2017

An Exploratory Study on the Role of Foreign Language Aptitudes in Instructed Pragmatics Learning In L2 Chinese

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Recommended Citation
Li, S. (2017). An exploratory study on the role of foreign language aptitudes in instructed pragmatics learning in L2 Chinese. Chinese as a Second Language Research, 6(1), 103–128. https://doi.org/10.1515/caslar-2017-0005.

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An exploratory study on the role of foreign language aptitudes in instructed pragmatics learning in L2 Chinese

DOI 10.1515/caslar-2017-0005

Abstract: This study investigated whether and how foreign language (FL) aptitudes interacted with different instructional conditions to affect pragmatic gains in L2 Chinese. Fifty American learners of Chinese were randomly assigned to an (explicit) input-based treatment group, an (explicit) output-based treatment group, and a control group. Following a metapragmatic session, the two treatment groups practiced target request-making forms through their respective computer programs, while the control group did not practice. Gains in pragmatic performance were measured by a listening judgment test and an oral production test at immediate and delayed posttests. The participants also completed three foreign language (FL) aptitude tests assessing rote memory, grammatical sensitivity, and working memory. The results revealed different patterns of correlation between FL aptitudes and pragmatic gains. The input group showed positive correlations between working memory and reductions in judgment response times at both immediate and delayed posttests. The output group showed a positive correlation between grammatical sensitivity and gains in production speech rates at immediate posttest; a negative correlation was also found between rote memory and reductions in production planning times made at immediate posttest.

Keywords: foreign language aptitude, request, explicit instruction, input-based and output-based instruction, Chinese

1 Introduction

Foreign language (FL) aptitudes, understood as a set of relatively stable cognitive abilities presumed to be linked to language learning (S.F. Li 2015; Skehan 2015; Vatz et al. 2013), has attracted sustained interests in applied linguistics over the past decades (for narrative synthesis see Skehan 2015; Vatz et al. 2013; for a quantitative meta-analysis, see S.F. Li 2015). As S.F. Li (2015) summarized, the

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interest in foreign language aptitudes (hereafter FL aptitudes) has generated two main strands of research. The first strand has investigated the extent to which FL aptitudes predict (or are correlated with) rate and/or achievement of L2 learning (e.g., Abrahamsson and Hyltenstam 2008; DeKeyser 1993, 2000; Granena and Long 2013; Hummel 2009). While this line of research generally does not consider the kind of instruction that learners receive and does not examine specific linguistic features, the second strand of research is more closely connected with instructed L2 learning. This second line of research (also called aptitude-treatment interaction research) has examined whether and how various FL aptitudes mediate the effects of different types of instructional conditions on L2 learning (e.g., Erlam 2005; Hwu et al. 2014; Hwu and Sun 2012; S.F. Li 2013; Robinson 2007, 2012; Sheen 2007; Shen 2011). This study belongs to the second strand of research. While existing studies in this line of research have exclusively targeted L2 morphosyntactic features, this study aims to extend the scope of investigation to L2 pragmatics of request-making. Drawing on Robinson's (2001, 2002) hypothesis on the relationship between FL aptitudes and instructional conditions, this study examined whether three FL aptitudes (grammatical sensitivity, working memory, rote memory) were related to different aspects of pragmatic gains under two modalities of instructional (input-based, output-based).

In the field of Chinese SLA, this study represents an initial effort to examine the role of FL aptitudes in instructed pragmatics learning. While previous research findings have shown that accuracy and speed of pragmatic performance in L2 Chinese were differentially amenable to instruction (e.g., S. Li 2012; S. Li and Taguchi 2014), it remains unclear whether and to what extent individual difference factors such as FL aptitudes mediate the observed instructional outcomes. Research on the three-way interaction between instructional conditions, FL aptitudes, and outcome measures can help advance our understanding of how instructional effectiveness can be enhanced by drawing on learners' cognitive strengths. For a target L2 such as Chinese, which is known for its difficulty to western learners, research on this topic is pedagogically meaningful for enhancing instructional efficacy.

2 Background

2.1 Recent theorizations of foreign language (FL) aptitude in SLA

Although there is general consensus in SLA that FL aptitudes affect L2 learning, researchers differ in terms of what cognitive abilities should be considered as FL aptitudes and how these cognitive abilities are connected with L2 learning (Skehan 2015; Robinson 2012). On the one hand, the multi-faceted nature of FL aptitude as a construct is reflected in various aptitude test batteries ranging from the traditional yet still influential Modern Language Aptitude Test (Carroll and Sapon 1959) to the most recently developed test battery, Hi-LAB (Linck et al. 2013). These test batteries show both overlaps and differences in the cognitive abilities that are measured. On the other hand, recent theories of FL aptitudes have seen two proposals, one by Skehan (2002) and the other by Robinson (2001, 2002). While Skehan's proposal attempts to connect various FL aptitudes (e.g., attentional control ability, working memory) with different SLA processes (e.g., input processing, noticing, and pattern identification), Robinson's proposal presents a framework for investigating how various FL aptitudes interact with specific instructional conditions (e.g., focus on form, explicit rule learning) to affect learning outcome. Because this study aims to examine the role of FL aptitudes in mediating L2 Chinese pragmatics learning under different instructional conditions, Robinson's framework is the most relevant and thus is discussed below.

According to Robinson (2005: 46), FL aptitudes refer to "individual's strengths in the cognitive abilities that information processing draws on during L2 learning and performance in various contexts and at different stages". He conceptualizes FL aptitudes as including a cluster of cognitive abilities. These cognitive abilities form hierarchical structures, with first-order abilities (e.g., working memory) combining to form second-order abilities (e.g., noticing the gap, metalinguistic rule rehearsal) that are hypothesized to support L2 learning. These second-order abilities can be grouped into aptitude complexes that are hypothesized to influence L2 learning under different instructional conditions (Robinson 2001, 2002). The rationale is that different instructional conditions pose specific information processing demands that draw on different cognitive abilities. Ultimately, instructional outcomes can be enhanced when learners' FL aptitude profiles match the processing demands of specific instructional conditions.

