The effect of Japanese proficiency and lexical accessing speed on the comprehension of indirect speech act in L2 Japanese

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Abstract: This study examined the comprehension accuracy scores and response time of indirect speech act by 63 native Chinese speakers learning Japanese, and discussed the effect from Japanese proficiency, as well as the speed of lexical access. The results showed that: (1) Japanese proficiency effects the accuracy rate of indirect speech act, the higher the Japanese proficiency, the higher the accuracy rate. However, there is no clear linear relationship between the learners' Japanese proficiency and the indirect speech act's response time. (2) The lexical accessing speed effects the learners' response time of indirect speech act, the faster the accessing speed is, the shorter the indirect speech acts' response time. The lexical accessing speed also affects the comprehension accuracy rate of the high-level learners. The faster the lexical accessing speed of the high-level learners, the higher the comprehension accuracy rate.

1. Introduction

Indirect speech act is defined as: the implementation of an illocutionary act is accomplished by the implementation of an indirect speech act (Shimizu Takafumi, 2009) [1]. For example, A sent B an invitation "konya, eiga wo miniikou (Let's go to see a movie tonight)." And B answered "shikenbenkyou wo shinakerebanaranainda (I have to study for the exam)." Outwardly, B just described his actual situation, but his answer is usually taken as a rejection to A, that is, the implicit meaning of rejection is realized through the implementation of the indirect speech act of stating reasons. Based on various communicative purposes, the way of expression adopted by speakers is not always direct and clear, but mostly conveys the intention of speech in implicit forms such as indirect speech act mentioned above. Therefore, it is essential for the hearer to understand the communicative intention from the speaker's utterance. However, the same form of language, when used in different situations, will produce different communicative intentions. People from same language community may still have problem in understanding and responding another's intention. It is safe to make an assumption that it would be even more difficult for foreign language learners

who have grown up in a different language and culture. In intercultural communication, if the hearer misunderstands speaker's intention, it is more easily to cause the negative evaluation on his/her attitude, politeness and other aspects of personality than "language ability being questioned", which may eventually lead to interpersonal friction. Based on the experimental pragmatics research method, this paper investigates the comprehension ability of indirect speech act of Japanese major students from two dimensions of accuracy and response time, and discusses the effect of Japanese proficiency and the lexical accessing speed on their comprehension.

2. Background

2.1. The effect of foreign language proficiency on indirect speech act comprehension

Taking English as the target language, Cook & Liddicoat (2002) [2] investigated 100 English learners' comprehension of direct request, conventional indirect request, and non-conventional indirect request, and found that learners with higher English proficiency showed the higher comprehension accuracy of indirect speech act. Taguchi (2005) [3] investigated 160 English learners' comprehension of indirect refusal, conventional indirect request, and non-conventional indirect request, and found that learners with high English proficiency had higher comprehension accuracy of indirect speech act, but the comprehension speed of them was not significantly faster than learners with low proficiency. Taguchi (2008) [4] surveyed 63 Japanese learners on their comprehension of indirect refusal, conventional indirect opinion, and non-conventional indirect opinion. It is found that the comprehension accuracy of intermediate-level students is higher than that of elementary-level students, which supports the view that Japanese proficiency affects the comprehension accuracy of indirect speech act, but it is not found that Japanese proficiency affects the comprehension speed of learners. While that study explored the effect of Japanese proficiency, its demarcation of Japanese proficiency was based on how long time learners had spent on studying Japanese, rather than on an actual test. Considering that longer learning time does not necessarily mean higher Japanese proficiency, future studies need to explore the effect based on actual tests of learners' Japanese proficiency.

