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# Relationship between Speed of Reading and Reading Comprehension Score in Undergraduate Students of EFLU: A Disquisition

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**Abstract**

The present study is an attempt to find if there is a relationship between silent reading speed and reading comprehension score in undergraduate students a pre-requisite study before starting a research involving factors related to metacognition and the affective domain. The sample of the study consists of twenty-four undergraduate students pursuing various foreign languages such as French, Russian, Arabic, Japanese, and German. To assess the reading comprehension of the students, two passages with multiple choice questions were selected from a book designed to check and improve reading speed and reading comprehension. The students worked in pairs, keeping a record of time taken to read for their partner. The word count of the passage was divided by the student's speed of reading to analyze the reading speed simultaneously the students answered the multiple choice questions given after the passage which was used to assess the comprehension level. The findings of the t-test revealed that there is a significant difference between the reading speed and reading comprehension scores and the Pearson's correlation shows that there is a positive and moderate relationship between the two variables. Secondly, it revealed that there is a significant difference between male and female students with respect to their reading comprehension scores and reading speed. In both cases the female students performed better in comparison to the male students. Finally, it reveals that there is a significant difference between the students pursuing different languages at their undergraduate level with respect to their reading comprehension and reading speed. The results indicated that the students from Japan had the highest scores, followed by those from Germany, France, Arabic, Spanish, and Russian.

**Keywords:** reading comprehension score, reading speed, undergraduate student

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## 1. Introduction

According to the Component Model of reading, the three domains that affect reading are the cognitive domain, the psychological domain, and the ecological domain. The cognitive domain deals with word recognition (decoding) and comprehension. The psychological domain includes motivation, interest, learning styles and other psychological phenomena; and the ecological domain is concerned with the home, culture, and classroom environments.

According to the report of National Reading Panel (2020) the five pillars of reading are: phonemic awareness, phonics, fluency, vocabulary and comprehension. A further probe showed that phonemic awareness and phonics are just means to reading and recurrent instructions have a negative effect on reading. Whereas fluency is defined as the ability to make sense of the text grammatically and with understanding of the punctuation. Vocabulary was developed through reading however, to understand reading comprehension a scientific study was recommended (Thomas, 2022).

As studies suggest, reading speed (fluency) is a component of reading comprehension. Reading fluency refers to the ability of a reader to decode the surface level of a text making it convenient for comprehension. It is considered a cognitive aspect which includes accuracy (decoding), automaticity, and prosody. Reading fluency can be studied as, oral reading fluency, silent reading fluency and retell fluency. It is found that oral reading fluency and silent reading fluency affect reading comprehension further all three fluencies that are oral reading fluency, silent reading fluency and retell fluency are significantly correlated with each other (Turkyılmaz, Remzi, Yildirim, & Ates, 2013).

Silent reading fluency has its roots in oral reading fluency. Initially, oral reading had held a prominent place in and out of the classroom. However, by the end of the 19$^{th}$ century Psychologists learned more about the inner working of the mind and hence oral reading as a mode of instruction lost its sheen. Further, the availability of printed materials and the standardization testing movement supported the shift from oral reading to silent reading. However, oral reading is still important to know the level of reading progress in beginners.

With the advent of LaBerge and Samuels's (1974) theory of automatic information processing in reading, reading fluency and its operation gained importance. This emphasises that a reader should be able to read fluently at an automatic level with minimal cognitive effort. It also says that poor comprehension in readers could be because they had to invest too much of their cognitive resources at the surface level of reading, hence were unable to contribute to meaning-making or comprehension. Later on, Stanovich (1980) refined the theory into an 'interactive compensatory' reading model. Where he reasoned how reading fluency contributes to reading comprehension as, a reader who is not competent enough in the process of surface reading tends to utilize more of his cognitive resources in the bottom-up approach than in the meaning-making hence his or her comprehension is affected.

Logan (1988) developed a memory-based theory of fluency called the "instance theory of automatization." It is based on three concepts obligatory encoding, obligatory retrieval and obligatory representation. Where encoding involves focusing attention on the stimuli or a word and storing it in memory, retrieval involves attending to a stimulus to retrieve it back from memory and representation refers to the coding and storage of the information trace of memory with a trace of stimulus. Later in (1997) it was suggested that automaticity develops as a consequence of the 'power law' which explains that, reaction time decreases as a result of repetition and practice.

