The output group received computerized output-based practice which lasted for four sessions (20-35 minutes each) over four consecutive days. The output-based practice followed the sequential instructional approach mentioned in the literature review section. Like the input-based practice, each output-based practice session contained learning materials of target request-making forms for two FS and two PB situations. Each practice session also followed the same procedure, which started with a metapragmatic warming-up phase, followed by sentence translation tasks and dialogue completion tasks.

The metapragmatic warming-up phase for the output group was the same as the one for the input group. After this warming-up phase, the participants read a description of a request scenario in English. Then they completed a sentence translation task in which they translated two English request sentences (one by one) into Chinese by using the target request-making forms. They were able to see the request sentences by clicking a button on the computer screen. The target request sentences were the same as the ones used in the grammaticality judgment task for the input group. Because the computer program did not recognize Chinese characters as input, the participants typed the sentences in *Pinyin*, and their translations were saved in the computers. After they finished the translation task, the participants clicked on the button "check my answer." Then they moved to the next screen which displayed their own translation and the target sentence (i.e., the answer keys) written in Chinese characters and in *Pinyin*.

After the translation task, the participants were directed to a dialogue completion task. Like the input group, the participants in the output group first read a request situation and completed the contextual judgment task (i.e., how big/small the request is). Explicit feedback popped up following their choices, and the participants had to provide the correct answer to continue. On the next screen, the participants read a dialogue for the situation they just read. The dialogue was the same as the one used in the input-based practice, except that there were two blanks (as opposed to two underlined parts). The participants' task was to type in, with *Pinyin*, one request sentence for each blank by using target request-making forms. Their input was recorded in the computers. As in the sentence translation task, the participants were also able to see the target request forms by clicking a button on the screen. Finally, the participants saw their responses and sample answers on the next screen as feedback. Figure 2 is a screen shot of sample output-based practice activity.

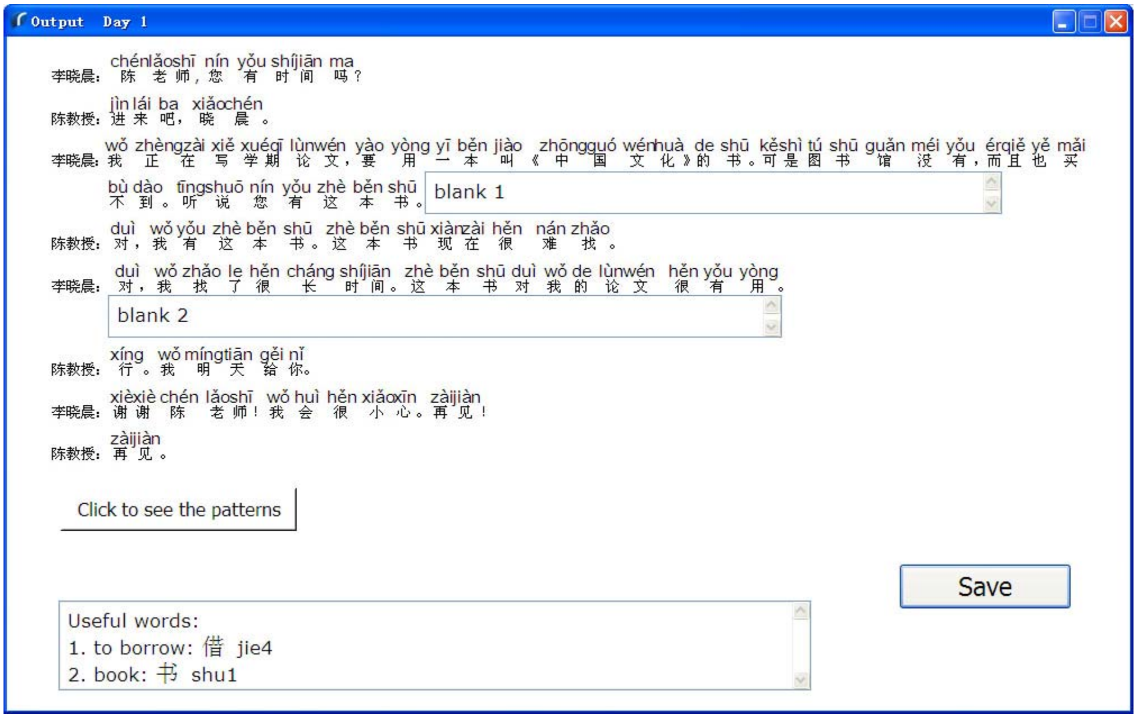

Figure 2. Sample output-based practice activity

3.3.4 The control group

The control group focused on Chinese reading comprehension, participating in four sessions of 20-30 minutes each. The reading materials included 12 short Chinese readings selected from the texts created by The University of Iowa Chinese Program (2004) for learners with intermediate level Chinese proficiency. Each text was accompanied by five questions with varying formats such as multiple choice questions, true/false questions, and constructed responses. Three readings were assigned for each session.

