An Analysis on Language Accuracy through Grammatical Judgement Test[1]

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Kim, Kyung-Ryung. 2006. An Analysis on Language Accuracy through Grammatical Judgement Test. *The Linguistic Association of Korea Journal, 14*(2), 17–34. In this study, the Grammatical Judgement Test is utilized to measure the Error Rates (ER) and Reaction Times (RT) of 24 Chinese Students in a Korean Language School. A Visual–Basic based computer software is developed to run the test on computers. The measured data is used to find if there is a concrete relationship between ER and RT in several grammatical categories. In all grammatical categories, the relationship is found to be non-existent. The Error Rates (or accuracy) vary depending on grammatical categories. However, it is found that other variables that may affect ER and RT, such as gender and period of study, may affect the language fluency but not in a critical way.

Key Words: Language Accuracy,[2] Language Fluency, Error Rates Test, Grammatical Judgement Test, Gender Difference

1. Introduction

One of the fundamental issues on effectiveness of teaching Korean in the field is the following: What is the most effective way to improve Korean language learners' proficiency level in communicative language

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1) Analyses and discussions on the language 'fluency' from the same test can be found in Kim (2006). Some of the discussions in Kim (2006) are repeated in this paper to make the discussions flow.

2) In this paper, the language 'fluency' is defined as the reaction time to stimuli. In some papers, it is defined as a language proficiency or competence but its definition can be misleading when it is understood in a general sense. Therefore, it is redefined to suit to the purpose of this paper.

teaching in Korea? Rephrased, the issue is either to focus more on "form accuracy" or to focus more on "meaning fluency" in the classrooms of Teaching Korean as a Foreign Language (TKFL).

Until recently, the common teaching philosophy in Korean teaching that has been widely accepted is to assign more weight on the form accuracy. Examples of the "form focused" teaching are grammar or vocabulary memorizing. These days, however, weight is being shifted from the form accuracy to communicative skills based on meaning/functional fluency, responding to learners' practical demand.

Krashen & Terrell (1983) propose that explicit grammar instruction or error correction should be avoided as peripheral factors for the effective teaching method. They also argue that second language learners can acquire both language accuracy and fluency in the same manner as in the first language acquisition.

However, teachers who place too much emphasis on language accuracy, tend to sacrifice learner's language fluency. If teachers place too much emphasis on learner's communicative competence, students may not accomplish a high level of language accuracy. That is, it is a matter of a balancing these two factors, which is a crucial issue for Korean language teachers.

The above concern supports the recent proposals by the field educators on equilibrium level of accuracy and fluency. This is due to the fact that Korean grammar structure is more sophisticated than other languages and therefore more attentions have been paid to accurate use of the language. However, the current fluency focused teaching may undermine this characteristics of Korean language in the language education. In addition, it is reported that improvement of accuracy is not easily achieved even when learners reach a higher level and habitual expressions acquired in the interim language process tend to work against learning process (Daughty, 1998; Ebsworth, 1999; Harmmerly, 1991). All these concerns led to the question on an appropriate level of acceptance for meaning focused instruction.

The primary questions that this study tries to address are 1) how Korean language learners acquire language accuracy in the field where the

meaning focused instruction dominates 2) whether a balance between accuracy and fluency is developed 3) what factors affect accuracy and fluency acquisition. For more concrete and objective answers to these questions, language experiments on reaction time and error rate are executed.

2. Literature Review

According to the traditional teaching methodology, emphasis has been put on understanding grammatical forms in Korean classrooms. Language learners generally have been challenged to memorize numerous lexical and grammatical items depending on the different levels by using reading materials.

Focusing on form theory have influenced for a long period of time in various areas such as teaching method, developing course material, etc (Celce-Murica, 1985; Stern, 1984). But this resulted in skepticism because language learners are not able to communicate at all in a real conversation. As an opposite reaction to this problem, meaning theory gained ground in classrooms, where teachers try to focus on communication skills by using various materials (Fotos, 1998; Fotos & Ellis, 1991).