Robinson's framework lists four instructional/learning conditions (e.g., focus on form, incidental learning via oral content, incidental learning via written content, and explicit rule learning), each with a set of accompanying FL aptitudes. The most relevant to this study is the "explicit rule learning" condition. It involves instructions that start with metalinguistic rule explanation, followed by comprehension and/or production activities designed for practicing the rules. The aptitude complexes hypothesized to influence learning under this instructional condition are two second-order abilities: memory for contingent text and metalinguistic rule rehearsal. Memory for contingent text consists of two primary cognitive abilities: working memory for text and speed of working

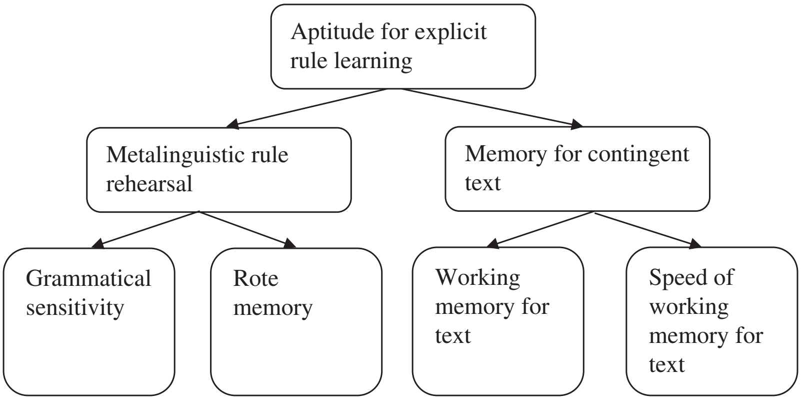

Figure 1: Hierarchical structure of aptitude profile for explicit rule learning (Adapted from Robinson 2012:69).

memory for text. Likewise, metalinguistic rule rehearsal consists of two primary cognitive abilities: grammatical sensitivity and rote memory (See Figure 1).

While these FL aptitudes are hypothesized to be implicated in explicit rule learning, their exact role in affecting learning outcome remains an empirical question for two reasons. First, because the explicit rule learning condition has been operationalized in different ways in the literature (e.g., deductive vs. explicit-inductive, input-based vs. output-based), there is a need to examine whether and how FL aptitudes interact with different variants of the explicit rule learning condition. Second, researchers have called for more refined investigations into the role of FL aptitudes in mediating instructional effects by taking into consideration the property of targeted linguistic features (DeKeyser 2012; Skehan 2015). Hence, even within the explicit rule learning condition, the mediating effects of FL aptitudes may differ across targeted features and how their gains are measured. Clearly, much remains to be done to examine the nature of aptitude-treatment interaction for instructed L2 learning. In this respect, Robinson's theorization provides a clear framework for investigating the relationship between specific FL aptitudes and specific instructional conditions.

2.2 FL aptitudes and instructional conditions

Existing studies on the role of FL aptitudes in mediating instructional effects are closely connected with instructed SLA research. Researchers generally start out with specifying different instructional conditions and identifying FL aptitudes that are assumed to be implicated in those conditions; the focus of analysis is typically on the extent to which FL aptitudes predict and/or correlate with learning gains. Because the effects of explicit vs. implicit instructional conditions has been of great interest in instructed SLA research, many studies have examined the extent to which FL aptitudes influenced L2 learning outcomes in these two types of conditions (e.g., S.F. Li 2013; Sheen 2007, 2011; Robinson 1997). For example, S.F. Li (2013) examined whether and how working memory and language analytic ability mediated gains in accurate judgment and production of Chinese classifiers obtained through either explicit (i.e., metalinguistic correction) or implicit (i.e., recast) feedbacks among adult American learners of Chinese. He found that working memory predicted the delayed gains in both classifier judgment and production among learners receiving explicit feedback, whereas language analytic ability predicted the delayed gains in classifier judgment (but not in classifier production) among learners receiving implicit feedback. He attributed these findings to the different information processing abilities that explicit and implicit feedbacks drew on among learners in order to affect their learning outcome. Whereas the ability to attend to and analyze the usage of classifiers embedded in recasts (i.e., functions of language analytic ability) was critical for learners to benefit from the implicit feedback condition, this ability was far less important for learners to benefit from metalinguistic corrections because the rules of usage were readily available in the explicit feedbacks. Rather, to benefit from the explicit feedback condition, the ability to process and use the correct classifier forms and suppress the incorrect forms (i.e., functions of working memory) was the most relevant.

Like S.F. Li's study, previous research has shown that FL aptitudes are differentially implicated in instructional conditions across the explicit-implicit spectrum. This observation was also confirmed in S.F. Li's (2015) quantitative meta-analysis based on 16 instructional studies (all targeting L2 morpho-syntactic features) published from 1971 to 2013. Interestingly, S.F. Li's synthesis revealed that FL aptitudes were more strongly implicated in explicit than in implicit instructional/learning conditions. A question, then, is whether and how FL aptitudes interact with different operationalizations of explicit instruction (e.g., see Hwu et al. 2014; Erlam 2005) to affect learning outcome.

Very few studies have pursued this research direction (e.g., Erlam 2005; Hwu et al. 2014; Hwu and Sun 2012). Hwu et al. (2014), for example, investigated whether and how three FL aptitudes (grammatical sensitivity, associative memory, and memory for text) mediated the effects of two explicit instructional conditions (i.e., deductive, explicit inductive) on learning Spanish psycho verb constructions among adult American learners. The deductive condition provided metalinguistic explanation upfront followed by a series of practice activities to reinforce the explicitly taught rules; in contrast, the explicit inductive condition pushed the learners to derive the targeted grammatical rules through structured activities (e.g., multiple choice questions containing only two options each with right/wrong feedback) before releasing metalinguistic information. Both instructional conditions led to comparable gains, but the three FL aptitudes differentially affected instructional outcomes, with memory for text showing the strongest effects and associative memory the weakest. Moreover, learners with lower overall aptitude benefited more from deductive instruction than from explicit inductive instruction in gains measured on the sentence correction test but not in gains on the sentence production task; on the other hand, learners with higher overall aptitude appeared to benefit equally well from both conditions on both measures. This means that, other things being equal, deductive instruction favored low aptitude learners when gains are measured in receptive tasks but not in productive tasks.