While prosody in reading refers to the use of intonation and punctuation marks to make a reading sound like authentic oral speech. It provides a sense of reading by creating boundaries between phrases and sentences. The written format is chunked into meaningful segments of a phrasal grouping of words into syntactically appropriate groups. Prosody helps in constructing the meaning of the written text and hence promotes reading comprehension (Rasinski, Reutzel, Chard, & Thompson, 2011).

Krashan in his article (2002) compares the skill building hypothesis and the comprehension building hypothesis where the former is developed using bottom–up approach where the student learns the phonics, then words and practices the skill of reading. Whereas in the later approach the student emphasises on the meaning of the text by reading a variety of interesting texts, styles, new vocabulary or what is termed as the whole language or a top-down approach. An analysis of various studies reveal that comprehension tests give a better picture when compared to the phonic aspect of reading. The developmental model of reading comprehension suggests that ability to read and understand is based on students' developing social, cognitive and linguistic systems. Further, reading comprehension requires fluent decoding of word-level, automatic higher-order processes and skills and the ability to use the skill automatically and consciously (Connor et al., 2011).

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*1.1 Statement of the Problem*

It has been noted that there has been a gap between what the Policies intends and the results obtained through reading programmes. Goodman (2008) in his report 'The Reading First Debacle' brought out the follies of the Reading First which had emphasised on the phonics. The National reading Panel emphasised teaching the whole language through its sub-programme 'No child Left Behind'. There have been debates on the scientific way of teaching reading and has been popularised by a movement called as 'Science of Reading' or Science Based Reading Research. Thomas (2022) in his article 'The Science of Reading Movement: The Never-Ending Debate and the Need for a Different Approach to Reading Instruction' emphasised that the policy makers should not stress on "one size fits all" solution for teaching reading and should look into the needs of the reader. There is a need to understand how reading can be improved under the umbrella term of science of reading in various countries under similar policies.

Similar programmes under different banners and labels specifically deals with the kinder garden students to the third class level students to assess their reading where English is their first language however, the proposed study deals with the Undergraduate students who have studied English as a second Language for at least twelve years. The reading comprehension is based on various factors from cognitive, affective, social, and linguistic aspects the researcher intends to do a comprehensive research to find the various factors that affect reading comprehension such as the use of metacognitive reading strategies, reader's self-efficacy and the student's epistemic beliefs as a major study. However, this study is a prerequisite before dwelling into the various factors mentioned above.

This study intends to examine the relationship between reading speed (fluency) and its effect on reading comprehension scores for undergraduate students. It intends to rule out the possibility that silent reading speed has an effect on the students reading comprehension before dwelling into the major research. In this study, silent reading fluency is taken into consideration, as students in an undergraduate course are supposed to have some basic competency in reading. Further, the research examines if there is any relationship between reading comprehension scores and the speed of silent reading related to gender and the languages studied at the undergraduate level. Reading fluency can be tested at different levels such as words, phrases, sentences or paragraph levels. To avoid task complications the researcher has calculated reading speed at the word level, however in context and a discourse level (Seabra, Dias, Mecca, & Macedo, 2017).

Reading speed is considered one of the indicators of reading fluency. Reading speed is calculated by the number of words read in a minute. Carver (1982), in his study on "Optimal rate of reading", found that University level students can comprehend 80 -90% if they read 250 words per minute. If the words—per—minute reading (wpm) is increased to 500 per minute the comprehension level dips by 40% and if the word-per-minute exceeds 1000 words per minute it falls by another 15 -20%. Nation (1997) and Carver (1982) emphasised that a skilled L1 learner can read about 250-300 words per minute. However, the research on the reading speed of L2 learners is still at an infancy level and has a lot of scope for research (Yen, 2016).

*1.2 Research Questions*

The three main research questions are:

Is there a relationship between student's silent reading speed and their reading comprehension scores?

Is there a difference between male and female students with respect to their reading comprehension scores and reading speed?

Is there a difference between the students who are pursuing different languages at their Undergraduate level with respect to their reading comprehension and reading speed?

*1.3 Research Hypotheses*

The research question has been formalised into five hypotheses.

Ha1: There is a significant relationship between the students' reading comprehension and their silent reading speed.

Ho1: There is no significant relationship between the students' reading comprehension and their silent reading speed.

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Ha2: There is a statistically significant difference between boys and girls with respect to their English reading comprehension score.

Ho2: There is no statistically significant difference between boys and girls with respect to their English reading comprehension score.

Ha3: There is a statistically significant difference between boys and girls with respect to their silent reading speed.

Ho3: There is no statistically significant difference between boys and girls with respect to their silent reading speed.