Nunan (1998) emphasizes that teachers have to balance both areas in order to facilitate language acquisition. Lightbrown & Spa (1990) argue that both language accuracy and fluency can be acquired simultaneously without sacrificing another. They created the combined instruction of grammar based communicative activities and facilitate this activities in the classroom. They found that students in the class showed a better performance than the other students in both language fluency and accuracy.

However, it is not easy to harmonize language fluency and accuracy during language instruction. Form focused approach has a potential danger when instruction is given in isolation of meaningful learning while implementing meaning based approach has a potential danger not to correct oral errors at an appropriate timing.

In the field of TKFL, meaning based approaches are being introduced and several studies on the result are published (원진숙, 1992; 이계순,1982). In the literature, adverse effects of meaning based approach are being reported such as disregarding formal aspects of Korean. It is implicative for Korean language education for which various grammatical forms are ubiquitous. Therefore, it is claimed that, in the long run, Korean learners may experience difficulties.

Chuanren (1992) found that students who fail to progress on in their language level have difficulties in improving language accuracy beyond a particular level. In the study, it is claimed that language accuracy plays a very important role in achieving a high level of linguistic proficiency. Even though all these hypotheses and conjectures may be reasonable, they are not tested objectively using a field data. Without quantitative data from language experiments, the exact relationship between accuracy and fluency remains ambiguous, along with the factors that affect accuracy and fluency.

In this study, the accuracy and fluency are estimated through a reaction time test.[3] Also, the relationship between accuracy and fluency is presented, considering factors such as duration of study, self evaluation (self confidence) and others, to draw implication on TKFL.

3. Methodology

3.1. Participants

Twenty four native Chinese speakers (13 female and 11 male) who learn Korean as a second language in Korea participated in this study.[4] Their actual ages ranged from 19 to 26. All participants attend a Korean

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3) A computer software is developed to run the test.

4) As mentioned in Kim (2006), 32 Chinese students and 5 Korean students (control or a standard for comparison) are tested. Test results of 8 Chinese students are found to be unusable due to insincerity of the participating students, finishing the test too fast by giving arbitrary answers.

language institute which is managed by a university in Korea.[5] Participants were analyzed for both proficiency level and study period[6] in Korea (6 months, 12 months and over 12 months).

5 native Korean speakers (2 females and 3 males) participated in this study as a control. All of them are undergraduate students at a university and their actual ages ranged from 21 to 26.

3.2. Grammatical Judgement Test

Test sentences were presented to participants using a reaction time program. The idea of the software is originated from Cheng (1996) but the program used in this study is developed using Visual Basic for Windows. This program records reaction times by one millisecond (0.001 sec) and also measures the error rates simultaneously.

The test sentences consist of 120 Korean sentences that are divided into grammatical and ungrammatical categories and they appear randomly on the computer screen. Participants are requested on the screen to click on either "true" or "false" button, reacting to each sentence. Each participant is supposed to answer all of 120 sentences.

The computer program measures the reaction times (the time difference between the test sentence pop-up and click) and report how many correct answers are given at the end of the test for error rate estimation. Based on the measured error rates, each Chinese learner's Korean accuracy for each sentence are acquired. These individual measures are used to present group accuracy by categories.

To relate the accuracy level to individual characteristics, questionnaires

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5) The name of the Institute is suppressed for anonymity of the author and review process.

6) To be statistically consistent, an uniform background of language is needed to compare the language performances among the participants (We can't compare the taste of apples and oranges and judge apples are more delicious than oranges, for example). Among foreigners learning Korean in Korea, Chinese learners are most common, which makes Chinese learners the most attactive samples for the analysis. Also study period in this experiment means the duration of studying Korean 'in Korea.'

are circulated to participants. In the questionnaire, the participants were asked basic question at first: age, gender, educational background, etc. Then, they were asked to rate their proficiency on a scale of 1 to 10. They also replied to other questions such as study period, motivation, learning methodology, etc. Similar questionaries were used for the native Korean group, too.