While Hwu's study operationalized explicit instruction in terms of deductive and explicit inductive conditions and examined their interactions with FL aptitudes, Erlam's (2005) study showed how FL aptitudes (i.e., phonetic coding ability, working memory, and language analytic ability) mediated the effects of different modalities of explicit instruction on learning L2 French direct object pronouns. Her study included three instructional conditions: processing instruction (PI), deductive instruction (DI), and inductive instruction (IN). Both PI and DI were explicit conditions in that metalinguistic information was provided to learners before they engaged in practice activities. The two conditions differed in that the activities in the PI condition were input-based whereas those in the DI condition were output-based. The treatment for the IN group was the same as that of the PI group, except that no metalinguistic information was provided. The results showed that the three FL aptitudes correlated differently with gains obtained through the three instructional conditions. Particularly relevant to the present study are the patterns shown for the PI and DI conditions (which differed only in instructional modality – input-based or output-based – as mentioned earlier): in the PI condition, gains in written production positively correlated with language analytic ability and with working memory, respectively; in the DI condition, gains in listening comprehension positively correlated with phonemic coding ability, and gains in oral production fluency negatively correlated with phonemic coding ability. These findings suggest that FL aptitudes are differentially implicated in different modalities of explicit instruction to affect learning.

In summary, while individual studies have demonstrated that FL aptitudes mediated L2 learning in both explicit and implicit instructional conditions, S.F. Li's quantitative meta-analysis indicated that FL aptitudes were more strongly associated with explicit learning than with implicit learning. Hence, it is meaningful to conduct refined investigations into how FL aptitudes interact with different operationalizations of explicit instruction. In this respect, extending aptitude-treatment interaction research to instructed L2 pragmatics learning can offer a fertile research avenue.

2.3 Extending aptitude-treatment interaction research to instructed L2 pragmatics

To date, research on aptitude-treatment interaction for instructed L2 learning has almost exclusively focused on morpho-syntactic features (see Vatz et al. 2013 for a review). However, because FL aptitudes are not necessarily tied to specific linguistic domains, they could also mediate the learning of linguistic features other than morphosyntax. Pragmatic features constitute one such linguistic domain that can extend the scope of aptitude-treatment interaction research and help examine the generalizability of existing research findings.

Although no published study has specifically investigated the role of FL aptitudes in instructed L2 pragmatics learning, Takahashi's (2005) data suggests that different (implicit) instructional conditions posed different levels of information processing demand on learners. In her study on the learning of English request making forms (e.g., "I wonder if …"), two groups of Japanese learners respectively engaged in form-comparison activities (i.e., identifying differences in request realizations by comparing dialogues containing native and non-native requests) and form-search activities (i.e., searching for distinctive native expressions in dialogues containing native and non-native requests). Analyses of activity logs and post-instruction learner self-report data showed that, in comparison with the form-search condition, the form-comparison condition led to more noticing of the targeted features, which, in turn, resulted in more production of the features at posttests (assessed by a written discourse completion test). These findings demonstrated that the two instructional conditions posed different information processing demands on noticing. Because noticing is supported by several FL aptitudes such as perceptual speed and phonemic coding (Robinson 2005; Skehan 2002), it seems that the FL aptitudes supporting noticing differentially affected learning under the two instructional conditions in Takahashi's study. However, because Takahashi did not include FL aptitude measures, the exact relationship between FL aptitudes and specific instructional conditions for pragmatics learning needs to be empirically examined.

Another way that instructed L2 pragmatics research can enrich aptitude-treatment interaction research lies in the expanded scope of outcome measures. In previous studies, performance speed, along with performance accuracy, has also been used as an indicator of pragmatic gain (e.g., S. Li 2012, 2013; S. Li and

Taguchi 2014; Shirinbakhsh et al. 2015). This is because accuracy and speed are understood as indicators of two distinct components of pragmatic competence, namely, knowledge and processing ability (Bialystok and Blum–Kulka 1993; Taguchi 2012). On the one hand, development of pragmatic knowledge involves acquiring increasingly refined knowledge of form-function-context mappings, which results in more accurate performance over time. On the other hand, development of processing ability entails gaining automatic control over pragmatic knowledge through repeated use of such knowledge, and performance speed can be expected to increase as processing ability develops., Researchers have documented the distinctive developmental trajectories of pragmatic knowledge (indexed by measures of performance accuracy) and processing ability (indexed by measures of performance speed) as a result of pragmatics instruction (e.g., S. Li 2012; S. Li and Taguchi 2014; Shirinbakhsh et al. 2015). An interesting question to explore is whether and how FL aptitudes mediate the instructional outcomes in both knowledge and processing ability. Because existing aptitude-treatment interaction research has focused exclusively on gains in performance accuracy, including outcome measures of performance speed can offer additional insights into the role of FL aptitudes in instructed L2 learning.

2.4 This study

The above sections have identified two gaps in the literature that merit future research: one is to examine how FL aptitudes interact with different modalities of instruction to affect learning, and the other is to investigate the effects of such aptitude-treatment interaction in terms of gains in both accuracy and speed. To fill these gaps, this study investigates whether and how FL aptitudes influence gains in pragmatic performance accuracy and speed as a result of different modalities of explicit instruction (i.e., input-based, output-based) for teaching request-making forms in L2 Chinese. The research question is:

> RQ: Are FL aptitudes related to the gains in judging and producing Chinese request-making forms under different instructional modalities?