2.2. The effect of foreign language lexical accessing speed on indirect speech act comprehension

Taguchi (2007) [5] believed that lexical accessing speed may be a cognitive factor affecting learners' comprehension of indirect speech act. This is because the comprehension of indirect speech act, which is a pragmatic comprehension process, involves the interaction between low-level processing and high-level processing. Low-level processing refers to paying attention to the phonetic information and processing the semantic meaning of words and short sentences, while high-level processing refers to deducing the speaker's intention hidden behind the conversation based on background knowledge and schema. Lexical accessing speed represents the efficiency of lexical semantic accessing and is the basis of supporting pragmatic comprehension. Rapid accessing to lexical semantics makes it easier to integrate related information, thus promoting effective comprehension of the whole text. Taguchi (2007) [5] found that learners' English lexical accessing speed was related to their comprehension speed of indirect speech act, while Pérez (2017) [6] found that learners' English lexical accessing speed was related to the accuracy rate of some indirect speech act comprehension tasks. However, the studies mentioned above have the following problems: (1) In Taguchi's study, the Lexical Access Test, which tests learners' lexical accessing speed, uses the text stimuli, while the indirect speech act understanding experiment uses the auditory stimuli. Although the results show that there is a correlation between lexical accessing

speed and indirect speech act comprehension speed, the inconsistency of stimuli presentation methods in the two tests may affect the reliability of the results. (2) Taguchi and Perez's studies explored the relationship between learners' lexical accessing speed and their indirect speech act comprehension based on correlation analysis, but correlation does not represent causality and cannot prove the effect of lexical accessing speed on indirect speech act comprehension. Therefore, future research should unify the way of stimuli presentation and modify statistical analysis method.

Based on the above background, this study aims to investigate comprehension of Chinese students in Japanese major about indirect speech act from two dimensions of the comprehension accuracy scores and the response time, and further discusses the effect of learners' Japanese proficiency and lexical accessing speed on their indirect speech act comprehension.

3. Methodology

3.1. Participants

Participants in this study were 63 Japanese major students enrolled in a foreign language university. 16 of them are sophomores, 23 are juniors and 24 are seniors. The average age of the 63 participants was 20.72 ($SD = 1.07$). Six students participated in a 3-month internship in Japan.

3.2. Instrumentations

3.2.1. Japanese Pragmatic Listening Test

The Japanese Pragmatic Listening Test from Taguchi (2008) [4] was modified to investigate the indirect speech act comprehension of the participants. The test consists of 12 conventional indirect opinion items, 12 non-conventional indirect opinion items, 12 indirect refusal items, and 12 distractor items formed by direct speech acts. Each item consists of a conversation spoken by a male and a female, a question and four answer options based on the conversation. The indirect speech act sentence is set as the last turn of the conversation.

This study made the following modifications to the test question. The first is the use of vocabulary in the conversation. Considering that the participants of this study are Chinese students majoring in Japanese, author made the following changes (Figure 1) to the loanwords conducted by Taguchi (2008) [4].

Taguchi (2008c)	Current study
400 番のクラス （400th class）	1 限の授業
ライティングアシスタント （writing assistant）	作文指導
エッセイ （essay）	レポート
ミッドターム （mid-term）	中間テスト

Figure 1: Changes to the loanwords

The second is the presentation method of the items. Taguchi (2008) [4] adopted the form of multiple choices questions to test learners' comprehension. Considering that the questions and the four answer options were presented in text, the response time would be affected by learners' Japanese reading speed and the order of correct choices, so this study changed it to the form of "YES/NO" judgment. Specifically, at the beginning of each item, a Japanese statement sentence was presented in text, followed by auditory presentation of a male and a female dialogue. The last sentence of the dialogue was an indirect speech act sentence, and the participants were asked to

judge whether the statement sentence was correct or not according to the content of the dialogue. Comprehension time is the time from the end of the conversation to the participant's decision of YES/NO. The statement sentence in 24 items were consistent with the intention conveyed by the indirect speech act sentences (YES judgment), while the statement sentences in 24 items were opposite to the intention conveyed by the indirect speech act sentences (NO judgment). In the end, three Japanese native speakers were invited to revise the sentences and dialogues of a male and a female. The author invited two Japanese native speakers, a male and a female, to make the recording of dialogues.