4. Results and Statistical Significance of the Results

Figure 1 presents the mean error rates for grammatical categories. Among the grammatical categories, 'tense' was the most difficult (highest in Error Rate) category for the Chinese group. The 'word ending inflection', 'honorific', 'word order, 'particles' were the difficult category in that order. In grammatical categories, 'particles' and 'word ending inflection' were usually difficult category for the foreign learners but this data is generally based on the learner with various national backgrounds. In this study, Chinese group was more challenged in the category of 'tense' than 'particles' or 'word ending inflection'.

Figure 1. Mean Error Rates for Chinese by Grammatical Categories
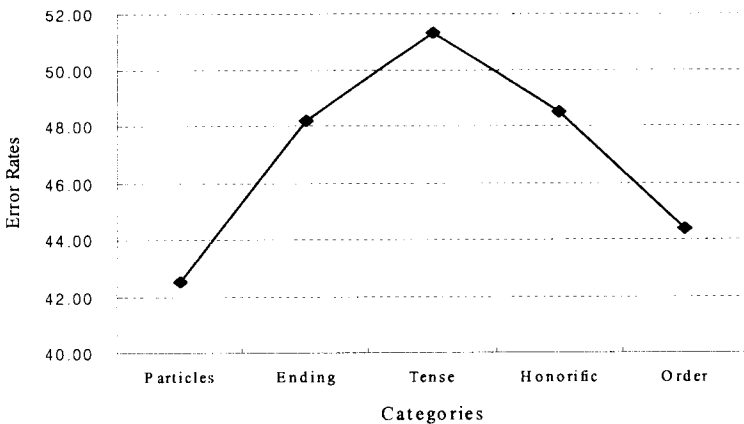
In Figures 2-1, 2-2, 2-3, 2-4, and 2-5, the scatter-plots for accuracy and fluency for each categories of 'particles', 'word ending', 'tense', 'honorific', and 'word order' are presented for more detailed analyses.[7]

The control group (Korean participants) show similar levels of ER (Error Rate) across all grammatical categories. Also a positive relationship between accuracy and fluency is found in the control group as in Kim (2006). However, in contrast to the control group, Chinese group show different level of ER depending on different grammatical categories (Figure 1). More detailed discussions by category are followed next.

Similar interpretation can be done for each grammatical category. In Figure 2-1, the relationship between reaction time and error rate for the grammatical category of 'particles' is shown.

Figure 2-1. Reaction Time and Error Rates for Chinese in 'Particles'
Correlation Coefficient(CC) = -0.0292
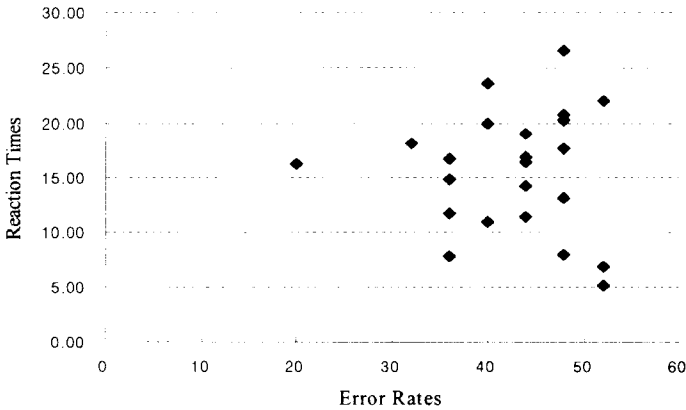
The range of reaction time is between 5.12 and 26.6 seconds. The range of error rates is between 20 and 52. The Correlation Coefficient

7) In Kim (2006), only the over all relationship in all grammatical categories is presented. In this study, the relationships between fluency and accuracy in each grammatical category are presented separately.