3 Method

3.1 Participants

Fifty adult American learners of Chinese participated in this study. They were all native speakers of English (11 males, 39 females, mean age = 20.56 years) studying Chinese in China. They were recruited from six different Chinese programs in Beijing and Shanghai. These programs all focused on grammar and vocabulary instruction and did not teach the target pragmatic features (described below). The participants had received two to four semesters of formal instruction on Chinese as a foreign language before going abroad. The researcher randomly assigned the participants into three groups, namely, a control group ($n = 16$), an input-based instruction group (hereafter "input group", $n = 17$), and an output-based instruction group (hereafter "output-group", $n = 17$). The three groups showed no difference in general Chinese proficiency measured by an adapted form of the C. Test, which is a standardized Chinese proficiency test (HSK Center of BLCU 2009), $F(2, 47) = 0.36$, $p > 0.05$. One participant from the control group was excluded from data analysis due to equipment malfunctioning. This study focused on the analysis of the input and output groups.

3.2 Target pragmatic features

Four Chinese request-making forms (with lexical internal modifications) were taught in this study (Table 1). Among these forms, two are typically used for making minor requests to friends, while other two are typically reserved for making major requests to professors. Request was selected as the targeted pragmatic feature in this study because it is a complex speech act that poses

Table 1: Target pragmatic features.

Form	Function/context
1. *(bāngmáng / bāng wǒ) verb yī xià (object) ba (help / help me) verb a little bit (object) PA*	Direct strategy with mitigated tone used for making a minor request to a good friends
2. *(bāngmáng / bāng wǒ) bǎ object verb yī xià ba (help/help me) prep. object verb a little bit PA*	
3. *nín kàn (subject) néng verb yīxià object ma? You see (subject) can verb a little bit object PA?*	Indirect strategy with mitigated tone used for making a major request to a professor
4. *nín kàn (subject) néng bù néng verb yī xià object? You see (subject) can or cannot verb a little bit object?*	

Note: The components in the parentheses are optional. PA: particle. Underlined parts are lexical internal modifications.

considerable difficulty to learners of L2 Chinese even at the advanced level (e.g., Hong 2011; S. Li 2014; Wen 2014). Research on whether and how the learning of request-making may be facilitated (or constrained) by individual difference factors in instructional environments can hopefully contribute to the development of individualized pragmatics instruction in L2 Chinese in the long run.

3.3 Input-based and output-based instructional conditions

All groups (including the control group) received the same 40-minute computerized metapragmatic instruction session on Day One before engaging in their respective activities from Day Two through Day Five. During the metapragmatic instruction session, the participants worked individually with a computerized program that introduced the targeted features (see Table 1) with several examples. The computer program began with introducing the speech act of request and its components (e.g., head act, internal and external modification. Then, the program showed several examples illustrating how the targeted pragmatic features could be used in two types of scenarios: making minor requests to friends and making major requests to professors. Two versions of a Written Discourse Completion Test (DCT) were administered immediately before and immediately after this session to ensure participants' intake of the explicitly taught metapragmatic information. In those tests, participants read a series of situational scenarios and produced the target request in writing (both characters and Pinyin were acceptable).

From Day Two to Day Five, the input and output groups engaged in four parallel computerized learning sessions, respectively, while the control group completed Chinese reading comprehension exercises that were not related to the target features. The input and output groups practiced using the target forms with the same set of 16 request-making scenarios, with the difference being the modality of practice tasks.

3.3.1 Input group

For the input group, each request scenario consisted of a form-judgment task and a form-selection task. In the form-judgment task, participants read a request scenario description in English and judged the grammaticality of two accompanying request forms written in Chinese. In case of incorrect responses, metalinguistic explanation was provided as feedback. Following is a sample form-judgment task.

> *Sample 1: Today is Li Xiaochen's turn to present at Professor Chen's class. Unfortunately Li Xiaochen's computer broke down and he/she lost all relevant files. So Li Xiaochen wants to ask Professor Chen to agree to shift his/her turn. The course has a very tight schedule and rescheduling will cause considerable inconvenience. Li Xiaochen explains the situation and says:*
> *Form 1*: *您看我能不能改一下作报告的时间吗？*
> 'Do you think I can change the time for my presentation?'

During the form-selection task, the participants read the same scenario and evaluated the contextual factors such as the interlocutors' power relationship and the size of the favor being asked. They then read an accompanying dialogue with two underlined sections. For each underlined section, they chose an optimal request form from three options: (a) a pragmatically appropriate and grammatically accurate form, (b) a pragmatically appropriate and grammatically inaccurate form, and (c) a pragmatically inappropriate and grammatically accurate form. The participants had to make the expected choices before moving on to the next item. In case of incorrect choices, metapragmatic feedback was provided. Following is a sample form-selection task based on the same request scenario as in Sample 1.

Sample 2: Scenario (see Sample 1)

A: *陈老师，有个事情我想跟您商量一下。*
'Professor Chen, there is one thing I'd like to discuss with you.'

B: *什么事，晓晨？*
'What is that, Xiaochen?'

A: *今天下午应该我做报告。可是昨天晚上我的电脑坏了。我的文件都丢了。*
'I was supposed to do my presentation this afternoon, but my computer broke down yesterday evening. I have lost all my files.'

(a) *您把我作报告的时间改一下吧。*
'You change the time for my presentation.' (inappropriate)

(b) *您看我能不能改一下作报告的时间？*
'Do you think I can change the time for my presentation?' (correct answer)

(c) *您看我能不能改作报告的时间一下？*
'Do you think I can change the time for my presentation?' (ungrammatical)

B : *嗯，我们课的安排很紧张 。。。*
'En, our class has a very tight schedule.'

A : *真对不起。可是我今天真的不能作报告了。*
'(I am) very sorry. But I really cannot do my presentation today.'

B : *我看一下我们的安排。。。下个星期吧。*
'Let me see our schedule ... (you do it) next week.'
可是你只有20分钟。
'But you only have 20 minutes.'
A : *好的，谢谢陈老师。再见！*
'OK, thank you, Professor Chen. Goodbye.'
B : *再见。*
'Goodbye.'

3.3.2 Output group

For the output group, each request scenario consisted of a form-translation task and a form-production task. In the form-translation task, the participants read a request scenario (in English) and translated (through typing) two accompanying English request utterances into Chinese by using the target forms. Expected answers were then provided as feedback. Following is a sample task based on the same request scenario as in Sample 1 above.