3.3.5 Amount of practice

Amount of practice in this study was operationalized as the number of instances for processing target form-function-context mappings (i.e., using target request-making forms in request-making situations) in target skill domains (i.e., comprehension and production). Each practice session provided two instances for processing. Hence, by the time of the mid-test (administered after two practice sessions), the input and output groups had practiced each mapping four times via their respective practice activities; by the time of the posttest (administered after four practice sessions), they had practiced each mapping eight times. The control group did not practice.

3.4 Outcome Measures

Two computerized instruments were used to assess the effects of practice: a Pragmatic Listening Judgment Task (PLJT) and an Oral Discourse Completion Task (ODCT). Since speed is one of the instructional targets of this study, all participants were explicitly told to complete the two assessment activities as quickly as possible.

The PLJT was used to assess the speed and accurate recognition of target request-making forms in applicable situations. The PLJT had 32 items: there were two practice items, 24 target items, and six distracters. The 24 target items included 12 FS (friend-small request) situations and 12 PB (professor-big request) situations. Among the 24 target items, 12 were “new” items (i.e., scenarios that the participants did not encounter during the practice sessions) and the remaining 12 were “old” items (i.e., scenarios that the participants encountered during the practice sessions).

For each PLJT item, the participants first received a mini vocabulary lesson by listening to a few useful Chinese words (each was read twice). Meanwhile, the Chinese words and their *Pinyin* and English translations were displayed on the screen. The participants then heard a request situation in English, which was accompanied by a written description of the situation shown on the screen. Two seconds after the English description was delivered, the participants heard a request utterance in Chinese. Right after that, the written description of the request situation disappeared, and a beep introduced three options. The three options were: (a) pragmatically appropriate and grammatically accurate, (b) pragmatically appropriate and grammatically inaccurate, and (c) pragmatically inappropriate and grammatically accurate. Upon hearing the beep, the participants clicked on one of these three options to indicate their choice. Their choices and response times were recorded in computers. The order of the three options was fixed for all situations. The three choices were counterbalanced across the 24 target request situations (i.e., eight request utterances for each option type). The PLJT had three comparable versions to reduce any practice effect.

The Oral Discourse Completion Task (ODCT) was the other outcome measure used to assess the participants' ability to produce the target request-making forms in different request-making situations. The ODCT had 22 items: two practice items, 16 target items, and four distracters. Eight of the 16 target items were FS situations and the remaining eight were PB situations. All target items overlapped with the items in the PLJT. Like the PLJT, half of the target ODCT items were "new" and the other half were "old".

For each ODCT item, the participants first received a mini vocabulary lesson. One or two useful Chinese words and their *Pinyin* and English translations were displayed on the screen. Then, they heard the description of a request situation in English. Meanwhile, they saw the written description of that situation (in English) on the screen. Immediately after the audio, the written description disappeared and the participants heard a beep. Upon hearing the beep, the participants started to respond orally in Chinese what they would say in that situation. They were instructed to say the request head act. Their oral production was recorded on computers. The participants then clicked the “finished” button to stop the recording and went on to the next item. Three equivalent versions of ODCT were prepared to reduce the possible practice effect.

Procedures

On Day One, all three groups received the metapragmatic instruction (described above). From Day Two to Day Five, the groups engaged in their respective practice activities over four consecutive sessions. Meanwhile, the input group completed the PLJT on Day One (after the metapragmatic instruction session), Day Three and Day Five. The output group completed the ODCT on Day One (after the metapragmatic instruction session), Day Three and Day Five. The control group did both PLJT and ODCT on Day One, Day Three, and Day Five. Note that the pretest was administered after the metapragmatic instruction session. This design allowed this author to capture any unique contribution of practice (to the development of pragmatic performance), over and above the effects of metapragmatic instruction.

4. Analysis of Data

Learning outcomes were analyzed for accuracy and speed dimensions of pragmatic performance, and this included five data sets: PLJT accuracy scores, PLJT response times, ODCT accuracy scores, ODCT planning times, and ODCT speech rates.

For the measure of PLJT accuracy, one point was awarded to each correct judgment (score range: 0-24). PLJT response times were calculated by averaging the number of seconds taken for selecting correct answers. The ODCT accuracy score is a composite score computed by adding up three separate scores for request head act frames, internal modification, and grammaticality of request utterances. Regarding the use of request head act frame, two points were given if a target head act frame was used; one point was awarded if a non-target but acceptable head act frame was used (e.g., using "*ke*^{3}*yi*^{3} + verb phrase + *ma*?", instead of "*neng*^{2} + verb phrase +*ma?"* when talking to professors); no point was given if a non-target and unacceptable head act frame was used. As for internal modifications, two points were awarded if one or more target internal modification device(s) was used; one point was given if non-target (but appropriate) internal modification device was used; no point was awarded if no internal modification device was used. With regard to grammatical accuracy, one point was given if the entire request utterance was grammatical, and no point was awarded if it was ungrammatical. The score range for the ODCT accuracy measure for each participant was 0-80 (i.e., five points per utterance x 16 utterances). Another Chinese native speaker and the author independently rated 30% of the request utterances. The ratings were highly correlated, Pearson's $r = .94$. ODCT planning times were measured by calculating the number of seconds taken to produce pragmatically appropriate request utterances. Finally, ODCT speech rates were calculated by computing the averaged number of Chinese syllables spoken per minute when producing pragmatically appropriate request utterances, excluding false starts, repetitions, partial repetitions, and repairs.