(CC) is a mere -0.0292, which is smaller than overall CC.[8] It is safe to assume that the relationship between the reaction time (fluency) and error rate (accuracy) for particles is negative but weak.

Figure 2-2. Reaction Time and Error Rates for 'Word Ending Inflection'
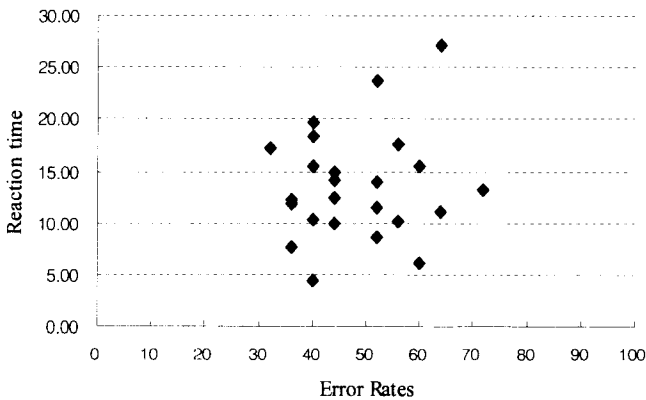Correlation Coefficient(CC) = 0.1372

Figure 2-2 indicates the RT and ER for the category of 'word ending inflection'. The CC is 0.1372, which implies error rate and reaction time is positively correlated and the relationship is 13.72% strong. That is, for word ending category, reducing reaction time (improving fluency) will even reduce error rate (improving accuracy). This is contrary to the common belief that to improve accuracy, one may have to sacrifice fluency (CC should be close to -1).

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8) Correlation Coefficient (CC) presents a level of relationship between two variables. If CC is close to 0, there is no relationship. If CC is close to -1, there is a negative relationship. If it is close to 1, there is a positive relationship. Also a low CC does not imply low significance of the result. CC is closely related to R^2 in regression analysis where it represents the degree of explanatory power of independent variables on dependent variable. Thus a low R^2 may imply low statistical significance of the model, whereas a smaller CC simply presents a degree of a relationship.

Figure 2-3. Reaction Time and Error Rates for 'Tense'
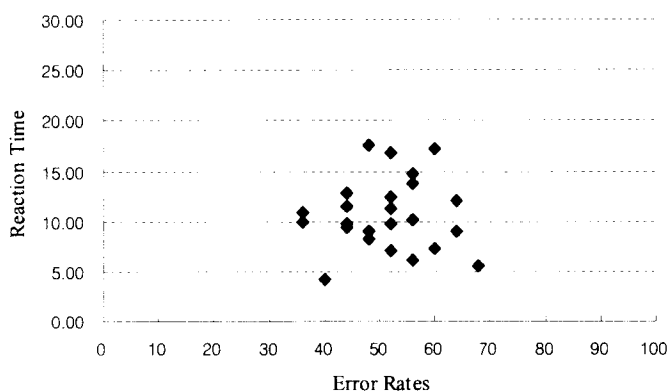Correlation Coefficient(CC) = 0.0239

Figure 2-3 shows the relationship between reaction time rate and error rate for the grammatical category of 'Tense' and Figure 2-4 show the relationship between reaction time rate and error rate for the grammatical category of 'honorific'. The CC for Tense is 0.0239 and CC for 'honorific' is -0.1345. Similar interpretations are possible.

Lastly, Figure 2-5 shows the relationship between reaction time rate and error rate for the grammatical category of 'word order'. This result is worthy of attention because the CC for ' word order' is the highest (-0.3198). This, again, means the relationship between error rate and reaction time for 'word order' is negatively correlated (if one increases, the other decreases, or vice versa).