Sample 3: *Scenario (see Sample 1)*
Target request: Do you think I can change my presentation time?
Translation 1: Use the following pattern:
nín kàn (*subject*) néng *verb* yīxià *object* ma?

In the form-production task, the participants first evaluated the contextual factors of a request scenario, just as the input group did. They then read an accompanying dialogue with two blanks to be filled with the target request forms. The dialogue was the same as the one for the input group (see Sample 2 above) expect that the underlines sections were replaced by blanks for the participants typed in their answers. Afterwards the participants read their own responses and the expected answers as feedback.

3.4 Outcome measures of pragmatic gains

This study used computerized receptive and productive tasks to measure pragmatic gains. The receptive task was a listening judgment test (LJT) with 24 target items counterbalanced for two types of request scenarios (i.e., minor requests to friends, and major requests to professors). Each test item first presented an (English) description of a request scenario to participants through simultaneous audio and visual input. The participants then heard a Chinese request utterance and judged whether it was (a) a pragmatically appropriate and grammatically accurate utterance, (b) a pragmatically appropriate and grammatically inaccurate utterance, or (c) a pragmatically inappropriate and grammatically accurate utterance. The order of the three options was counterbalanced. The computers recorded the choices and response times. The LJT data was analyzed in terms of judgment accuracy (i.e., one point awarded for each correct judgment for a maximum of 24 points) and judgment response times (i.e., averaged number of seconds taken to make correct judgments). There were three parallel versions of the task (LJT-1, LJT-2 and LJT-3).

The productive task was an oral production test (OPT) with 16 target items counterbalanced for the two types of request scenario mentioned above. Each test item first presented a (English) description of a request scenario through simultaneous audio and visual input. The participants then orally produced request utterances, which were recorded by the computers. The production data was analyzed in terms of production accuracy (i.e., scores were obtained through a rating procedure[1]), production planning times (i.e., averaged number of seconds taken to plan for responses), and production speech rates (i.e., averaged number of Chinese syllables spoken per minute when producing pragmatically appropriate request utterances). There were three parallel versions of the task (LJT-1, LJT-2 and LJT-3).

3.5 FL aptitude measures

Based on Robinson's (Robinson 2001, 2002) framework, the input- and output-based conditions in this study belonged to the category of explicit rule learning. Four FL aptitudes were hypothesized to mediate learning outcome: rote memory, grammatical sensitivity, working memory for text, and speed of working memory for text. Because no valid instrument was available for measuring the speed of working memory for text, this aptitude was excluded from the study. The remaining three were measured by using the tests below. Rote memory capacity was measured by the Word Pairs section of the Modern Language Aptitude Test (MLAT) (Carroll and Sapon 1959). Participants first studied 24 Kurdish-English word pairs for 2 minutes. They then had 2 minutes to practice writing English

1 The rating of each response was based on three facets, request head act (score range: 0–2), internal lexical modification (score range: 0–2), and overall grammaticality (score range: 0–1). Hence the production accuracy score range was 0 to 80 (i.e., 5 points per scenario × 16 scenarios). Interested readers are referred to S. Li and Taguchi (2014) for more details in rating.

equivalents for the Kurdish words. Finally, they were given 4 minutes to complete 24 multiple-choice questions designed to assess the retention of the word pairs.

Grammatical sensitivity was measured by the Words in Sentences section of the MLAT. This 15-minute test included 45 pairs of English sentences. In each pair, the first sentence was a key sentence with one underlined word. The second sentence had five underlined words and/or phrases, and participants were asked to select the one that shared the same grammatical function as the underlined word in the key sentence.

Finally, working memory for text was measured by a modified version of Daneman and Carpenter's (1980) reading span test (Rodríguez 2008). The test included 84 English sentences ranging from 10 to 16 words. Each sentence ended with a two-syllable word. Half of the sentences were grammatical and the remaining half was not. The sentences were randomly assigned to Section A and Section B, with each section consisting of 12 blocks of sentences. Among the 12 blocks, three blocks contained two sentences, three contained three sentences, three contained four sentences, and the remaining three contained five sentences. During the test, the sentences appeared on the computer screen one by one, starting with Section A and then Section B. In each section, two-sentence blocks appeared first, followed by blocks with three, four, and five sentences. For each block, participants read out loud each sentence in normal speed as soon as it appeared on the screen. Immediately afterwards, they judged the grammaticality of the sentence. While reading the sentences, participant also needed to memorize the last word of each sentence and, upon having read all sentences in one block, they had to recall all the final words of the sentences in that block. An examiner checked all the correctly recalled words on an answer sheet before moving on to the next block. Following Friedman and Miyake's (2004) suggestions, the examiner controlled the pace of sentence display in order to prevent the participants from using strategies (e.g. subvocalization, semantic association) to improve their performance. The reliability coefficient for the full test was 0.83, using the Spearman Brown double length formula.

3.6 Procedures

Instruction and assessment were conducted individually in a lab on campus and were monitored throughout. During Week One, all participants attended the metapragmatic instruction session and immediately afterwards took a pretest (consisting of LJT-1 and OPT-1) on Day One. From Day Two through Day Five, the participants engaged in their respective activities (input- or output-based practice). On Day Five, after instruction, all participants took an immediate posttest consisting of LJT-2 and OPT-2. Two weeks after the immediate posttest, they took a delayed posttest (LJT-3 and OPT-3) and the three aptitude tests.

3.7 Data analysis

To answer the research question, the researcher first calculated two sets of gain scores for the four measures assessing participants' knowledge of request-making forms (i.e., listening judgment accuracy, listening judgment response times, oral production accuracy, and oral production speech rates). The first set was obtained by subtracting the pretest scores from the immediate posttest scores. The second set was calculated by subtracting the pretest scores from the delayed posttest scores. The researcher calculated Pearson's correlation coefficients between measures of pragmatic gains and the scores of the three aptitude tests for input and output groups separately.