To answer research question one, two separate 2 (group) x 3 (time) repeated measures ANOVAs were conducted. That is, the PLJT measures (i.e., PLJT accuracy and PLJT response times) of the input group and the control group were compared over pretest, mid-test (after four instances of processing), and posttest (after eight instances of processing). To answer research question two, three separate 2 (group) x 3 (time) repeated measures ANOVAs were conducted. That is, the ODCT measures (i.e., ODCT accuracy, ODCT planning times, and ODCT speech rates) of the output group and the control group were compared over pretest, mid-test, and posttest. The alpha level was set as .05 for all statistical procedures.

5. Results

5.1 Results for Research Question One: Effect of amount of practice on comprehension

Table 2 displays the descriptive statistics of PLJT accuracy and PLJT response times. Figure 3 and Figure 4 show the means plots for each measure.

Table 2. Accuracy and Speed of Recognizing Target Request-making forms

Measure	Group		Pretest	Mid-test	Posttest
PLJT accuracy	Input	Mean	14.05	19.58	20.11
(Score range: 0-24)		*SD*	4.09	2.45	1.99
	Control	Mean	14.60	15.33	14.46
		SD	3.66	3.10	3.48
PLJT response times	Input	Mean	4.23	3.80	3.16
		SD	1.67	1.48	1.18
	Control	Mean	4.24	3.63	3.86
		SD	1.61	2.50	1.85

Note. Response times refer to average number of seconds taken to select correct answers.