Figure 2-4. Reaction Time and Error Rates for 'Honorific'
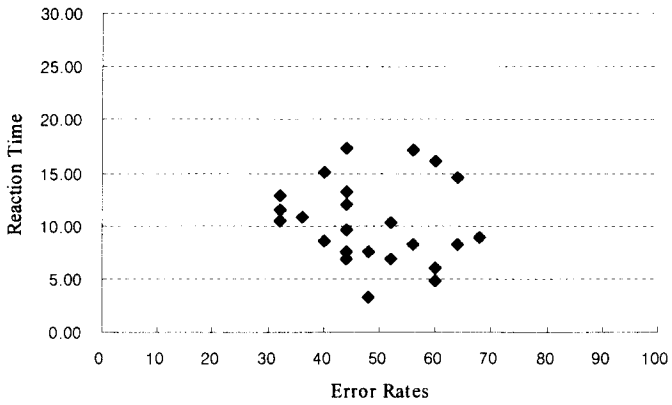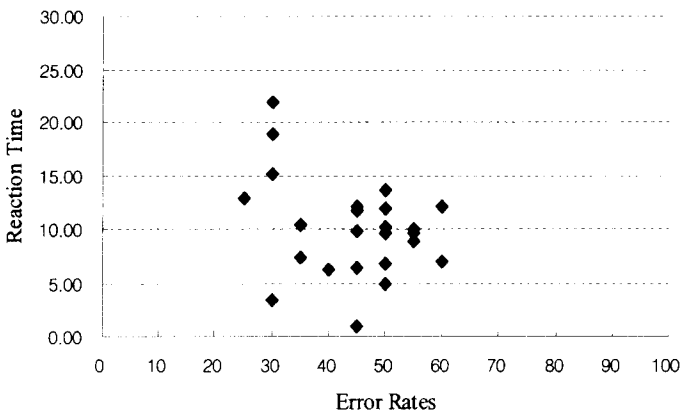Correlation Coefficient(CC) = -0.1345

Figure 2-5. Reaction Time and Error Rates for 'Word Order'
Correlation Coefficient(CC) = -0.3198

This conforms to the common belief that one should give up accuracy
or fluency when learning a foreign language and can not improve both.
However, 32% is higher than other results but still not high enough to

convince ourselves that we can not improve both even in Word Order. These results from all the categories imply that accuracy and fluency may not be strongly related in foreign language learning.

To formally discuss the significance of the results, a hypothesis test has been done following Minimum et al (1993). The null hypothesis is

$$H_0 : \rho = 0 .$$

t required for testing the null hypothesis that $\rho = 0$ is

$$t = \frac{r}{\sqrt{(1 - r^2)/(n - 2)}}$$

where, r = the sample coefficient
n = the number of pairs of scores in the sample.

In our experiment, r ranges from 0.029 to 0.3198 and n is 24. Therefore, the degree of freedom is n – 2 = 22. Using the table H in appendix F of Minium (1993), critical values are found to be 0.404 at $\alpha = 0.05$ (95% confidence level, two-tailed) and 0.515 at $\alpha = 0.01$ (99% confidence level, tow-tailed). Because our r's are less than the critical values, we cannot reject the null hypothesis of no correlation. In our context, we cannot reject the hypothesis that there is no relationship between reaction time and accuracy rate.

So far, the relationship between error rate and reaction time in each grammatical category is considered. However, both accuracy and fluency may be influenced by factors such as period of study, self confidence in the language, and gender.