Ha4: There is a statistically significant difference between the students reading comprehension with respect to the languages pursued at the undergraduate level.

Ho4: There is no statistically significant difference between the students reading comprehension with respect to the languages pursued at the undergraduate level.

Ha5: There is a statistically significant difference between the students silent reading speed with respect to the languages pursued at the undergraduate level.

Ho5: There is no statistically significant difference between the students silent reading speed with respect to the languages pursued at the undergraduate level.

**2. Literature Review**

A few studies in the area of reading speed and reading comprehension have been discussed to build-up the research and provide support. Skinner, Williams, Morrow, Hale, Neddenriep, and Hawkins (2009) in their study tried to validate the construct used to measure reading speed, comprehension, and comprehension rates. To understand the relationship between oral reading fluency and its effect on the reading comprehension level, Skinner et al, in their research have tried using the Time Reading Series (%C/M) than the prevalent WC/M (Spargo, 1989). As word count per minute measure does not measure the comprehension rate, and is more appropriate for beginner-level readers. In Times Reading Series, the oral reading speed of the student was recorded per minute and was placed in the denominator and the per cent of correctly answered questions on a comprehension test was placed in the numerator. This formula (%C/M) was used to calculate the oral reading speed for grades 4$^{th}$, 5$^{th}$, and 10 th-grade students. Findings revealed that there is a positive correlation between reading speed and the reading comprehension score for 5$^{th}$, and 10 th-grade students. However, there was no correlation for the 4 th- grade students, as the 4 th- grade students were still in the developmental stage of learning to read fluently. Further, it was found that reading speed resulted in a broad range of variance in cluster scores and subset scores. The broad reading variance for grades 4 and 5 was more however, it decreased for grade 10. Finally, the research states that there is a failure in establishing the validity of reading speed using a brief measure, especially for advanced readers.

Abdelrahman and Bsharah (2014) carried out a study to find the effect of speed reading strategies on developing reading comprehension among secondary literary stream students in the English language. Their study consists of 42 students assigned into two groups who were chosen randomly from schools, a controlled group of (21) students, and an experimental group of (21) students trained on speed reading strategies. Pre and post-reading comprehension tests were administrated. The results showed that the students in the experimental group were better than the students in the control group. The difference between the means was due to the use of speed reading strategies. In light of the results, it is recommended that teachers should train students extensively on the use of speed reading strategies such as skimming and scanning.

Kim (2015) tried to expand the understanding of reading fluency based on the Component-Based Model of Reading Fluency through a longitudinal study with a sample of 143 Korean students at two points in time, in the age group of 5 to 6 years of age. The study focused on the developmental changes among word reading fluency, listening comprehension, text reading fluency and reading comprehension; and the relation between text reading fluency and reading comprehension. The other areas which were studied are the literary and cognitive predictors. Results revealed that text-reading fluency was related to reading comprehension, however, reading comprehension was more related to text-reading fluency than word-reading fluency and listening comprehension. Further, the orthographic skills were more related to text reading fluency than literary skills and word reading fluency. The study explains the developmental nature of text reading fluency in reading development.

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Seabra, Dias, Mecca, and Macedo (2017) suggested that reading speed or fluency is a component of the reading comprehension model. This study explored the relationship between RS and RC, in transparent orthographies such as Portuguese, where intelligence, word recognition and listening were controlled. The sample consisted of 212 students from different schools and grades. The findings revealed that there was a significant relationship between RC and all other measures. The regression analysis revealed that RS contributes to RC and is different for different schools and grade levels. There is a significant relationship between RS and RC only for 4 th- grade students and becomes marginal after controlling for word recognition. It is observed that from 4$^{th}$ grade onwards the RS begins to relate with RC. Hence, providing a developmental perspective to the reading model.

Durukan (2020) studied the impact of speed reading training on the reading speeds and comprehension skills of secondary school students. Results revealed that the reading comprehension of female students was greater than that of male students, but this difference was not statistically significant. Further, it indicates that the reading speed increased approximately two times their initial reading speed with the given training, as did the comprehension level. As a result of this analysis, a positive and significant relationship was found between reading speed and reading comprehension.

Morrice, Hughes, Stark, Wittich, and Johnson (2020) in their study validated the International reading speed texts in a Canadian Sample. The findings of the study show that the mean reading speed of the Canadian sample fell within the standards established by the British English Language and that there is no significant difference between the reading speed of the two samples however there may be variability when compared to the IReST standards.