3.2.2. Japanese Proficiency Test

The Japanese proficiency of the participants was measured by cloze test of Kazuko Komori et al. (2007) [7]. This test includes 585 characters, and 86 Spaces need to be filled. The participants are required to fill a kanji or kana in each space to ensure the whole text is integrated. Kazuko Komori et al. (2007) reported that the reliability coefficient of this test is 0.95, which is very high.

3.2.3. Lexical Access Test

The lexical access test consisted of practice and a formal experiment in which the auditory stimuli are used. The stimuli in the formal experiment included 43 living and 43 non-living nouns. The experiment unified the difficulty, frequency of use, and number of moras of living and non-living nouns. Specifically, first of all, according to the retrieval results of Japanese language reading tutorial system Reading Tutor, the difficulty of two groups of stimuli is limited to 21 nouns in level 2 or 3, 9 nouns in level 4, and 8 nouns in level 5. Only 5 stimuli in each group are too difficult to retrieve corresponding level in Reading Tutor. Secondly, using the Word Frequency Web-accessible Database and Search Engine to retrieve every stimulus, it turns out that stimuli of two groups do not exist significant differences in the use of frequency [t (84) = 1.26, p=.21]. Finally, there was no significant difference in the number of moras between the two groups [t (84) = 0.28, p=.78]. As this experiment is presented auditorily, the author tries to avoid using homophones when choosing stimuli. For the 27 homophones that the author had no choice but to use, Japanese native speakers and Chinese advanced Japanese learners were asked to confirm, that is, "When hearing these stimulating sounds, only the words used in the experiment can be remembered instead of any other words". After all the stimuli were selected, a female Native speaker of Japanese was invited to record all the stimuli.

3.3. Procedures

The Japanese Pragmatic Listening Test and the Lexical Access Test were generated with E-Prime 3.0. In the Japanese Pragmatic Listening Test, the fixation point "+++++++" appeared on the computer screen at first and then disappeared 350 milliseconds later, followed by a Japanese statement sentence in text presentation. The participants were asked to read the statement sentence carefully, understand it, and memorize it (there was no limit on reading time). When the participants were sure they understood it, they pressed the space key and then a Japanese dialogue of a male and a female began. After listening to the dialogue, they were asked to judge whether the statement sentence is correct or not as quickly and accurately as possible. The time between the end of the dialogue and the participants pressing the "judge" key and the result whether the judgment is correct or wrong are recorded automatically by the computer. There was a 300-millisecond interval between the stimuli. Before the formal experiment, the author explained the test to the participants and guided them to do two practice items.

After the Japanese Pragmatic Listening Test, the Lexical Access Test was performed. First, a

fixation point "+" appeared in the center of the computer screen and disappeared 250 milliseconds later, followed by sound of stimuli. Participants were asked to press the "living" and "non-living" keys as quickly and correctly as possible to indicate their judgments of the words they heard. The computer automatically recorded the time between the onset of each stimulus and the subjects' judgments, as well as the judging result. Before the test, the author explained the concepts of living and non-living to participants through examples, and told participants that the stimuli of this experiment did not contain plant nouns. After that, participants were guided to practice. After the practice, the author confirmed participants' understanding of living nouns and non-living nouns correctly before performing the formal experiment. There was an interval of 600 milliseconds between the stimuli. Finally, the Japanese proficiency of 63 participants was measured by group test for 4 times.

4. Results

4.1. Results of Japanese Proficiency Test

Table 1 summarizes the descriptive statistics of the number of correct judgment items in the Pragmatic Listening Test. As the 12 direct speech act items were only used as the distractor in the test, the results are not listed here. In all 2,268(63 participants*36 items) items, 1914 were judged correctly. Table 2 summarizes the descriptive statistics of the response time of 1,914 correct judgment items in the Pragmatic Listening Test.

