

The relationship between reading fluency and other aspects of language proficiency: A look from a speed reading course

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ABSTRACT: Past research has reported that training on other aspects affected the learner's language complexity but did not substantially promote accuracy or the results were too ambiguous to determine if accuracy was also improved (Ellis, 1987; Crookes, 1989; Wigglesworth, 1997). This study set out to determine if this is also the case for speed reading courses, in which EFL learners are trained to improve their reading fluency. An experiment was conducted on university students in order to see if their language knowledge accuracy would improve when their reading fluency developed. During the experiment, two treatment groups and two control groups were following an English program at university while the treatment groups also followed a speed reading course, which lasted two months. A set of language memory span tests were given before and after the treatment. The results indicated that although improvement in reading fluency facilitates language complexity, it does not assist language accuracy development to a remarkable degree.

KEYWORDS: Reading fluency; language complexity; language accuracy; speed reading courses; language memory span tests.

→ Received 25/6/2020 → Revised manuscript received 14/9/2020 → Published 25/12/2020.

1. Introduction

The distinction between accuracy and fluency in second language acquisition was first pointed out in the 1980s but only a decade later did theorists suggest adding complexity as another aspect of language development. Since then there has been a consensus on the triangle of language proficiency: accuracy, complexity, and fluency. Accuracy is the degree to which a learner's usage follows the correct structures while fluency is generally understood as the ability to be spontaneously communicative. Complexity refers to how elaborated and varied a learner's language use is. It has been proposed that accuracy and complexity both represent the level of internalized language knowledge of the learner, and fluency is how much control and how fast the learner can access this knowledge.

Previous studies have examined the relationship between accuracy, fluency, and complexity as well as how they develop through training courses, but to date, there has not been

any consensus on whether these three dimensions develop concurrently or not. Some researchers have argued that the development of fluency may be at the expense of accuracy and complexity (Ellis, 1994). Some language practitioners have also found that learners' propensity to focus too much on accuracy may negatively affect their fluency in communication and that when they draw quickly on their knowledge (focusing on fluency), their grammar use may be inaccurate. Other scholars have, however, asserted that fluency development does not necessarily have to be in a trade-off relationship with accuracy (Yuan & Ellis, 2003; Mehnert, 1998).

This study looks at reading fluency development in a speed reading course and aims to decide if it is accompanied by language complexity and language accuracy. The participants' language complexity and accuracy were measured using language memory span tests, each of which contained 20 sentences of increasing length and grammatical complexity.

Although linguists have supposed two types of complexity, cognitive and linguistic, this study concerns only linguistic complexity, which refers to structures and features of the particular language.

2. Literature review

According to many language practitioners and researchers, L2/FL performance and competence are complex terms as they contain various components. The majority of past research has relied on three factors to describe and assess L2/FL performance and competence: fluency, accuracy, and complexity (Ellis & Barkhuizen, 2005; Skehan, 1998). Since the 1990s, these three variables have come into focus in L2/FL learning research. It is believed that fluency, accuracy, and complexity can be used as both performance descriptors and proficiency indicators. Fluency refers to using the language with native-like rapidity, accuracy refers to being error-free, and complexity refers to the ability to handle a wide range of structures and vocabulary (Wolfe-Quintero, Inagaki, & Kim, 1998, p. 4).

Accuracy has been distinguished from fluency since the 1980s when researchers were trying to depict and measure second language oral skills. They distinguished *fluency-oriented activities* and *accuracy-oriented activities* in a language program. Fluency activities help to improve spontaneous oral linguistic production while accuracy focuses on the accurate production of language structures (Brumfit, 1984). Complexity, the third component of the triad, came into focus in the 1990s after Skehan (1998) for the first time added it to his L2 model. Since then complexity has been commonly characterized as “*the extent to which the language produced in a performing task is elaborate and varied*” (Ellis, 2003, p. 340) or “*the scope of expanding and restructured second language knowledge*” (Wolfe-Quintero, et al., 1998, p. 4). In the L2/FL acquisition literature, complexity relates itself to language tasks and language production. Some researchers also broke down the notion of complexity into two kinds: *cognitive complexity* and *linguistic complexity* (Housen, Daele, & Pierrard, 2005; Williams & Evans., 1998). While *cognitive*

complexity concerns the second language learner and is determined by such factors related to the learners, one of which is memory span, *linguistic complexity* concerns the second language system. Some indicators of the learner’s linguistic complexity are the variety of structures and the large stock of vocabulary.