## 3. Methodology

In this study, the researcher examines the relationship between the silent reading speed of undergraduate students who have studied English as a second language for not less than twelve years, and their reading comprehension.

### *3.1 Research Design*

To examine the relationship between students' silent reading speed and their reading comprehension scores, descriptive research method is employed. A group of twenty four undergraduate students from B.A. IV semester, 'Foreign languages' were taken into consideration, who had studied English for a minimum of twelve years as a second language.

Dependent variables: - reading comprehension scores and reading peed scores.

Independent variables: - languages pursued at the undergraduate level and gender.

### *3.2 Population for the Study*

The population of the study are undergraduate level students at the English and Foreign Languages University who pursue different Languages such as French, Russian, Arabic, Japanese, and German at, Hyderabad, Lucknow, and Shillong.

### *3.3 Sample for the Study*

The sample of the study are twenty-four, IV. Semester undergraduate level students at English and Foreign Languages University who pursue different languages such as French, Russian, Arabic, Japanese, and German as their main course and join together for an elective course paper called 'Academic English Reading and Writing', at The English and Foreign Languages University. Hyderabad. Moreover, all the students have studied English as a second language and have been selected for the Undergraduate level course based on their previous intermediate qualifications and an entrance exam. Based on this it is assumed that students have a considerable level of decoding ability and silent reading fluency in English.

### *3.4 Sampling Method*

A purposive sampling procedure has been used by the investigator. Participants of the study are students who have joined a four-month elective course called Academic Reading and writing at the University. Of the twenty-four sixteen students are girls and eight are boys at the undergraduate level, IV Semester students of group "B'. Students were informed about the research and were asked to volunteer for it. Each student studies a different language such as

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French, Russian, Arabic, Japanese, and German at their Undergraduate level, and joins in for a common elective paper on 'Academic English Reading and Writing' at English and Foreign Languages University, Hyderabad, India.

*3.5 Tools Used in the Study*

3.5.1 Reading Comprehension Passage

The tool used to assess the reading comprehension score, are two passages from a book titled 'Triple Your Reading Speed'- by Wade E. Cutler (3rd. Edition Macmillan, 1993). This book is specially designed to help 'boost reading power at school or on the job.' The two Passages that were selected are titled 'Radio Communications and the Sun' by Wade .E. Cutler and an expert 'Narrative of A. Gordon Pym' by Edgar Allan Poe were selected with a word count of 1,306 and 1,140 respectively. Each passage was followed by twenty-five multiple-choice questions which were mostly factual with one or two inferential questions. The validity of the reading comprehension tests one and two are 0.832 and 0.882 respectively and the Cronbach's alpha is 0.72.

*3.6 Data Collection Procedure*

A former oral consent was obtained from the Coordinator B.A. Foreign Languages along with that of a senior professor under whom the researcher worked as an assistant teacher. Students were asked to volunteer to participate in the study. Their participation was recorded as their consent. Further, students who volunteered for the study, settled in a quite classroom and were given instructions about the process of the study. They were asked to sit and work in pairs. A copy of the two passages were distributed to each pair of student and hand-outs for marking the multiple choice questions (MCQ) of each passage were kept ready with the researcher to be provided once the student completes reading the passage. The students were asked to read each passage at their usual pace and then answer the twenty-five MCQ in their individual hand-outs. The student's partner was instructed to keep a record of time taken to read the passage using a stop watch in their cell phones.

Then the MCQ hand-out was given to the student after s/he read the passage. Instructions were given to mention their code and preliminary information such as gender and number of years they have studied English on the answer sheet. Students were instructed to keep their work discreet and not discuss or share answers with their partner. However, while answering the questions the readers were allowed to revisit the passage for brief instances as the study doesn't intend to test the memory of the students. The students read the passages alternatively and finally complete reading both the passages and submitted their answer scripts. Which were then evaluated by the researcher based on the answer key given at the end of the book.

*3.7 Data Analysis*

3.7.1 Reading Comprehension Score Analysis

The researcher scored the comprehension passages of all the students using the answer key provided at the end of the book. An average of both comprehension scores was taken into account for each student as the reading comprehension score.

3.7.2 Reading Speed Score Analysis

All the participants reading speed was recorded in seconds for both the passages respectively. The word count of each passage is divided by the recorded time taken by the student to read the passage to calculate the reading speed per second. The average reading speed for both the passages was deduced per second and then converted for a minute. Thus, the raw scores for reading comprehension and reading speed for each student is tabulated for a descriptive study. As it is a quantitative study, descriptive statistics are used to analyze the difference between the scores. The means and the standard deviations are calculated to compare the two means. However, to find the difference between the two means a t-test and an f-test was used. To find the significant relationship between the reading speed and reading comprehension scores a Pearson's Correlation was used.