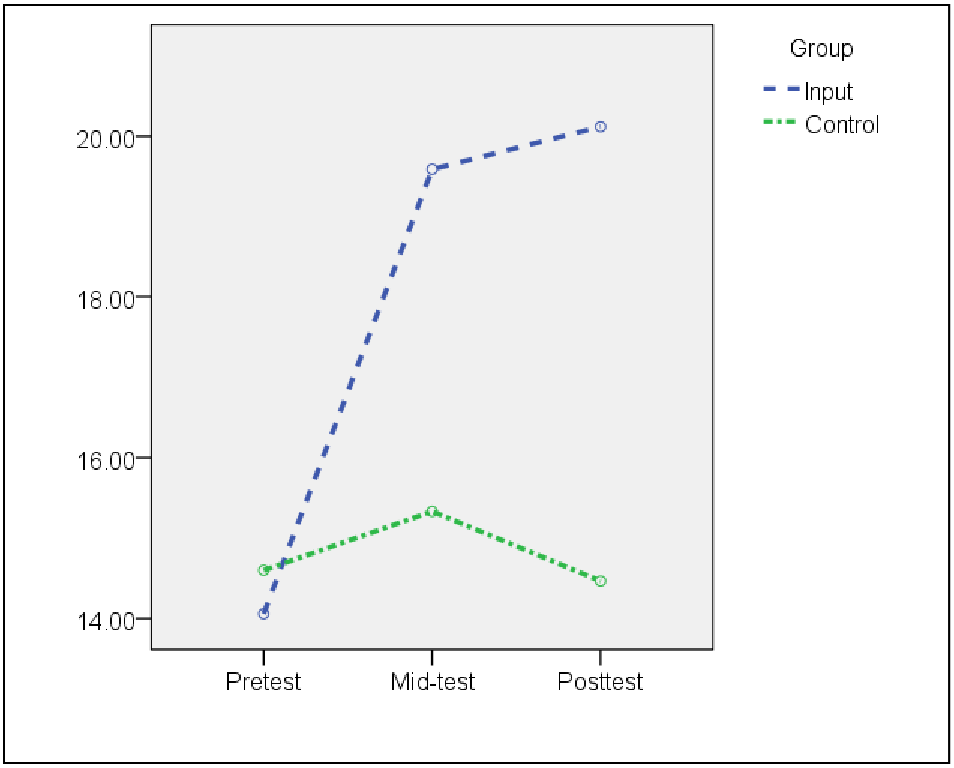

Figure 3. Means plot for the PLJT accuracy measure

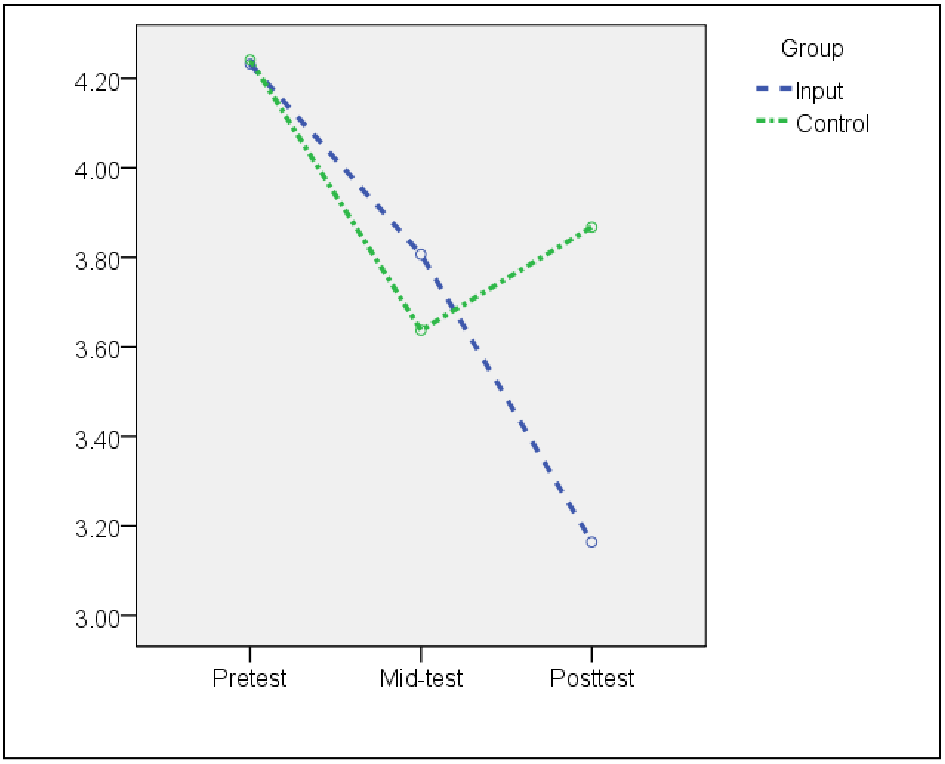

Figure 4. Means plot for the PLJT response times measure

5.1.1 PLJT accuracy scores

The results of the 2 (group) x 3 (time) repeated measures ANOVA revealed a significant main effect of time, F (2, 60) = 15.56, p<.001 (partial η2=.34), a significant main effect of group, F (1, 30) = 12.94, p=.001 (partial η^2= .30), and a significant effect of time x group interaction, F (2, 60) = 13.23, p<.001 (partial η^2=.31). The results showed that the input group improved significantly over time, F (2, 32) = 29.86, p<.001 (partial η^2=.65). Subsequent pairwise comparisons revealed significant differences between pretest and mid-test (p<.001) and between pretest and posttest (p<.001). There was no significant difference between mid-test and posttest, although there was a tendency towards increased accuracy. The control group showed no significant improvement over time, F (2, 28) = .52, p=.60. Three independent samples t tests were performed to determine if there was any difference between the two groups at any time (i.e., pretest, mid-test, and posttest). The results showed no difference on the pretest, t(30) = -.39, p=.69. However, the input group significantly outperformed the control group on the mid-test, t(30) = 4.32, p<.001, as well as on the posttest, t(21.70) = 5.53, p<.001.

5.1.2 PLJT response times.

The results of a 2 (group) x 3 (time) repeated measures ANOVA revealed a significant main effect of time, F (2, 60) = 4.25, p=.019 (partial η^2=.12). The main effect of group was not significant, F (1, 30) = .11, p=.74, nor was the effect of time x group interaction, F (2, 60) = 1.64. p=.20. The results showed that the input group significantly reduced their response times over time, F (2, 32) = 4.53, p=.018 (partial η^2=.22). Post hoc pairwise comparisons revealed that the only significant difference was between pretest and posttest (p=.035). There was no difference between pretest and mid-test (p=.71), or between mid-test and posttest (p=.26). On the other hand, the control group did not show any significant improvement over time, F (2, 28) = 1.43, p=.26. Three independent samples t tests were performed to determine if there was any difference between the two groups at any time point (i.e., pretest, mid-test, and posttest). No difference was found on the pretest, t(30) = -.01, p=.98, the mid-test, t(30) = .23, p=.81, and the posttest, t(30) = -1.29, p=.21.

5.2 Results for Research Question Two: Effect of amount of practice on production

Table 3 displays the descriptive statistics of ODCT accuracy, ODCT planning times, and ODCT speech rates. Figure 5, Figure 6, and Figure 7 show the means plots for each measure.

Table 3. Accuracy and Speed of Producing Target Request-making Forms

Measure	Group		Pretest	Mid-test	Posttest
ODCT accuracy	Output	Mean	62.11	70.88	75.11
(Score range: 0-80)		SD	13.11	11.22	4.04
	Control	Mean	58.93	56.86	59.80
		SD	13.15	12.72	12.89
ODCT planning times	Output	Mean	3.11	1.99	1.46
		SD	1.87	0.10	0.58
	Control	Mean	3.49	2.81	2.29

		SD	3.14	2.19	1.85
ODCT speech rates	Output	Mean	107.11	115.69	130.65
		SD	28.62	39.65	39.48
	Control	Mean	113.20	117.79	127.60
		SD	36.27	40.69	43.58

Note. Planning times refer to the number of seconds taken to produce pragmatically appropriate request utterances. ODCT speech rates refer to the average number of Chinese syllables spoken per minute when producing pragmatically appropriate request utterances, excluding false starts, repetitions, partial repetitions, and repairs.