Prior studies investigating the effect of external factors on the learner’s accuracy, fluency and complexity in language performance have proposed methods to assess the three components and explanations of how these three dimensions develop. In L1 learning, Wigglesworth (1997) confirmed that planning time provides greater advantages for high proficiency learners to make complex and fluent language production but the results were not unambiguous enough to decide whether accuracy was also developed. Conversely, Wigglesworth and Storch (2009) reported that in their research on the effect of collaborative writing on fluency, accuracy, and complexity of the second language learner, accuracy was positively affected but fluency and complexity were not. In L2/FL learning, the majority of developmental measures of complexity, accuracy, and fluency have been used to explore the effects of a treatment or an external factor on oral and written language production. For example, Yuan and Ellis (2003), and Mehnert (1998) examined how planning time helps learners to write better and assessed the learner’s writing in three dimensions: fluency (syllables per minute (spm)), accuracy and complexity. The results showed planning time resulted in greater fluency, accuracy, and complexity. However, other authors, such as Ellis (1987) and Crookes (1989), argued that planning time affects the learner’s language production in terms of complexity but did not significantly influence it in terms of accuracy. Recently Ahmadian and Tavakoli (2011) indicated that their findings showed careful planning time positively influenced complexity and accuracy but resulted in dysfluency.

Although a considerable amount of literature has been published on the association between the three aspects of language, there has not been agreed that fluency, accuracy, and complexity

develop simultaneously. This experiment, therefore, set out with the aim to determine if the development in fluency through the speed reading course leads to improvement in accuracy and complexity.

3. Methodology

The experiment was conducted in an EFL context and all the participants were English majors at university. The study set out to seek the answer to the following research question: Does reading fluency development lead to an improvement in language accuracy and complexity?

3.1. Participants

The participants for this study were put into four groups: two treatment groups, hereafter called group A and group B, and two control groups, hereafter called group C and group D. The treatment groups followed the usual English program and the speed reading course at the same time. The control groups just followed the usual English program. There were 125 students at the beginning of the study. However, one participant from group A quit the speed reading course after the fifth session. Two participants from group B stopped at the tenth and thirteenth sessions. Four students in group C did not do the post-test and two quit the English program at university. At the end of the treatment, the numbers of students in the four groups reduced to 31 for group A, 30 for group B, 26 for group C and 29 for group D accumulating to a total of 116 students. Only the results of these participants were analyzed.

3.2. Materials

During the speed reading course, group A and group B read the 20 passages in the book named *Asian and Pacific speed readings for ESL learners* (Millett, Quinn & Nation, 2007). Each text contained around 550 words and was accompanied by 10 comprehension questions. The texts were written with the 1st 1000 word level and were relatively easy for learners who have reached the 2nd 1000 word level (Chung & Nation, 2006).

Two memory span sets were utilized for the

pre-test and post-test. Each set consisted of 20 sentences that were written within the 1000 word level. The sentences were of increasing length and syntactical complexity. The two sets contained corresponding sentences that were equal in terms of vocabulary level, length, and grammatical difficulty. The sentences were put in a computer program, which allows the participants to read each of the sentences within a certain amount of time. The test was not orally done because that would have involved both listening skills and memory span, which would have made it more challenging to measure the participants' memory span as it would be impossible to determine if an error was caused by limited memory span or bad listening skills.

3.3. Procedure

All participants in the four groups had to sit the pre-test on language memory span before the treatment and the post-test after the treatment. Two sets of language memory span tests were used in order to eliminate the text effect. On the pre-test, half of the participants from each group were asked to do one set of the memory span sets and the other half had to do the other set. On the post-test, the administration was the reverse of that on the pre-test. For each of the tests, the students first read the instructions on the computer. They then saw each of the 20 sentences appearing on the screen for a certain amount of time, which was enough for an average native speaker to read the sentence aloud and then to pause for two or three seconds. After the sentence disappeared, the participants had to type the sentence before moving on to the next sentence.

After the pre-test, the treatment groups (group A and group B) had the speed-reading course while following the usual English program. They had three speed reading sessions every week. The control groups only followed the general English program at the university.