**4. Findings**

*4.1 Testing Hypothesis One*

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To answer the first research question which states "Is there a relationship between silent reading speed and reading comprehension?" a descriptive statistics is done, where the means and standard deviations of reading comprehension and reading speed was analysed.

Table 1. One-sample statistics

| One-Sample Statistics | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|
| Reading Comprehension Average Score | 5304 | 14.73916 | 4.043672 | .055522 |
| Reading Speed Average Score in Minutes | 5304 | 244.36857 | 66.383374 | .911487 |

Interpretation: The results from Table 1 depicts that the mean of reading comprehension is (M=14.7 and SD=4.0). The mean of Reading Speed is (M=244.3 SD=66.3).Thus there is a difference in the two means and their standard deviations. Further, to find the difference between the reading comprehension mean and the reading speed mean a t-test is performed.

Table 2. One-sample test

| One-Sample Test | Test Value = 0 | | | | |
|---|---|---|---|---|---|
| | t | df | Sig. (2-tailed) | Mean Difference | 95% Confidence Interval of the Difference |
| | | | | | Lower Upper |
| Reading Comprehension Average Score | 265.464 | 5303 | .000 | 14.739159 | 14.63031 14.84801 |
| Reading Speed Average Score in Minutes | 268.099 | 5303 | .000 | 244.368571 | 242.58168 246.15546 |

Interpretation: The results from table II depicts a t-test value for reading comprehension is (t=265.4 at df 5303). The p value is (.000) which is less than the level of significance at 0.01 levels. The t-test value for reading speed is (t=268.0 at df 5303). The p value is (.000) which is less than the level of significance at 0.01 confidence. As the p values are less than the significance value at 0.01 level of significance thus, it signifies that there is a difference between the two means. Thus it can be stated that there is a difference between the means of reading comprehension and the reading speed. Further, to find if there is any relationship between the two variables a correlation is done between reading comprehension and reading speed

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Table 3. Correlations

| Correlations | | Reading Comprehension Average Score | Reading Speed Average Score in Minutes |
|---|---|---|---|
| Reading Comprehension Average Score | Pearson Correlation | 1 | .600** |
| | Sig. (2-tailed) | | .000 |
| | N | 5304 | 5304 |
| Reading Speed Average Score in Minutes | Pearson Correlation | .600** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 5304 | 5304 |

**. Correlation is significant at the 0.01 level (2-tailed).

Interpretation: The results from table III depicts that the Pearson's Correlation coefficient r for reading speed and reading comprehension score is 0.600 at 0.01level of significance. The r value shows that there is a moderately positive correlation between reading comprehension and reading speed. Hence, the null hypothesis one is rejected which states that there is no significant relationship between reading comprehension and reading speed scores and the alternate hypothesis one is accepted which states that there is a significant relationship between reading comprehension and reading speed.

*4.2 Testing Hypothesis Two*

To answer the second research question a descriptive statistics was done, where the means and standard deviations of reading comprehension are analysed for male and female students.

Table 4. Group statistics

| Group Statistics | Gender | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Reading Comprehension Average Score | female | 1835 | 15.41906 | 4.045667 | .094453 |
| | male | 3470 | 14.37964 | 3.996706 | .067853 |

Interpretation: The results from table IV depicts that the mean for females is (M=15.41 and SD= 4.04) and the mean for male students is (M=14.3 and SD=3.99).The mean for female students is slightly more than the male students whereas the standard deviation for male students is approximately the same when compared to the female students. Further, to find the difference between the male and female students with respect to reading comprehension a t-test is performed.

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Table 5. Independent samples test

| Independent Samples Test | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | | | | Lower | Upper |
| Reading Comprehension Average Score | Equal variances assumed | 28.12 | .000 | 8.971 | 5302 | .000 | 1.0394 | .1158 | .812 | 1.26 |
| | Equal variances not assumed | | | 8.93 | 3694.37 | .000 | 1.0394 | .1162 | .811 | 1.26 |

Interpretation: As reading comprehension is a continuous variable and gender is a dichotomous variable we will be comparing the means using a t-test. The results from table V depicts that the Levene's f-test value is (f= 28.1) which is greater than the significant value at (0.05) level of significance. The t-test value for equal variance is (t=8.9 at df 5302 and p= 0.000). The p value is less than the significant value at 0.05 level of significance. Hence the null hypothesis two is rejected, which states that there is no significant difference between male and female students with respect to their reading comprehension scores and the alternate hypothesis two is accepted which states that there is a difference between male and female students with respect to their reading comprehension scores.