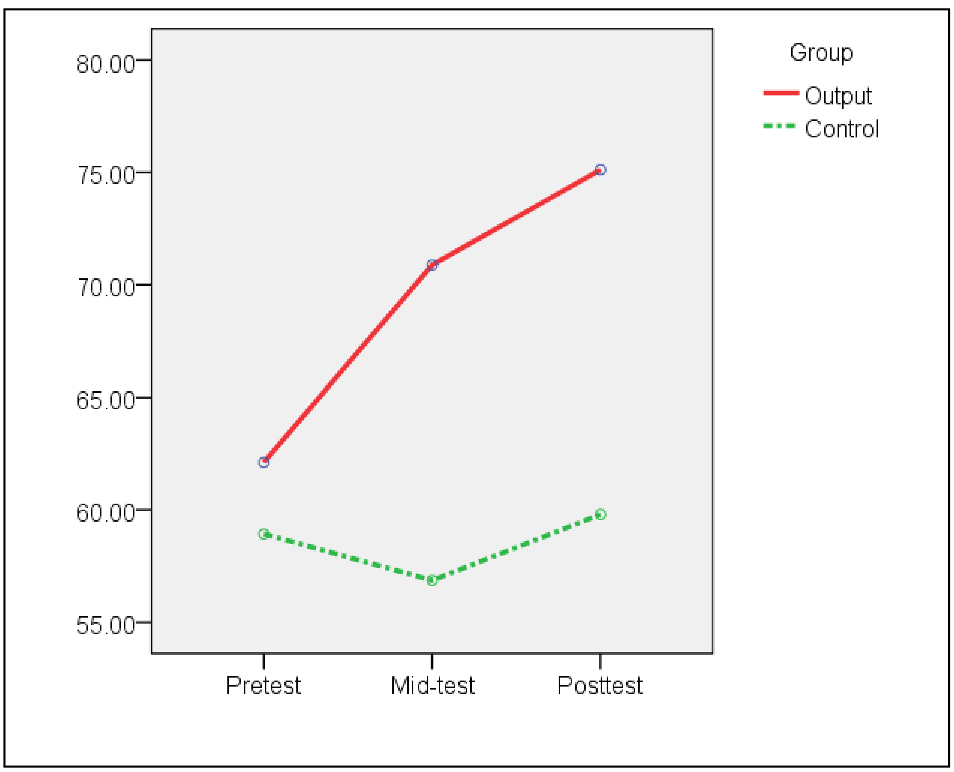

Figure 5. Means plot for the ODCT accuracy measure

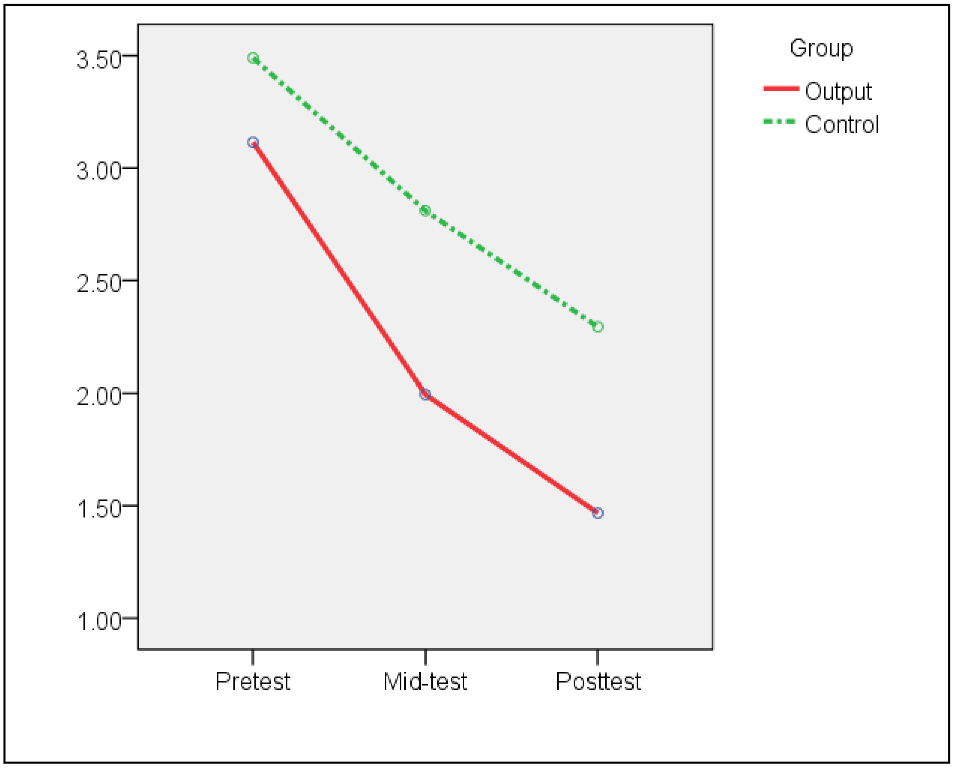

Figure 6. Means plot for the ODCT planning times measure

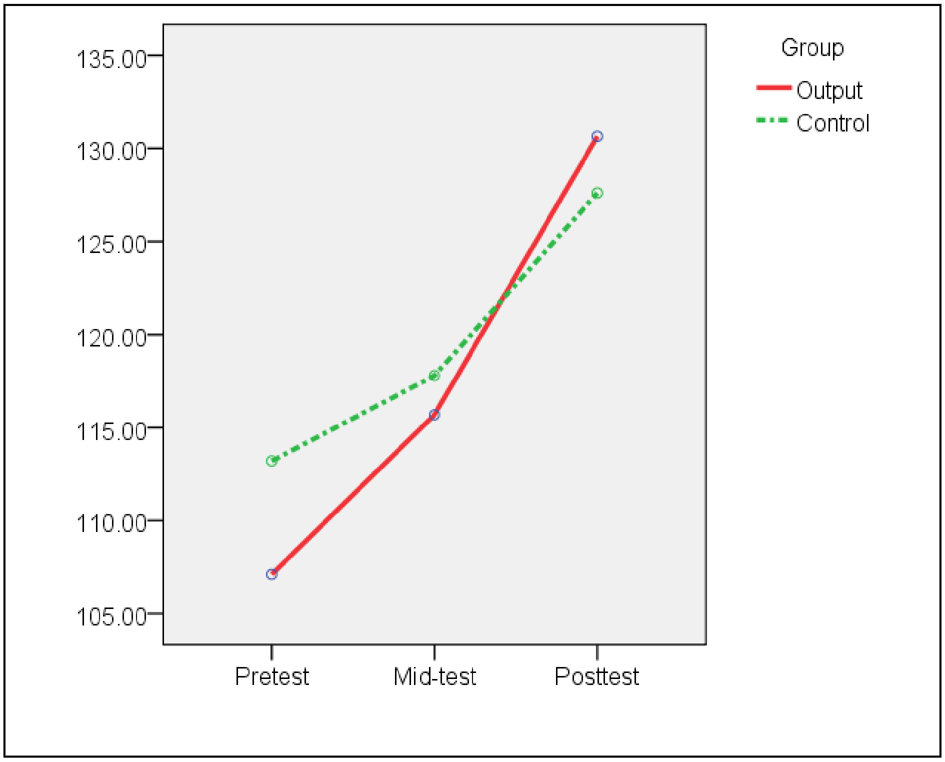

Figure 7. Means plot for the ODCT speech rates measure

5.2.1 ODCT accuracy scores.

The results of a 2 (group) x 3 (time) repeated measures ANOVA revealed a significant main effect of time, F (1.68, 50.62) = 12.47, p<.001 (partial η^2=.29), a significant main effect of group, F (1, 30) = 8.26, p=.007 (partial η^2= .22), and a significant effect of time x group interaction, F (1.68, 50.62) = 11.51, p<.001 (partial η^2=.28). The results showed that the output group made significant gains over time, F (1.28, 20.56) = 16.77, p<.001 (partial η^2=.51). Subsequent pairwise comparisons revealed significant differences between pretest and mid-test ($p<.001$) and between pretest and posttest ($p=.001$). The difference between mid-test and posttest was not significant ($p=.26$). The control group did not show any significant improvement over time, F (2, 28) = 2.29, $p=.12$. Three independent samples t tests were also performed to determine if there was any difference between the two groups at any time point (i.e., pretest, mid-test, and posttest). The results showed no difference on the pretest, $t(30)$ = .68, $p=.49$. However, the output group significantly outperformed the control group on the mid-test, $t(30) = 3.31$, $p=.002$, as well as on the posttest, $t(16.42) = 4.41$, $p<.001$.

5.2.2 ODCT planning times.

The results of a 2 (group) x 3 (time) repeated measures ANOVA revealed a significant main effect of time, F (1.36, 40.72) = 17.59, $p<.001$ (partial $\eta^2=.37$). The main effect of group was not significant, F (1, 30) = 1.52, $p=.23$, nor was the effect of time x group interaction, F (1.36, 40.72) = .56, $p=.51$. The results showed that the output group significantly reduced their planning times over time, F (1.09, 17.50) = 18.44, $p<.001$ (partial $\eta^2=.54$). Post