Table 1: Descriptive statistics of the number of correct judgment items in the Pragmatic Listening Test

	M	*SD*	*Max*	*Min*
Indirect refusal(*k*=12)	10.70	1.43	12	6
Conventional indirect opinion(*k*=12)	10.02	1.68	12	4
Non-conventional indirect opinion(*k*=12)	9.67	1.49	12	5
In total(*k*=36)	30.38	3.58	36	17

N= 63. *k*= the number of items.

Table 2: Descriptive statistical of the response time of correct judgment items in the Pragmatic Listening Test (Unit: ms)

	M	*SD*	*Max*	*Min*
Indirect refusal(*k*=674)	1,139.20	1,325.72	11,922	18
Conventional indirect opinion(*k*=631)	1,250.89	1,661.67	24,388	37
Non-conventional indirect opinion(*k*=609)	1,268.69	1,566.97	17,197	36
In total(*k*=1,914)	1,217.22	1,520.32	24,388	18

4.2. Grouping according to the results of Lexical Access Test and Japanese Proficiency Test

Based on the response time data recorded by computer, the author calculated the average accessing speed of correct judgment items in each participant's 86 stimuli (unit: *ms*), 63 participants were divided into fast group 21 (*M*=1,076.45, *SD*=99.46, *Min*=806.51, *Max*=1,184.19) and medium group 21 (*M*=1,383.43, *SD*=97.43, *Min*=1,271.71). *Max*=1,578.67) and 21 participants in slow group (*M*=1,861.48, *SD*=183, *Min*=1,609.21, *Max*=2,228.50). According to the one-way analysis of variance, the lexical accessing speed of the above three groups is significantly different [F (2, 60) = 186.48, p<.001], that is, the grouping is effective.

The Japanese Proficiency Test is graded according to the principle of "1 point for correct

answers, no point for wrong answers". Based on the score, 63 participants were divided into high group of 20 participants (*M*=62.80, *SD*=4.99, *Min*=58, *Max*=74), middle group of 19 participants (*M*=52.00, *SD*=3.42, *Min*=47, *Max*=57), low group of 24 participants (*M*=39.83, *SD*=5.18, *Min* =30, *Max* =46). Based on the one-way analysis of variance, the Japanese proficiency of the three groups was significantly different [$F (2, 60) = 133.65$, $p <.001$], that is, the grouping was effective.

4.3. Results of decision tree analysis

In order to investigate the effect of learners' Japanese proficiency and lexical accessing speed on their indirect speech act comprehension, the author took the above two factors as independent variables, the accuracy and response time of indirect speech act comprehension as dependent variables respectively, and conducted two decision tree analysis with SPSS 22.0.

4.3.1. Analysis results of accuracy

The results of decision tree analysis are shown in Figure 2, using Japanese proficiency and lexical accessing speed to predict the accuracy of indirect speech act comprehension. The average correct rate of 63 participants is 84.39%.
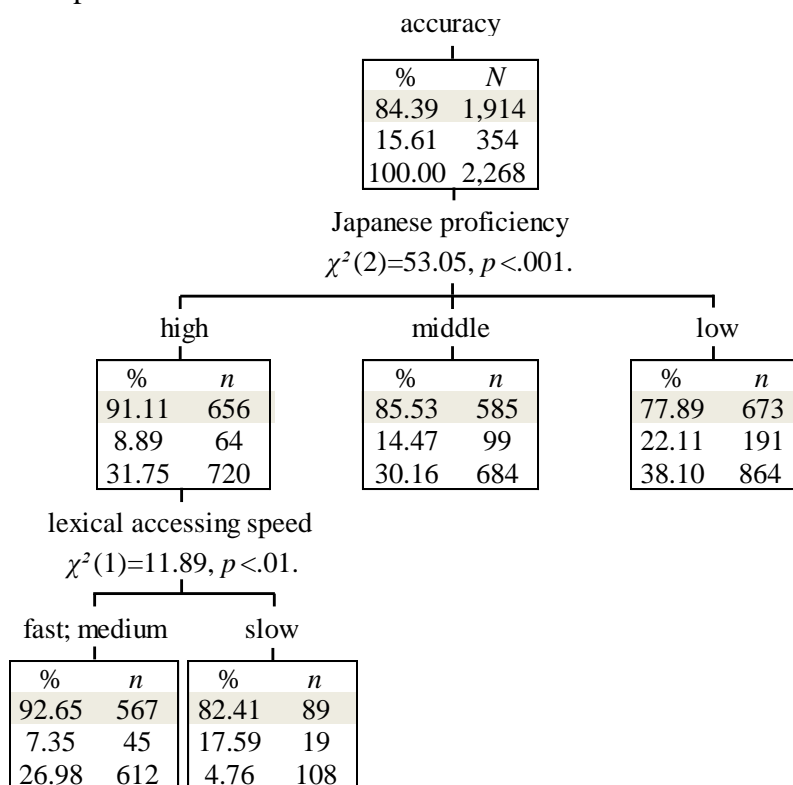