Figure 3 shows the effects of study period (duration) on error rates. Depending on the different study periods, Chinese learners in this study are grouped into three- 6 months, 12 months, and over 12 months. For this group of Chinese learners, the duration of study does not affect accuracy improvement. This result indicates that language accuracy can not be acquired within a short period of time for the Korean language learner.
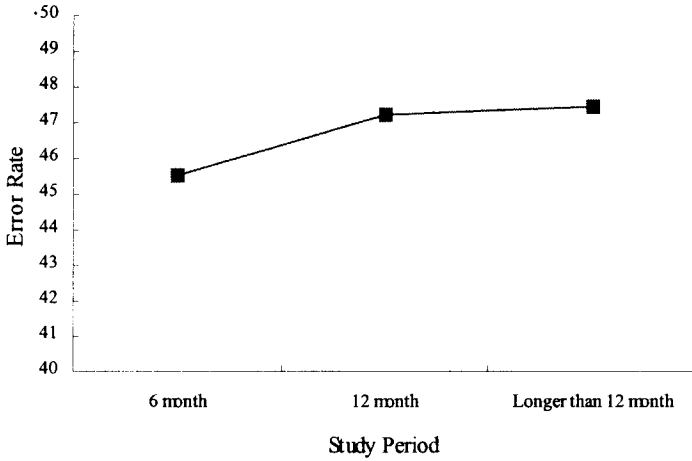
Figure 3. Error Rates by Study Period

Figure 4 shows the effect of self evaluation and error rates. Participants are asked to evaluate their own language proficiency using the scale of 1 to 10.[9] Interestingly, regardless of different self evaluation scale, most of the participant's language accuracy did not show much difference.

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9) The reason for scaling self-evaluation level by 1 to 10 is that people are familiar to this evaluation scale, which is used in score, 100% being perfect score. If this is a questionnaire asking their preferences on apples, for example, 5 scale could be used to say 1=hate it, 2=don't hate it, 3=neutral, 4=like it, 5=love it.
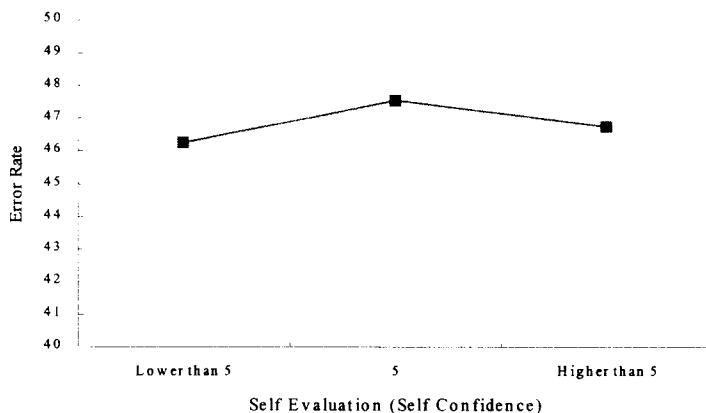
Figure 4. Effect of Self Evaluation on Error Rates

Figure 5[10] shows the effect of gender and mean error rates estimated from this study. Female learners and male learners shows the similar results for error rates test. That is, the overall accuracy level are not different by gender. However, females learner takes short reaction time than male learners. This results indicates that female learners can acquire language fluency faster than male learners. This result supports the common belief that females are better speaker/listener but accuracy level are not so different between genders. Implication from this result is that when teaching Korean to Chinese students, do not presume that female students understand better than make male students just because female students' reaction time is faster. Male students do understand what teachers say. They may be just slower in reaction.

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10) Partial results for RT (Figure 3, 4, 5) are shared in Kim (2006). If this paper is accepted for publication, the forthcoming paper will be referenced with full name and information.
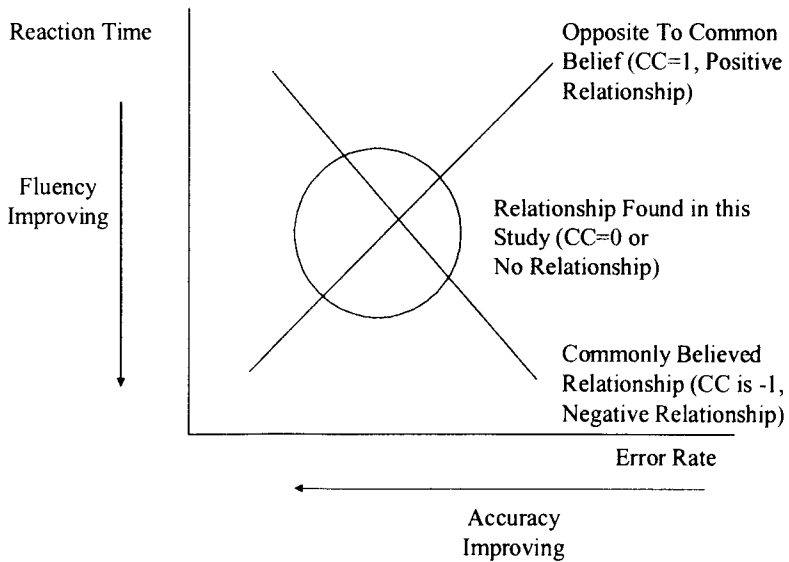
Figure 5. Accuracy and Gender