hoc pairwise comparisons showed significant differences between pretest and mid-test ($p=.001$), between mid-test and posttest ($p=.024$), and between pretest and posttest ($p=.002$). The control group also showed significant reduction over time, F (1.52, 21.27) = 4.27, p=.037 (partial η^2=.23). However, subsequent pairwise comparisons did not find any significant difference between pretest, mid-test, and posttest. Three independent samples t tests were performed to determine if there was any difference between the two groups at any time point (i.e., pretest, mid-test, and posttest). No difference was found on the pretest, t(30) = -.50, p=.62, the mid-test, t(30) = -1.39, p=.13, and the posttest, t(30) = -1.75, p=.09.

5.2.3 ODCT speech rates

The results of a 2 (group) x 3 (time) repeated measures ANOVA revealed a significant main effect of time, F (2, 60) = 13.55, p<.001 (partial η^2=.31). The main effect of group was not significant, F (1, 30) = .02, p=.89, nor was the effect of time x group interaction, F (2, 60) = .77, p=.47. The results showed that the output group made significant gains over time, F (2, 32) = 8.05, p=.001 (partial η^2=.34). Follow-up pairwise comparisons revealed no significant difference between pretest and mid-test (p=.59). However, a significant difference was found between the mid-test and posttest (p=.009), as well as between the pretest and posttest (p=.01). On the other hand, the control group also significantly increased their speech rates over time, F (2, 28) = 6.49, p=.005 (partial η^2=.32). Post hoc pairwise comparisons revealed that the only significant difference was between pretest and posttest (p=.001). No other significant difference was found. Three independent samples t tests were performed to determine if there was any difference between the two groups at any time point (i.e., pretest, mid-test, and posttest). No difference was found on the pretest, $t(30) = -.53$, p=.59, the mid-test, $t(30) = -.15$, p=.88, and the posttest, $t(30) = -.21$, p=.84.