4. Results and discussions

4.1. Reading fluency development in the speed reading course

Two indicators were used in order to assess the participants' reading fluency development in the

speed reading course: speed and comprehension. The words per minute (wpm) method was used to measure reading speed. The speed increases in the course were calculated by taking the average speed of the first three texts away from the average speed of the last three texts. The comprehension level was determined by the number of correct answers they made out of the ten comprehension questions accompanying the text. The results indicated that both treatment groups made a significant improvement in reading speed (see Table 1). Group A increased their average speed by 56.94 wpm and group B made an average increase of 51 wpm.

Table 1: Means and standard deviations of initial speeds and final speeds for both treatment groups

		Group A	Group B
The average speed on the first 3 texts	Mean	131.96	132.36
	SD	27.28	23.80
The average speed on the last 3 texts	Mean	188.90	183.36
	SD	40.73	38.18
The speed increases in the course	Mean	56.94	51.00
	SD	40.52	29.91

Regarding the comprehension level, two comparisons were made. First, the average score on the first three texts was compared with the average score on the last three texts. Second, the average score on the first half of the texts was compared with the average score in the second half of the texts.

Table 2: Means and standard deviations of comprehension scores on the first three texts, the last three texts, in the first half and the second half of the course for the two treatment groups

Measure		Group A	Group B
First three texts	Mean	7.34	7.16
	SD	0.85	0.59
Last three texts	Mean	7.84	7.74
	SD	0.68	0.65

Measure		Group A	Group B
The first half of the course	Mean	7.11	7.21
	SD	0.58	0.37
The second half of the course	Mean	7.67	7.44
	SD	0.45	0.31

The data show that both group A and group B had an average score of over seven out of 10 on the first three texts, the last three texts, the first half of the texts, and the second half of the texts. Comparing the groups' average scores on the last three texts with their average score on the first three texts showed that both groups made slight increases. Comparing their average scores on the first half of the course with their average scores on the second half of the course showed the same trend. These results show that the participants could keep their comprehension accuracy at the same level as they increased their speeds. This both reinforces the idea that they made real progress in reading speed and that speed reading courses can help readers to improve their speed without comprehending less.

4.2. Language complexity development

As mentioned before, this study set out to explore the link between reading fluency and language complexity. In what follows, this relationship will be explored by looking at the memory span test results. The tests aimed to see how well the readers could cope with the sentences shown to them in terms of meaning, syntax, and lexis. In regard to meaning, they were supposed to repeat the exact message the sentences described. Regarding syntax, they were supposed to provide the grammatically correct forms of the original sentences. In terms of lexis, they were supposed to repeat the same words and spelling as in the original sentences.

The participants' results on the pre-test and post-test were measured by counting the number of sentences correctly rewritten. The difference between the raw scores on the pre-test and post-test indicated the amount of improvement. The highest score a participant could make on the pre-test or post-test was 20. A repeated-measures

Table 4: Means and standard deviations of the percentage of errors on the pre-test and post-test and their difference for all groups

Measure		Group A	Group B	Group C	Group D
The percentage of errors in the pre-test	Mean	11.26%	15.43%	12.81%	11.52%
	SD	4.42	6.10	8.74	3.18
The percentage of errors in the post-test	Mean	9.29%	13.87%	10.38	11.31%
	SD	4.35	7.25	5.67	4.29
The decrease in the percentage of errors	Mean	1.97%	1.56%	2.43%	0.21%
	SD	5.94	8.54	10.35	5.31

Table 3: Means and standard deviations of pre-test and post-test memory span for all groups

		Group				Analysis of variance		
		Group A	Group B	Group C	Group D	Group F(3,112)	Time F(1,112)	Interaction F(3,112)
Pre-test	Mean	9.48	9.20	9.65	10.00	2.96*	88.29**	8.59**
	SD	3.30	3.09	3.21	4.04			
Post-test	Mean	14.94	14.00	11.04	11.72	2.96*	88.29**	8.59**
	SD	2.56	2.84	3.19	3.08			

** $p < .01$, * $p < .05$

ANOVA was carried out on the pre-test (initial score) and post-test (final score) data. The repeated-measures factor was the time (pre-test vs. post-test) and the between-subjects factor was the group. The results are shown in Table 3 below.