4 Results

Table 2 presents the descriptive statistics of the three aptitude measures for the input and output groups. Results of separate independent samples *t* tests showed no group difference on any of the three aptitude measures (Table 2). Table 3 shows the descriptive statistics of the three learner groups across the four measures of pragmatic gain. Interested learners are referred to Li and Taguchi (2014) for detailed reporting on the effects of instruction on pragmatic gains. The key findings are summarized here: (a) both input and output groups (but not the control group) significantly increased judgment scores and production scores over time and generally outperformed the control group on both

Table 2: Descriptive statistics of three aptitude measures.

	Input ($n = 17$)		Output ($n = 17$)		*t* test results
	Mean	*SD*	Mean	*SD*	
Grammatical sensitivity (score range: 0–45)	25.06	6.28	23.76	6.65	$t(32) = 0.58$, $p = 0.56$
Rote memory (score range: 0–24)	21.41	4.08	19.71	5.92	$t(32) = 0.98$, $p = 0.33$
Working memory	15.32	2.84	16.60	1.99	$t(32) = -1.52$, $p = 0.14$

Table 3: Descriptive statistics of pragmatic gains.

Measure	Time	Input ($n = 17$)		Output ($n = 17$)		Control ($n = 16$)	
		Mean	*SD*	Mean	*SD*	Mean	*SD*
Judgment score (range: 0–24)	Pretest	14.05	4.09	14.64	4.75	14.60	3.66
	Posttest 1	20.11	1.99	16.94	2.77	14.46	3.48
	Posttest 2	21.11	2.26	17.00	3.37	15.80	3.54
Judgment response times	Pretest	4.23	1.67	4.27	1.49	4.24	1.61
	Posttest 1	3.16	1.18	3.54	1.24	3.86	1.85
	Posttest 2	3.12	1.24	3.66	2.38	3.51	1.42
Production score (range: 0–80)	Pretest	61.88	9.64	62.11	13.11	58.93	13.15
	Posttest 1	74.00	3.74	75.11	4.04	59.80	12.89
	Posttest 2	70.76	7.72	72.29	11.57	61.46	13.04
Production planning times	Pretest	2.86	3.44	3.11	1.87	3.49	3.14
	Posttest 1	1.51	0.54	1.46	0.58	2.29	1.85
	Posttest 2	1.81	0.98	1.67	0.83	2.20	2.30
Production speech rates	Pretest	109.89	36.56	107.11	28.62	113.20	36.27
	Posttest 1	122.18	38.56	130.65	39.48	127.60	43.58
	Posttest 2	132.04	41.54	146.01	46.10	133.41	40.48

accuracy measures. (b) The input group (but not the output group) significantly reduced judgment response times but did not outperform the control group at both posttests. (c) The output group (but not the input group) significantly reduced production planning times but failed to outperform the control group at both posttests. (d) The output group and the control group (but not the input group) significantly increased production speech rates; however, it did not outperform the control group at both posttests.

Tables 4 and 5 present the results for the main research question of this study for the input and output groups. For the input group (Table 4), significant positive correlations were found between working memory and reductions in judgment response times made from pretest to immediate posttest ($r = 0.52$, $p = 0.03$) as well as from pretest to delayed posttest ($r = 0.53$, $p = 0.03$). For the output group (Table 5), a significant positive correlation was found between grammatical sensitivity and gains in production speech rates made from pretest to immediate posttest ($r = 0.57$, $p = 0.02$). There was also a significant negative correlation between rote memory and reductions of production planning times from pretest to immediate posttest ($r = -0.49$, $p = 0.048$).

The negative correlation between rote memory (RM) and reduction in production planning times for the output group means those with larger RM capacity made less reduction in planning times after engaging in output-based activities,

Table 4: Correlations between gains and FL aptitude scores for the input group ($n = 17$).

Outcome measure	Gain	Grammatical sensitivity	Rote memory	Working memory
Judgment accuracy	Immediate	−0.03	0.14	0.27
	Delayed	0.19	0.27	0.26
Judgment response times	Immediate	0.16	0.35	0.52*
	Delayed	0.28	0.31	0.53*
Production accuracy	Immediate	−0.19	−0.17	0.01
	Delayed	0.04	0.17	0.03
Production planning times	Immediate	−0.02	0.13	−0.14
	Delayed	0.05	0.16	−0.13
Production speech rates	Immediate	−0.22	0.01	−0.04
	Delayed	0.03	0.04	0.15

Note: $*p < 0.05$.

Table 5: Correlations between gains and FL aptitude scores for the output group ($n = 17$).

Outcome measure	Gain	Grammatical sensitivity	Rote memory	Working memory
Judgment accuracy	Immediate	−0.41	−0.22	−0.13
	Delayed	−0.39	−0.03	0.11
Judgment response times	Immediate	0.13	0.33	0.02
	Delayed	0.12	0.18	0.11
Production accuracy	Immediate	−0.23	−0.30	−0.35
	Delayed	0.12	−0.35	−0.31
Production planning times	Immediate	−0.42	−0.49*	−0.20
	Delayed	−0.39	−0.42	−0.29
Production speech rates	Immediate	0.57*	0.38	0.38
	Delayed	0.42	0.22	0.07

Note: $*p < 0.05$.

whereas learners with smaller RM capacity made more reduction. To understand the nature of this negative correlation, I conducted follow-up analyses. The learners in the output group were first divided into two subgroups (that is, larger RM learners, smaller RM learners) based on whether their rote memory score was below or above the group mean of 19.70. The learners within each subgroup were further divided into two groups based on whether their planning times were below or above the group means at pretest (i.e., Mean = 3.11) and at immediate posttest (i.e., Mean = 1.64), as well as whether their individual reductions in planning times were above or below the average from pretest to immediate posttest (i.e., Mean = 1.64). The results were presented in Table 6.

Table 6: Relationship between rote memory and production planning times.

Rote memory (RM)	Pretest planning times		Immediate posttest planning times		Reduction in planning times	
	Below average	Above average	Below average	Above average	Below average	Above average
Smaller RM learners ($n = 6$)	2	4	3	3	1	5
Larger RM learners ($n = 11$)	10	1	9	2	10	1

Note: The numbers indicate the number of learner(s) that falls in each category.