5. Conclusion and Educational Implication

There are several findings from this study. First, depending on the different grammatical categories, error rates show the diverged results for Chinese experiment group. The Chinese group did worst in error rate in the category of 'tense.' It conforms to the fact that there is no comparable grammatical component to Tense in Chinese. This seems to be an effect of 'mother-tongue transfer. That is, they don't use it, they don't understand it. Therefore, for Chinese, teachers should spend more time on 'tense' than 'honorific' or 'word ending' to improve the language accuracy. If time allows, put extra time on 'particles' or 'word order'.

Second, teachers can improve accuracy and fluency simultaneously. It is against the common belief that one of them should be sacrificed or ignored to improve the other, as mentioned in Kim (2006). The general idea is presented in Figure 6.

Figure 6. Schematic Presentation of the Relationship found

Reaction Time

Opposite To Common
Belief (CC=1, Positive
Relationship)

Fluency
Improving

Relationship Found in this
Study (CC=0 or
No Relationship)

Commonly Believed
Relationship (CC is -1,
Negative Relationship)

Error Rate

Accuracy
Improving

In Figure 6, three possible relationships are presented. One is the line coming from the top of Y-axis (reaction time) to right corner of the Figure. This line presents the commonly believed relationship: improving fluency will worsen accuracy. The opposite to this common belief is the line from the lower-left corner to upper-right corner: improving fluency will improve accuracy. However, in the results of this study, neither of the relationship is identified. Rather, there appeared a third relationship, which is presented as a circle in Figure 6. The third relationship is that there may be no concrete relationship between fluency and accuracy among Chinese Korean learners for all grammatical categories. This is the base of the proposition that accuracy and fluency can be achieved simultaneously without compromising the other in teaching Korean for Chinese, at least.

Third, depending on study period, Chinese group show different tendency at language accuracy. Accuracy can be slowly improved

anyway.   But if a teacher has longer time to teach or a learner has enough time to learn, try to be patient in improving accuracy. Also, a teacher's role is important here to encourage students that accuracy can not be improved easily and takes time.   From a theoretical view point, it is also proposed that a fluency focused, short run teaching method may be efficient, but learners true ability to understand accurately can be earned in the long run.   The result in this study support the proposition.

Fourth, self confidence is important in improving language accuracy. Teachers should encourage students to be self-confident in the language they are learning. Fifth, female students may appear to understand the language better because they are more fluent than male students. However, the level of accuracy seems to be the same. Therefore, teachers should not misinterpret female students' reaction. It may not imply the female students understand accurately as well.

Overall, learners of Korean in this study did worse in accuracy test. This is very implicative for the field of Teaching Korean as a Foreign Language. Communicative language instruction helps to gain language fluency but grammatical instruction should be emphasized simultaneously in order to secure language accuracy for the learners.

The limitation of the results reported in this paper and implications of it is that the experiment is done for Chinese Korean learners only. Therefore, a caution is necessary in generalizing the results from this study to other Korean learners than from China. Therefore, a natural course of further study is to expand the study to include English and/or Japanese speaking learners and others. The expanded studies will facilitate a more effective teaching method for learner-oriented or learner-specific language education.

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