Figure 2: Decision tree analysis to predict the accuracy of indirect speech act comprehension

First of all, the influence of Japanese proficiency was the strongest, and the difference between high, middle and low groups was significant [$\chi^2 (2) = 53.05$, $p<.001$.]. The correct rate from high to low was high group (91.11%), middle group (85.53%), low group (77.89%). This indicates that learners' comprehension ability of indirect speech act is from a high starting point, and gradually increases with the improvement of Japanese proficiency.

Secondly, the comprehension accuracy of high group learners was further affected by the lexical accessing speed. The high group with fast and medium lexical accessing speed (92.65%) had higher

comprehension accuracy than the high group with slow lexical accessing speed (82.41%). The comprehension accuracy of middle group and low group was not affected by lexical accessing speed.

4.3.2. Analysis results of response time

Only the data of correct judgment items were used in response time data analysis. 9 extreme values contained in 1,914 data were eliminated. Thus, 1,905 response time data were ultimately used. Figure 3 shows the results of predicting the response time of participants in terms of their Japanese proficiency and lexical accessing speed.

response time（after logarithmic transformation）

M	6.61
SD	0.95
N	1,905

lexical accessing speed
$F(2, 1902)=168.74, p<.001.$

fast

M	6.14
SD	0.87
n	645

medium

M	6.65
SD	0.86
n	628

slow

M	7.04
SD	0.90
n	632

Japanese proficiency
$F(2, 642)=11.79, p<.001.$

Japanese proficiency
$F(1, 626)=12.80, p<.01.$

Japanese proficiency
$F(1, 630)=12.76, p<.01.$

low

M	5.97
SD	0.73
n	219

high

M	6.18
SD	0.87
n	367

middle

M	6.56
SD	1.18
n	59

high

M	6.47
SD	0.89
n	197

middle;low

M	6.73
SD	0.83
n	431

high;middle

M	6.91
SD	0.86
n	313

low

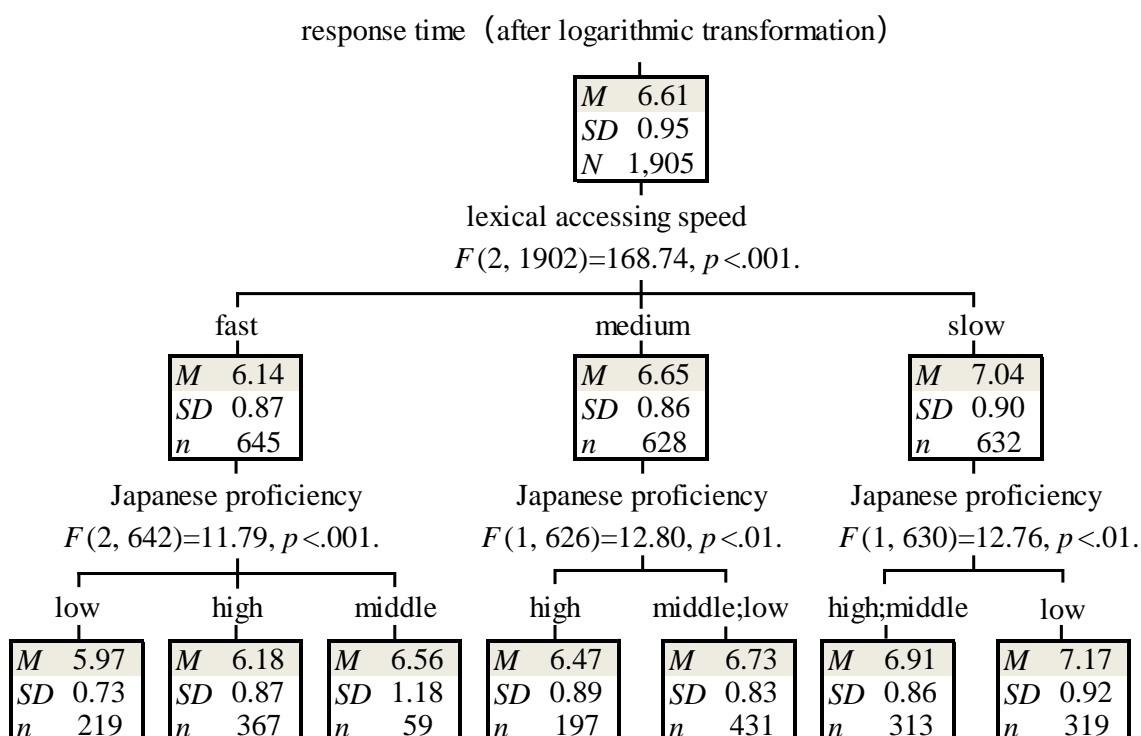| M	7.17
SD	0.92
n	319

Figure 3: Decision tree analysis to predict the response time of indirect speech act comprehension

First of all, the lexical accessing speed was most strongly effected by the response time [$F(2, 1902) = 168.74, p<.001.$]. The learners with the fastest lexical accessing speed also had the shortest response time (6.14), followed by the learners with the medium lexical accessing speed (6.65), and finally the learners with the slowest lexical accessing speed (7.04).