As Table 6 shows, larger RM learners used less-than-average amount of planning times, and this pattern was consistent across pretest and immediate posttest. Equally consistent over time was the pattern that at least half of smaller RM learners used more-than-average amount of planning times. However, in terms of the reductions in planning times, the majority (five in six) of smaller RM learners showed above-average reductions, whereas the majority (10 in 11) of larger RM learners showed below-average reductions. The discussion section presents more detailed interpretations of the findings.

In summary, the results showed that the three FL aptitudes were differentially implicated in input-based and output-based instructional conditions to affect pragmatic gains measured in performance accuracy and performance speed. This three-way interaction between treatment conditions, aptitudes, and outcome measures are discussed below.

5 Discussion

The input and output groups showed varied patterns of correlation between different measures of pragmatic gains and FL aptitudes. Hence, the main research question was answered affirmatively. Tables 4 and 5 further revealed that all significant correlations were found between gains in pragmatic performance speed and FL aptitudes (i.e., between reductions of judgment response times and working memory, between reductions of production planning times and rote memory, and between gains in production speech rates and grammatical sensitivity). In contrast, gains in pragmatic performance accuracy were not significantly correlated with any FL aptitude.

Such marked difference in correlation patterns between accuracy and speed measures (i.e., FL aptitudes influenced instructional effects on performance speed but not performance accuracy) can be explained in relation to the relative effectiveness of instruction. Because the input-based and the output-based instructions were explicit and deductive (i.e., explicit metapragmatic instruction followed by respective practice activities), they were effective in producing gains in pragmatic performance accuracy among both groups regardless of individual learners' FL aptitude profiles. This "homogenizing" effect of (explicit) deductive instruction was also reported in previous research on aptitude-treatment interaction with a focus on L2 grammar learning. For example, Erlam (2005) found that deductive instruction, compared with other two instructional conditions (i.e., inductive instruction, and processing instruction), yielded the smallest number of significant correlations between gains in L2 grammar knowledge and FL aptitudes. Hence, my findings indicate that effective (explicit) instruction, regardless of instructional modality, can greatly minimize the mediating effects of FL aptitudes on gains in L2 pragmatic performance accuracy. On the other hand, instructional effects on gains in performance speed were generally weak or even non-existent at the group level in this study (see the results section), and FL aptitudes were found to mediate instructional effects on performance speed. These results suggest that, when the effects of instruction are not strong enough to override individual differences in learning outcome, learners with different FL aptitude profiles tend to benefit differentially from instruction.

Turning to the specific significant correlations, for the input group, working memory positively correlated with reductions in judgment response times, meaning that learners with larger working memory capacity benefited more from input-based instruction for speedy judgment of request forms. By contrast, for the output group, there was no significant correlation between reductions of judgment response times and working memory. These findings can be explained by considering whether the input-based and output-based instructional conditions provided opportunities for learners to utilize their working memory capacity to improve form judgment speed. The input-based practice activities asked learners to judge different types of request utterances through form-judgment and form-selection tasks. In this way, learners with larger working memory capacity could better retain and analyze the different types of request utterances and subsequently made faster (and also more accurate) judgments than those with smaller working memory capacity. In other words, for the purpose of increasing judgment speed, the input-based instructional condition tended to favor those learners with larger working memory capacity than those with smaller working memory capacity. On the other hand, the output-based activities asked learners to produce request utterances based on given request-making forms through form-translation and form-production tasks. In these activities, working memory was involved in request form production, but not in request form judgment. In other words, the output-based instructional condition did not provide opportunity for learners to utilize their working memory capacity to improve judgment speed. As a result, working memory was not significantly correlated with reductions in judgment response times for the output group.

Still, one may wonder why it was working memory but not the other two aptitudes (i.e., rote memory and grammatical sensitivity) that affected judgment response times. This can be explained by the function of working memory. Working memory involves "temporary storage and manipulation of information that is assumed to be necessary for a wide range of complex cognitive activities" (Baddeley 2003:189). As such, working memory is likely to influence performance on tasks that involve online processing. The listening judgment test (i.e., the LJT) was one such online task. In responding to each test item, learners must (a) keep the heard request utterances in mind, (b) retrieve the learnt request-making forms from long-term memory, and (c) compare the heard request utterances with the target request-making forms. Steps (a) and (b) are directly related to the storage function of the working memory, while step (c) is related to its manipulation function. Hence, a larger working memory capacity would enable one to better retain the heard request utterances, retrieve the target request-making forms, and make faster comparisons. All these enabled those with larger working memory capacity to make speedier judgment, which was reflected through the measure of judgment response times. Different from working memory, rote memory and grammatical sensitivity have less connection with judgment speed (i.e., judgment response times) as measured in this study. According to Carroll (1981), rote memory refers to the ability to learn and retain sound-meaning associations, and grammatical sensitivity refers to the ability to detect the grammatical functions of various linguistic units. As such, these two FL aptitudes may not necessarily influence judgment speed.

The second significant positive correlation was found for the output group: grammatical sensitivity correlated significantly with immediate gains in production speech rates. This means that learners with better language analytic ability benefited more from output-based instruction for developing the ability to quickly produce request utterances. This finding can be explained by the way grammatical sensitivity might interact with output-based activities to enhance production speed (i.e., speech rates). In this study, the target request-making forms were taught as sentence patterns containing several linguistic elements. In completing output-based activities, the learners needed to produce request utterances by filling the target request-making forms with new linguistic elements (i.e., appropriate verbs and nouns) according to specific scenarios. Because learners with higher levels of grammatical sensitivity were better at detecting and understanding the grammatical functions of the different linguistic elements of target request-making forms, they were also faster in putting together request utterances and articulating them than those with lower levels of grammatical sensitivity. Because the output-based activities repeatedly drew on one's grammatical sensitivity for producing requests, the output-based instructional condition tended to favor learners with higher grammatical sensitivity for improving production speed. As a result, grammatical sensitivity positively correlated with gains in production speech rates. In contrast, the input-based activities did not provide any opportunity for learners to take advantage of their grammatical sensitivity for improving the speed of producing request utterances, and this probably caused the lack of significant correlation between gains in speech rates and grammatical sensitivity for the input group.