*4.3 Testing Hypothesis Three*

Table 6. Group statistics

| Group Statistics | Gender | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Reading Speed Average Score in Minutes | female | 1835 | 259.70410 | 83.358520 | 1.946146 |
| | male | 3470 | 236.25941 | 53.610533 | .910153 |

Interpretation: The results from table VI depicts that the mean for reading speed for females is (M=259.7 and SD= 83.35) and the mean of the male students is (M= 236.25 and SD= 53.61). The mean for female students is greater than that of the male students. The standard deviation for female students is more in comparison to male students which shows that though the mean of female students is more however the male students are more homogenous as their standard deviation is less than the female students. Further, to find the difference between the male and female students with respect to their reading speed a t-test is performed.

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Table 7. Independent samples test

| Independent Samples Test | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | F | Sig. | T | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference |
| | | | | | | | | | Lower Upper |
| Reading Speed Average Score in Minutes | Equal variances assumed | 994.951 | .000 | 12.415 | 302 | .000 | 23.44 | 1.8892 | 19.741 27.1483 |
| | Equal variances not assumed | | | 10.912 | 656.2 | .000 | 23.44 | 2.1484 | 19.231 27.657 |

Interpretation: As reading speed is a continuous variable and gender is categorical variable we will be comparing the means using a t-test. . The results from table VII depicts that the Leven's f-test is 994 which is greater than the significant value at 0.05 level of confidence. The t-test value for equal variance assumed is (t=12.41 at d. f 5302 and p= .000) at 0.05level of confidence. As the p value is less than the significance value the Null hypothesis three is rejected which states that there is no significant difference between male and female students with respect to their reading speed. Hence, the alternate hypothesis three is accepted which states that there is a difference between the male and female students with respect to their reading speed.

*4.4 Testing Hypothesis Four*

Table 8. Discriptives

| Discriptives | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Reading Comprehension Average Score | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
| | | | | | Lower Bound | Upper Bound | | |
| French | 674 | 14.4848 | 23.501887 | .13489 | 14.21996 | 14.74968 | 10.000 | 18.000 |
| Russian | 975 | 11.1416 | 43.823771 | .12246 | 10.90130 | 11.38197 | 8.000 | 17.000 |
| Arabic | 574 | 12.7064 | 32.939010 | .12268 | 12.46546 | 12.94740 | 9.000 | 15.500 |
| Japanese | 179 | 116.8097 | 63.773001 | .08915 | 16.63489 | 16.98463 | 10.000 | 20.500 |
| German | 111 | 316.1970 | 12.577383 | .07724 | 16.04545 | 16.34857 | 13.000 | 19.500 |
| Spanish | 177 | 12.0000 | 0.000000 | .00000 | 12.00000 | 12.00000 | 12.000 | 12.000 |
| Total | 530 | 414.7391 | 64.043672 | .05552 | 14.63031 | 14.84801 | 8.000 | 20.500 |

Interpretation: The results from table VIII depicts that the means of students' reading comprehension score concerning the languages such as French, Russian, Arabic, Japanese, German, and Spanish are (M=14.48; 11.14;12.70; 16.80; 16.19; and 12.00 ) with a standard deviation of (SD= 3.5; 3.8; 2.9; 3.7; 2.5; and.00) respectively. Results reveal that the mean for Japanese students is highest followed by German, French, Arabic, Spanish and Russian.

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Table 9. ANOVA

ANOVA

| Reading Comprehension | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 26406.704 | 5 | 5281.341 | 463.969 | .000 |
| Within Groups | 60306.957 | 5298 | 11.383 | | |
| Total | 86713.661 | 5303 | | | |

Interpretation: As reading comprehension is a continuous variable and languages pursued is a multi-variant or categorical variable we will be comparing the means using ANOVA. The results from table IX depicts that the f-test for the variables reading comprehension and the languages pursued such as French, Russian, Arabic, Japanese, German, and Spanish is(f= 463.9 at df 5 and p=.000). The p value is less than the significant value at 0.01. Hence the Null-hypothesis four is rejected which states that there is no significant difference between the students' reading comprehension score with respect to the Languages' pursued by them at the undergraduate level. Hence the alternate hypothesis four is accepted which states that there is a difference between means of students pursuing different languages at the Undergraduate level with respect to their reading comprehension.