Secondly, it is unpredictable for the effect of Japanese proficiency on the speed of indirect speech act comprehension. For the learners with the fastest lexical accessing speed [$F(2, 642) = 11.79, p<.001.$], the low group had the shortest response time (5.97), then the high group (6.18), and the middle group (6.56). In terms of learners with midium lexical accessing speed [$F(1, 210) = 5.95, p<.05.$], the response time of the high group (6.47) was significantly faster than that of the middle group and the low group (6.73). For the learners with the slowest lexical accessing speed [$F(1, 630) = 12.76, p<.01.$], the response time of high group and middle group (6.91) was significantly faster than that of low group (7.17).

5. Discussion

5.1. The effect of Japanese proficiency

Learners' Japanese proficiency affect their accuracy of indirect speech act comprehension, that is, the higher the Japanese proficiency is, the higher the comprehension accuracy of indirect speech act is. This conclusion is consistent with the results of Cook & Liddicoat (2002) [2] and Taguchi (2005, 2008) [3]-[4]. As mentioned above, although the previous research explored the effect of Japanese proficiency on learners' indirect speech act comprehension, the demarcation of Japanese proficiency is based on the length of Japanese learning rather than actual test scores. Based on the actual test of the Japanese proficiency of learners, this study confirmed the effect of it on the accuracy of indirect speech act comprehension. In fact, the relationship between the second language pragmatic competence and second language proficiency is hot topic in interlanguage pragmatics. Some empirical studies have found that the higher the second language proficiency is, the higher the pragmatic competence is, but some research believed the second language level has no forecasting function for pragmatic competence. Taking the comprehension of indirect speech act as an example, this study investigates the pragmatic comprehension ability of Japanese learners, and the results support the view that the second language proficiency promotes pragmatic competence. In this study, the task of indirect speech act comprehension uses auditory presentation, which requires immediate understanding of related vocabulary and grammar. The learners with higher Japanese proficiency, who had richer knowledge of vocabulary and grammar, were able to realize automatic processing immediately, and thus had sufficient attention to deduce the speaker's intention. Therefore, cultivating learners to master solid language knowledge is the basis of improving their accuracy rate of pragmatic comprehension. However, the effect of Japanese proficiency on response time is unpredictable, which cannot indicate that learners' Japanese proficiency have influence on the comprehension speed of indirect speech acts. This result supports the conclusion of Taguchi (2005, 2008) [3]-[4].