The results indicated that there was a general gain for all groups from pre-test to post-test, $\eta^2 = .441$. The interaction (group x time) result data showed that the memory span gains from pre-test to post-test for the two treatment groups were significantly greater than for the control groups, $\eta^2 = .187$. In order to determine the nature of the interaction effect, a one way ANOVA was carried out to compare the gain scores (pre-test to post-test) of the four groups. The results showed the mean scores of the four groups were significantly different, $F(3, 112) = 8.59$, $p = .000$, $\eta^2 = .187$. The mean gain score for group A memory span development was 5.46 (N=31, SD = 2.94). The mean gain score for group B speed training was 4.80 (N=30, SD = 2.68). The mean gain score for group C control was 1.39 (N=26, SD = 4.00). The mean gain score for group D control was

1.72 (N=29, SD = 5.23). Pairwise comparisons using the Bonferroni adjustment for multiple comparisons showed a significant difference between group A and group C ($p = .001$) and between group A and group D. ($p = .002$). There was also a significant difference between group B and group C ($p = .007$) and between group B and group D ($p = .015$). There was no significant difference between groups C and D ($p = 1.000$).

Altogether, these results indicate that the treatment groups made substantial increases in language memory span while many of the participants in the control groups did not make significant progress. It can, therefore, be suggested that the participants' improvement in reading fluency in the course facilitated their language complexity development.

4.3. Language accuracy

This study also seeks to determine whether language fluency development facilitates language knowledge accuracy. This was done by looking at the answers that the participants provided in the memory span tests and scrutinizing

the mistakes that they made. We compared the percentage of errors each participant made in the pre-test with that in the post-test. The error rate was measured by taking the percentage of errors per total number of words of the incorrect sentences. The result is presented in Table 4.

As can be seen from Table 4, all groups had a decrease in the percentage of errors from the pre-test to the post-test. Group C was the best; groups A and B ranked the second and the third; and group D did the worst. We also looked at individual participants' scores and found that groups A and B had more participants with decreases in the percentage of errors. These results are presented in Table 5.

Table 5: Numbers of participants with a decrease and participants with no decrease in the percentage of errors on the memory span tests for all groups

	Group A	Group B	Group C	Group D
No of participants with a decrease	22	24	14	16
No of participants with no decrease	9	6	12	13

Taken as a whole, the results indicate that the treatment groups did slightly better than the control groups and that most of the participants in the treatment groups made progress. However, the improvement was not remarkable. It can, therefore, be supposed that reading fluency improvement in the speed reading course does not facilitate language knowledge accuracy development. This is in agreement with findings by Ellis (1987), Crookes (1989), and Wigglesworth (1997), who reported that training on other aspects of language facilitates language complexity, but there was little evidence that it enhanced language accuracy development.

5. Conclusions

The purpose of the current study was to determine whether improvement in reading fluency would facilitate improvement in language complexity and language accuracy. In the experiment, two treatment groups were following

the general English program at university and a supplementing speed reading course. During the course, they read 20 texts, each of which was accompanied by 10 comprehension questions. Reading fluency in the course was measured by calculating the speed the participants read a text and the number of correct answers they had for the 10 comprehension questions. The improvement in reading fluency was identified by taking the average speed/comprehension score on the first three texts away from the score on the last three texts. Language complexity and accuracy was measured by a set of language memory span tests.

The results indicated that the treatment group significantly improved their reading fluency in the course. Both groups made substantial increases in speed and slight increases in comprehension level. In regard to language complexity, it was found that the treatment groups outperformed the control groups. While many participants in the treatment groups made progress, few participants in the control groups gained an increase in scores from pre-test to post-test. The results suggest that the improvement in reading fluency was accompanied by an improvement in language complexity. Regarding language accuracy, the study found that although both treatment groups had a decrease in the percentage of errors from pre-test to post-test, the improvement was not remarkable compared to the control group. In other words, the participants' development of reading fluency did not substantially enhance their language accuracy development.

An implication drawn from the findings is that the language teachers can focus their learners' attention on certain aspects of language at a time without being worried about having to trade off other aspects since the improvement in fluency seems to facilitate language complexity development and at least does not negatively affect language accuracy. The fact that the participants' language accuracy did not significantly improve is rather disappointing. However, the nature of language accuracy is, as other studies have also shown, so multifarious that further studies should be done before we can jump to any definite conclusion about the relationship between

language fluency and language accuracy.

In conclusion, this work has contributed to existing knowledge of the relationship between language fluency, complexity, and accuracy by confirming that fluency development is accompanied by improvement in language complexity and that focus on fluency will not

negatively affect language accuracy. Although caution must be applied when interpreting the results, the findings are inspiring to language practitioners since they suggest that the three language aspects do not necessarily have to be in a trade-off relationship.

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