*4.5 Testing Hypothesis Five*

Table 10. Discriptives

Discriptives

| Reading Speed | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound | | |
| French | 674 | 226.486 | 19.91915 | .76728 | 224.980 | 227.993 | 197.688 | 246.710 |
| Russian | 975 | 211.630 | 52.43365 | 1.6793 | 208.335 | 214.926 | 102.034 | 277.882 |
| Arabic | 574 | 221.578 | 76.13337 | 3.1781 | 215.336 | 227.820 | 110.400 | 293.253 |
| Japanese | 1791 | 269.686 | 55.95748 | 1.3223 | 267.093 | 272.280 | 160.700 | 345.735 |
| German | 1113 | 265.549 | 82.11517 | 2.4610 | 260.721 | 270.378 | 63.269 | 365.273 |
| Spanish | 177 | 177.439 | .000000 | .00000 | 177.439 | 177.439 | 177.439 | 177.439 |
| Total | 5304 | 244.368 | 66.38337 | .91148 | 242.581 | 246.155 | 63.269 | 365.273 |

Interpretation: The results from table X depicts that the means of reading speed with respect to the languages pursued at the Undergraduate level such as French, Russian, Arabic, Japanese, German, and Spanish with a mean of (M= 226.48; 211.63; 221.57; 269.68; 265.54 and 177.43) and a standard deviation of (SD=19.9; 52.4; 76.1,55.95;82.11; and.00) respectively. Results reveal that the mean for Japanese students is highest followed by German, French, Arabic, Russian and Spanish. Hence the language groups in the class are heterogenous with varied means and standard deviation.

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Table 11. ANOVA

| ANOVA | | | | | |
|---|---|---|---|---|---|
| Reading Speed | Sum of Squares | df | Mean Square | F | Sig. |
| Between Groups | 4000578.526 | 5 | 800115.705 | 218.853 | .000 |
| Within Groups | 19369189.700 | 5298 | 3655.944 | | |
| Total | 23369768.226 | 5303 | | | |

Interpretation: As reading speed is a continuous variable while language pursued is a multi-variant variable we will be comparing the means by running an f-test. The results from table XI depicts that the f-test or ANOVA for the variables reading speed and the languages pursued such as French, Russian, Arabic, Japanese, German, and Spanish is ( M=218.85 at df 5 and p= .000) at 0.05level level of confidence. As the p value is less than the significance level the Null hypothesis is rejected which states that there is no significant difference between the scores of reading speed with respect to the languages pursued at the under-graduation level. Hence the alternate hypothesis five is accepted, which states that there is a significant difference between the scores of reading speed with respect to the languages pursued at the under-graduation level.

**5. Discussion**

Each research question is discussed separately

1. To answer the first research question which states that "Is there a relationship between silent-reading speed and reading comprehension of Undergraduate students?" a descriptive statistics was done to compare the means of reading comprehension (R.C) and reading speed (R.S). Results showed that there is a difference between the two means. Further, to know the difference between R.C. and R.S. a t-test was done which revealed that there is a significant difference between the two means as the p values are less than the significant value of 0.01. Further, to find if there is any relation between R.C. and R.S. a Pearson's correlation was done. Which revealed that there is a statistically significant relationship between reading comprehension scores and reading speed. As the r value for the Pearson's correlation is 0.600. Hence, it can be inferred that reading speed and reading comprehension scores are significantly correlated**.** They are positively and moderately correlated. The null hypothesis fails to be accepted and the alternate hypothesis is accepted. Which states that there is a relationship between reading speed and reading comprehension. These studies fall in line with the studies done by Skinner, Williams, Morrow, Hale, Neddenriep, and Hawkins, (2009), Spargo. (1989), Abdelrahman and Bsharah (2014), Kim (2015), and Seabra, Dias, Mecca, and Macedo (2017).

2. To answer the second research question which states that "Is there an association between the students' gender and their reading comprehension?" a descriptive statistics was done to compare the means between the male and female students with respect to their reading comprehension. It showed that the mean of the female students was slightly more in comparison to the male students. Further a t-test was done which reveals that there is a statistically significant difference between male and female students' with respect to their reading comprehension scores. Hence the null hypothesis fails to be accepted and the alternate hypothesis two is accepted which states that there is a difference between male and female students with respect to their reading comprehension scores. This study falls in line with the finding of Durukan (2020).