The last significant (negative) correlation was between rote memory (RM) capacity and reductions in production planning times from pretest to immediate posttest. This means that larger RM learners made less reduction of planning times after engaging in output-based activities than smaller RM learners. In this study, after receiving the metapragmatic instruction, larger RM learners were *already* fast in planning oral productions (at pretest) prior to output-based practices because they had the target request-making forms readily accessible (thanks to their larger rote memory capacity). In support of this observation, Table 6 shows that larger RM learners mostly used shorter (i.e., below-average) planning times at pretest. Hence, larger RM learners had little room to improve on planning speed during the subsequent output-based practices. In contrast, after the metapragmatic instruction session, the smaller RM learners were relatively slow in planning oral production at pretest because the targeted forms were less readily available for them (due to their relatively limited rote memory capacity). Again, Table 6 shows that smaller RM learners mostly used longer (i.e., above-average) planning times at pretest. The smaller RM learners thus had more room to improve during output practices. In other words, output practices had a larger effect on smaller RM learners than on larger RM learners in terms of reducing planning times (i.e., improving planning speed). The results in Table 6 provides support to this conclusion, because larger RM learners mostly made less (i.e., below-average) reduction of planning times, whereas smaller RM learners mostly showed more (i.e., above-average) reduction. The negative correlation between RM and reduction in planning times is thus not surprising.

Because previous studies on the role of grammatical sensitivity and rote memory in mediating the effects of instructed L2 learning (e.g., Erlam 2005; Hwu et al. 2014; S.F. Li 2013) generally focused on measures of performance accuracy (rather than performance speed), and because these studies almost exclusively targeted grammatical features (instead of pragmatic features), it would be difficult to directly compare their findings to the results reported in this study. Nevertheless, this study suggests that including the speed dimension of L2 performance (in addition to the accuracy dimension) may allow researchers to gain a fuller picture of whether and how grammatical sensitivity and rote memory can affect instructional effects on learning L2 grammar and other L2 features (e.g., vocabulary, and pragmatics).

In this study, because the input-based and the output-based instructional conditions both started out with metapragmatic explanations, followed by either receptive or productive practice activities, they belonged to the generic instructional category of explicit rule learning as defined by Robinson (2001, 2007). While Robinson's framework hypothesized that all four FL aptitudes (three included in this study) would interact with this generic instructional condition to affect learning outcome, the results reported here showed that the mediating effects of these aptitudes varied across instructional conditions (i.e., input-based, output-based) and depended on the nature of outcome measures (i.e., performance accuracy and performance speed). Specifically, we found: (a) the input-based condition favored learners with larger working memory capacity for reducing judgment response times; (b) the output-based condition benefited learners with lower rote memory capacity for reducing production planning times; it also favored those with higher grammatical sensitivity for gaining production speech rates; and (c) no FL aptitude was implicated in gains in judgment and production accuracy across instructional conditions. In the context of this study, which provided a total of 16 scenarios for practicing using the target pragmatic features, one can say that the effects of interaction between FL aptitudes and (explicit) instructional conditions are highly limited (if not completely non-existent) on gains in pragmatic knowledge, which is susceptible to instruction; on the other hand, for gains in pragmatic processing ability, which is far less amenable to instruction with a relatively small amount of practice opportunities, FL aptitudes differentially interact with different modalities of instruction to influence learning outcome. As such, this study highlights the importance of considering the nature of outcome measure as well as the modality of instructional conditions for future aptitude-treatment interaction research on instructed L2 learning.

6 Pedagogical implications and limitations

The findings of this study can inform pedagogy by highlighting the importance of considering learners' FL aptitude profiles in understanding the effectiveness of different instructional conditions for specific teaching objectives. For example, if the goal of instruction is to enhance performance accuracy in both listening judgment and oral production of request utterances, learners' FL aptitude profiles (as measured in this study) are unlikely to influence instructional outcomes. However, if fluency of judgment and production is also part of the goal of teaching, instructors will need to choose and conduct instruction in relation to learners' FL aptitude profiles. For instance, in order to enhance the speed of listening judgment (i.e., to reduce response times), instructors may want to choose input-based activities (rather than output-based activities) and provide more practice opportunities for learners with smaller working memory capacity (consider the positive correlation between working memory capacity and reduction in judgment response times reported above). Likewise, for the purpose of increasing the speed of oral request production, instructors may want to choose output-based activities (instead of input-based activities) and offer additional practice opportunities for those with relatively low grammatical sensitivity (consider the positive correlation between grammatical sensitivity and gains in production speech rates). In both scenarios, for learners with more favorable FL aptitude profiles under specific instructional conditions (e.g., larger working memory capacity under the input-based condition), they can be given a relatively small amount of learning activities for targeted performance benchmarks, and this, in turn, can allow more time for these learners to work on other aspects of pragmatic performance. This kind of individualized instruction based on learners' FL aptitude profiles can thus optimize teaching resources for targeted instructional goals.

Due to its exploratory nature, this study is limited in several aspects, and the generalizability of its findings needs to be investigated through future research efforts. The first limitation is the relatively small sample size for the two treatment groups. Hence, the results reported here need to be confirmed with larger learner groups. Second, due to the lack of valid instrument for measuring the speed of working memory for text, this FL aptitude, although included in Robinson's framework, was not examined in this study. This made it difficult for this study to directly test Robinson's theorization of aptitude-treatment interaction for the generic condition of explicit rule learning. Hence, as Skehan

(2015) observed, advances in aptitude-interaction research for instructed SLA will partially rely on the development of valid FL aptitude tests in the future. Finally, specifically for aptitude-treatment interaction research on instructed L2 pragmatics learning, an interesting question remains as whether there are different types of FL aptitudes that are more specifically related to pragmatics learning, and if yes, how these aptitudes would mediate instructional effects. Robinson (2005) proposed several such pragmatics-specific aptitude factors (e. g., non-verbal sensitivity, interactional intelligence), and these should be included in future aptitude-treatment interaction studies on L2 pragmatics learning.

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