6. Discussion

Research question one asked whether the accuracy and speed of recognizing target request-making forms improved after input-based practice. The results were confirmed. However, the degree of improvement differed between the two measures. The effect size associated with the accuracy measure (partial η^2=.65) was about three times larger than that associated with the speed measure (partial η^2=.22). These findings suggested that the input-based practice had a stronger effect on pragmatic recognition accuracy than on pragmatic recognition speed.

Research question one also examined the amount of input-based practice needed for making significant gains in accuracy and speed of pragmatic recognition. Concerning the measure of PLJT accuracy, four instances of processing were sufficient to enable the input group to make significant improvement from pretest to mid-test and to outperform the control group. However, an additional four instances of processing did not lead to further gains, as there was no significant difference between mid-test and posttest. This finding was probably due to a ceiling effect, since the mean scores of the mid-test (M = 19.58) and posttest (M = 20.11) both approximated the maximum score of 24. The pattern of the PLJT response times was different, however. Significant reductions of PLJT response times were observed only after the input group engaged in eight instances of processing. Even so, the effects of practice were weak, because the input group never outperformed the control group. In summary, four instances of processing were sufficient for the input group to make significant gains in pragmatic recognition accuracy and to outperform the control group; eight instances of processing led to significant gains in pragmatic recognition speed but were still not enough for the input group to outperform the control group.

Research question two asked whether the accuracy and speed of producing target request-making forms improve over time as a function of output-based practice. The results were again confirmative. However, regarding the amount of output-based practice needed for making significant improvement, the patterns differed across the three production measures. Concerning ODCT accuracy, the output group demonstrated significant gains from pretest to mid-test, but did not show further gains from mid-test to posttest, despite their continued engagement in output-based practice. Interestingly, though, the standard deviation of the ODCT accuracy scores for the output group dropped from 11.22 at mid-test to 4.04 at posttest, but the standard deviations of the control group remained the same (i.e., 12.72 at mid-test and 12.89 at posttest). These findings indicate that pragmatic production accuracy of the output group became more uniform while the control group did not. On the other hand, the output group outperformed the control group on pretest and mid-test. Hence, our results showed that four instances of processing were sufficient for the output group to make significant gains in pragmatic production accuracy and to outperform the control group; the additional four instances did not improve accuracy further but reduced individual variation on this measure.

Regarding the two production speed measures, the output group reduced their ODCT planning times from pretest to mid-test, and again from mid-test to posttest. As for ODCT speech rates, the output group showed significant improvement from mid-test to posttest, and from pretest to posttest but not from mid to posttest. However, despite these improvements, for both speed measures, the output group never outperformed the control group, and the control group also demonstrated significant improvement.

The control group did not practice; nonetheless, they made significant gains in production speed over time. In this regard, it is helpful to consider the pragmatic production accuracy measure (i.e., ODCT accuracy) in conjunction with the two production speed measures. For the output group, the increased production speed was associated with greater production accuracy. This suggests that the learners were in the process of incorporating new declarative pragmatic knowledge into their existing interlanguage system while becoming more efficient and speedy in using the newly learnt mappings. While this suggests an underlying proceduralization process for the output group, it was not the case for the control group whose increased production speed was not accompanied with greater production accuracy. The increase in production speed for the control group was probably a result of repeating similar production tasks (i.e., the ODCT task). In fact, SLA researchers have found task repetition an effective way for promoting accuracy, fluency, and complexity of L2 learners' oral production (e.g., Ahmadian & Tavakoli, 2010; Bygate, 2001; De Jong & Perfetti, 2011). However, the control group's gains in production speed should not undermine the effectiveness of output-based practice. Rather, the discussion here points to the necessity of considering the nature of increased production speed. It is important to distinguish proceduralization as a function of output-based practice (i.e., in the case of the output group) from simple speed-up as a result of task repetition (i.e., in the case of the control group).

For both input and output groups, pragmatic accuracy developed to a fairly high degree after only four instances of processing, yet the effects of practice on promoting speed were weak even after eight instances of processing. These results echo the findings reported in Li's (2012) study and further indicate that, regardless of modality of practice, performance speed requires a greater amount of practice to develop than accuracy. To explain these observations, it is helpful to understand what accuracy and speed stand for. The two accuracy measures (i.e., PLJT accuracy and ODCT accuracy) can be seen as a reflection of the learners' declarative pragmatic knowledge. For instance, in order to obtain a high ODCT accuracy score, the learners had to produce target request-making forms in applicable contexts. On the other hand, the three speed measures (i.e., PLJT response times, ODCT planning times, and ODCT speech rates) can be seen as indicators of how efficiently the declarative knowledge is used in request-making tasks. For instance, during the recognition task, the learners needed to keep in mind a request-making scenario and compare a heard request utterance with target request-making forms before making their judgment. Therefore, speedy access to declarative pragmatic knowledge is essential to the reduction of response times in the recognition task. From a skill acquisition perspective (DeKeyser, 1998, 2007b), improvement in both accuracy and speed of pragmatic performance indicate the proceduralization of pragmatic knowledge.