5.2. The effect of lexical accessing speed

First, the lexical processing speed affects learners' comprehension speed of indirect speech act. This indicates that the semantic processing of words is an important part of low-level processing in pragmatic comprehension, and the faster the processing speed is, the faster the learners' pragmatic comprehension speed is. So far, few studies have investigated the effect of Japanese lexical accessing speed on indirect speech act comprehension. As mentioned above, although the research of Taguchi (2007) [5], where English was taken as the target language, proved the correlation between learners' lexical accessing speed and their comprehension ability of indirect speech acts, Taguchi tested learners' English lexical accessing speed by using text presentation. Meanwhile, auditory presentation is used to test learners' comprehension of indirect speech act. So there is no unity in stimuli presentation method. In addition, based on the statistical results of correlation coefficient, Taguchi pointed out that lexical accessing speed is related to the comprehension speed of indirect speech acts. However, correlation does not represent causality, and it cannot be proved that learners' lexical accessing speed has an effect on the comprehension speed of indirect speech acts. In this study, the original Lexical Access Test was conducted to test learners' Japanese lexical accessing speed through auditory presentation, which was consistent with the stimulus presentation method of the Pragmatic Listening Test. What's more, decision tree analysis is used to verify the effect of Japanese lexical accessing speed on indirect speech act comprehension speed. The lexical accessing speed measured in the Lexical Access Test represents the ability of the learners to obtain semantic meanings quickly and correctly from the mental dictionary. Fast and correct lexical

accessing ability can accelerate the process that learners' understand the content of auditory presentation, and thus promote their inferential speed of the speaker's intention. In addition, the speed of lexical accessing affected the accuracy of indirect speech act comprehension of learners in high group. This result supports Pérez's (2017) [6] conclusion. For the high group of learners, the faster the lexical accessing speed is, the higher the accuracy of indirect speech act comprehension is. This result reflects the cognitive pattern of low-level processing (lexical accessing speed) promoting high-level processing (pragmatic comprehension accuracy), that is, the automatic lexical accessing of the learners with high Japanese proficiency can directly accelerate the integration of various kinds of information in the speech, and then make correct pragmatic inference. Therefore, in the process of understanding auditory presentation of indirect speech act, the automatic processing of lexical semantics can accelerate the speed of understanding indirect speech acts and ensure the accuracy of understanding indirect speech acts. It follows then that, in order to enable learners to understand indirect speech act quickly and well, and thus to achieve smooth communication, it is effective to introduce training methods that can promote learners to automate their lexical accessing.

6. Conclusions

First, this study modified the Pragmatic Listening Test conducted by Taguchi (2008c), and generated the experiment based on E-Prime 3.0, a psychological experimental operation platform. This experiment can test the learners' Japanese pragmatic comprehension ability from the two dimensions of comprehension accuracy and response time. As a tool to test the pragmatic comprehension of Japanese learners, it is of positive significance to the development of Japanese pragmatic competence test. Secondly, the Lexical Access Test designed in this study can be used to test Japanese lexical accessing speed in the future. Finally, based on decision tree analysis method, this study explores the effects of learners' Japanese proficiency and lexical accessing speed on the accuracy and response time of indirect speech acts, and the conclusions can provide targeted suggestions for Japanese pragmatic teaching.

Acknowledgment

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