3. To answer the third research question which states that "Is there an association between the students' gender and their reading speed?" a descriptive statistics was done to compare the means between the male and female students with respect to their reading speed. It showed that the mean of the female students was slightly more in comparison to the male students. Further a t-test was done which, revealed that there is a statistically significant difference between male and female students with respect to their reading speed. Hence the null hypothesis fails to be accepted and the alternate hypothesis three is accepted which states that there is a difference between male and female students with respect to their reading speed scores. This study falls in line with the finding of Durukan (2020).

4. To answer the fourth research question which states that "Is there an association between the languages pursued at the Undergraduate level with respect to their reading comprehension?" a descriptive statistics was done to compare

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the means of students pursuing different languages at the Undergraduate level with respect to their reading comprehension. It showed that the mean for Japanese students is highest followed by German, French, Arabic, Spanish and Russian. Further a t-test was done which revealed that there is a statistically significant difference between students pursuing different languages at their Undergraduate level with respect to their reading comprehension scores. Hence the null hypothesis fails to be accepted and the alternate hypothesis is accepted which states that there is a difference between students pursuing different languages at their Undergraduate level with respect to their reading comprehension scores.

5. To answer the fifth research question which states that "Is there an association between the languages pursued at the Undergraduate level with respect to their reading speed?" a descriptive statistics was done to compare the means between the male and female students with respect to their reading speed. It showed that the mean for Japanese students is highest followed by German, French, Arabic, Russian and Spanish means. Further a t-test was done which, revealed that there is a statistically significant difference between students reading speed with respect to the languages pursued at the Undergraduate level. Hence the null hypothesis fails to be accepted and the alternate hypothesis five is accepted which states that there is a difference between students pursuing different languages at their Undergraduate level with respect to their reading speed. Thus all the five research questions are answered. This study is similar as it shows that how Canadian students align better to British than the Irish standards (Morrice, Hughes, Stark, Wittich, and Johnson, 2020).

## 6. Conclusion

In response to the first research question, it shows that there is a significant difference between the two means however, the Pearson's correlation r value is 0.6 which shows that there is a positive and moderate relationship between reading speed and reading comprehension of Undergraduate students. This implies that though the sample is from undergraduate students there is still a relationship between reading speed and reading comprehension and studying English as a second language for minimum of twelve years did not make a big difference or in other words reading speed is still a factor that effects reading comprehension.

Some of the literature review that fall in line is the study conducted by Skinner, Williams, Morrow, Hale, Neddenriep, and Hawkins, (2009**)** to measure reading speed, comprehension, and comprehension rates for students of grade fourth, fifth and tenth. Secondly, it revealed that there is a significant difference between male and female students with respect to their reading comprehension scores and reading speed. In both reading speed and reading comprehension the female students performed better in comparison to the male students. Finally, it reveals that there is a significant difference between the students pursuing different languages at their Undergraduate level with respect to their reading comprehension and reading speed. It showed that the Japanese student scored highest followed by German, French, Arabic, Spanish and Russian though, the students have studied English as a second language for not less than twelve years.

### *6.1 Implications of the Study*

The evidence of the study reveals that there is a moderately positive relationship between the students reading comprehension scores and their silent reading speed. This shows that silent reading speed is a factor that can affects reading comprehension of a person however, it has a moderate effect on their reading comprehension scores. It can also be implied that students who have studied English for more than twelve years have a fare understanding of a given passage and even if errors of pronunciation, additions or omissions are made while silent reading, it does not affect the understanding of the passage. As student's previous knowledge and contextual knowledge play an important role in the process of comprehension.

Secondly, it highlights that there exists a differences between students reading comprehension and silent reading speed based on their gender. It revealed that female students were better in comparison to the male students. This study was done in an urban setup and can get varied results in rural areas and different states where the female students' ratio is not similar. Finally, it also shows that there exists any differences between students reading comprehension and silent reading speed based on the languages pursued at the undergraduate level. Where the means of students pursuing Japanese, German and French were more in comparison to students pursuing Arabic, Russian and Spanish with respect to their reading comprehension though they all had studied English for not less than twelve years.

### *6.2 Limitations of the Study*

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The study has taken place with a small sample and the other factors that affect reading comprehension were not taken into consideration such as the physical, physiological and social aspects. Errors while reading such as decoding, pronunciation, the addition of words, or omissions of words are not examined nor is the comprehension score deducted for the number of errors committed.

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