In this study, the total amount of practice (i.e., eight instances of processing) was relatively small. Hence, the effects of practice on the development of procedural pragmatic knowledge were probably very limited. On the other hand, the declarative pragmatic knowledge seemed to be greatly refined through repeated (i.e., four instances) activation and retrieval of target forms, which led to improvement in pragmatic accuracy. This could explain why the gains in accuracy were more prominent than the gains in speed in both input and output groups. Collectively, the present findings indicate that four instances of processing are sufficient for refining declarative pragmatic knowledge to a significantly higher degree, but procedural pragmatic knowledge requires more than eight instances of processing to fully develop. As such, this study can serve as a reference point for future research exploring the optimal amount of practice for L2 pragmatic development.

7. Concluding Remarks and Directions for Future Research

In this study, computer technology was used to implement skill-specific practice activities for promoting L2 learners' request-making accuracy and speed in comprehension and production. Computer technology also made it possible to manipulate the amount of practice so as to examine its effects on L2 pragmatic development. Moreover, the computerized outcome measures enabled this author to record learners' responses as well as response times, which allowed simultaneous examination of pragmatic performance accuracy and speed as a function of practice. All of these afforded by technology made it possible to conduct this instructional study within the skill acquisition framework. While the study by Li (2012) first explored the relationship between amount of input-based practice and pragmatic development, the results of this study added to the generalizability of previous findings because both input-based and output-based practices were examined. As such, this study can contribute to the field by confirming the applicability of the skill acquisition theory to research on L2 pragmatics instruction. In a broader manner, this study is another effort to connect computer technology and SLA theory construction, a point envisioned by Garrett (1991) and reinforced by

Chapelle (2009) in a recent issue of the *Modern Language Journal* (Lafford, 2009) on this topic.

As an instructional study in L2 pragmatics research, it can be improved in two ways. For one, *pragmatic performance speed* in this study was conceptualized (and examined) as the promptness in using the correct form-function-context mapping in request-making tasks. Yet, as one of the reviewers pointed out, sometimes it may be desirable for learners to be hesitant when performing a face-threatening act (e.g., stammer, stutter, not be too swift), just as native speakers do. Unfortunately, this study did not collect native speaker baseline data, and thus we cannot determine if the disfluency found in L2 performance (e.g., false starts, repetitions, and repairs) was comparable with native speakers' disfluency. Future instructional studies should include native speaker data to resolve this issue.

Moreover, this study treated pragmatic appropriateness and grammatical accuracy separately when scoring L2 learners' production data. This approach was considered appropriate for the purpose of this study, because the author intended to find out whether the learners were able to produce the target request-making forms appropriately and also accurately. Yet as one reviewer indicated, this approach could conceal the interconnection between grammar and pragmatics. While examining the relationship between grammar and pragmatics was beyond the scope of this study, a qualitative analysis of the learners' production data (i.e., examining whether and how certain grammatical errors led to pragmatic inappropriateness) could further reveal how L2 grammar and pragmatics develop together as a function of instruction.

As for future applications of computer technology to research on L2 pragmatics instruction, this study points to several topics for investigation. First, it would be important to examine how much practice is needed to promote the development of procedural pragmatic knowledge. Tracking a group of instructed learners over an extended period of time would be a useful design for examining the process through which procedural pragmatic knowledge develops. Computer technology will again be useful because it can document L2 learners' pragmatic performance accuracy and speed over time. In fact, researchers in interlanguage pragmatics (ILP) have already begun to use computer technology to examine pragmatic development longitudinally (e.g., Belz & Vyatkina, 2005; González-Lloret, 2008; Kagegawa, 2009; Sykes, 2005; Vyatkina & Belz, 2006), and instructional ILP research has much to learn from this line of research. In addition, since the practice activities employed in this study were highly controlled for research purposes, it would be interesting to study learners' degree of involvement in these practice activities. Computer technology can document in detail learners' responses to practice activities such as their choices and time taken to finish exercises. Collecting and analyzing data of this kind could contribute to a better understanding of L2 learners' attitudes and affective responses to computer-based instruction.

Finally, on the practical side, the author found Revolution (Media Version), the computer software used in this study, relatively easy to learn and use for researchers who are not well versed in computer technology. Although the computer commands need to be manually written, the good news is that they are essentially based on English, so it is not difficult to master the basic commands needed for conducting a study like this. Moreover, as the software works for both Mac and PC, one does not need to worry about its compatibility with the operating systems. The only drawback that the author experienced was that the software does not recognize Chinese characters, so the output group had to type in *Pinyin* instead. However, overall, this computer technology can be a powerful tool for research and teaching purposes.

Notes

1. The grammatical error of this (Chinese) utterance lies in word order, i.e., the lexical downgrader *yi*^{2} *xia*^{4}(a little bit) should follow the verb *yong*^{4} (to use) rather than the object *dian*^{4} *nao*^{3} (computer).
2. This utterance is pragmalinguistically in appropriate because the linguistic form bears an imperative mood.

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