Is there a correlation between oral reading rate and social conversational speaking rate?

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The purpose of this research was to determine if there was a correlation between oral reading rates and social conversational speaking rates. This research was conducted using a sample size of 25 students, ages 8-12, in one elementary building in Southern Iowa. Student data were collected from a previous district’s fall assessment in the area of oral reading rate. Students were given specific prompts when providing their social conversational speaking. When comparing oral reading rate with their social conversational speaking rate, it was found that there was a correlation when measured in words per minute suggesting that students’ reading rates of text correlates to their social conversational speaking rates.

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Is There A Correlation Between Oral Reading Rate and Social Conversational Speaking Rate?

A Graduate Research Paper

Submitted to Division of Literacy Education

Department of Curriculum and Instruction

In Partial Fulfillment

Of the Requirements for the Degree

Masters of Arts in Education

Sarah C. Mason

University of Northern Iowa
March 2019

This Graduate Research Paper submitted by Sarah C. Mason

Titled: Is There a Correlation Between Oral Reading Rate and Social Conversational Speaking Rate?

Has been approved as meeting the department requirement for the

Degree of Master of Arts in Education

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Date Approved                  Graduate Faculty Reader

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Date Approved                  Head, Department of Curriculum and Instruction
Acknowledgements

I wanted to say thank you to the students, parents, and staff of the elementary school for their participation in this study. I want to say thank you to Diane Mason for her assistance with the statistical data involved in this study as well. I also want to thank my family, friends, and professors for their support and time.
Abstract

The purpose of this research was to determine if there was a correlation between oral reading rates and social conversational speaking rates. This research was conducted using a sample size of 25 students, ages 8-12, in one elementary building in Southern Iowa. Student data were collected from a previous district’s fall assessment in the area of oral reading rate. Students were given specific prompts when providing their social conversational speaking. When comparing oral reading rate with their social conversational speaking rate, it was found that there was a correlation when measured in words per minute suggesting that students’ reading rates of text correlates to their social conversational speaking rates.
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Introduction

With the publication of the 2000 report by the National Reading Panel came a push for higher reading standards and expectations. Multiple forms of research conducted, based on the various aspects of reading mentioned in the report include: alphabolics (phonemic awareness and phonics instruction), fluency, comprehension, teacher education and reading instruction, and computer technology, and reading instruction (National Reading Panel, 2000). Specifically, as part of that report multiple articles of quantitative research were reviewed surrounding specific programs and strategies on three aspects of fluency: speed, accuracy, and expression (National Reading Panel, 2000). A qualitative analysis of other articles was also conducted and used to check the National Reading Panel’s findings. Many of the selected research articles reviewed used oral reading as measurement in their quantitative studies, which the National Reading Panel (2000) further expanded in the report. This aspect, oral reading as part of fluency, is one of the topics for this current research paper.

When thinking about the words “oral reading fluency,” this area takes on many meanings. For this study, oral reading fluency was interpreted to mean reading aloud. Examining a classroom, it can be found that many students have various rates of oral reading while reading aloud as well as various rates of speaking when in social conversation (Fountas & Pinnell, 2009; Hasbrouck & Tindal, 2006; Hasbrouck & Tindal, 2017; Hayiou-Thomas, Harlaar, Dale, & Plomin, 2010; Holliman, Wood, & Sheehy, 2010; Logan, Byrd, Mazzocchi, & Gillam, 2011; Neumer, 2013; Sturm & Seery, 2007). Oral reading also can appear to sound different for each student depending on student rates of speech and gender (Clopper & Smiljanic, 2011; Jacewicz, Fox, & Wei, 2010). As
teachers look for ways to enhance instruction for students with diverse fluency, most of these instructional decisions come from data collected through monitoring the progress of these students (Fountas & Pinnell, 2009; Hasbrouck & Tindal, 2006; Hasbrouck & Tindal, 2017; Hayiou-Thomas, Harlaar, Dale, & Plomin, 2010; Holliman, Wood, & Sheehy, 2010; Neumer, 2013).

The monitoring of student progress takes on many forms of assessment and evaluation, specifically in the area of oral reading fluency (Bishop & League, 2006; Hudson, Lane, & Pullen, 2005; Nese, Park, Alonzo, & Tindal, 2011; Rasinski & Hoffman, 2003). One of these forms of evaluation comes from listening to students reading orally to the teacher (Hasbrouck & Tindal, 2006; Hasbrouck & Tindal, 2017; Kuhn, Schwanenflugel, & Meisinger, 2010; Rasinski & Hoffman, 2003; Schwanenflugel, Meisinger, Wisenbaker, Kuhn, Strauss, & Morris, 2006). While in a classroom setting using oral reading as a measurement tool and hearing the various rates of conversational speaking by both males and females I wondered is there was a correlation between social conversation speaking rate and oral reading rates? In addition, I also wondered is there a difference with gender and social conversation speaking rate and oral reading rates?

**Rationale for Choosing Topic**

Over the past several years multiple researchers have published a variety of oral reading rate benchmarks or norms to use as a way of tracking student progress as one part of oral reading fluency assessment and evaluation (AIMSweb, 2006; Christ, et al., 2018; University of Oregon, 2018; Fountas & Pinnell, 2009; Hasbrouck & Tindal, 2006; Hasbrouck & Tindal, 2017). In addition, some research shared that there were small differences in speaking rates when looking at gender while other research shared there
were no differences (Jacewicz et al., 2009; Jacewicz et al., 2010; Ray & Zahn, 1990). With the growing influence and utilization of oral reading rate benchmarks by teachers and schools, and the research surrounding both genders of students reading and speaking at different rates, it is important to see is there was a correlation between social conversation speaking rate and oral reading rates? In addition, it is important to see is there a difference with gender and social conversation speaking rate and oral reading rates?

**Purpose of Research**

The purpose of this research is to see is there a correlation between social conversational speaking rate and oral reading fluency rate, using both words per minute and syllables per minute as measurements due to literature utilizing both types of measurements (Fiorin et al., 2015; Hasbrouck & Tindal, 2017; Jacewicz, Fox, & Wei, 2010). This research specifically focused on children in ages 8-12. In addition, this research examined is there a difference with gender and social conversation speaking rate and oral reading rates? With the amount of research available on oral reading fluency and the variability of rate of words per minute, it was important to examine to see if there was a correlation between the two.

**Literature Review**

Oral reading fluency has many parts, definitions, measurements, and correlations. Over the next sections, literature will be reviewed in each of those categories. Beginning the literature review will be some of the research specifics of oral reading fluency. One form of measurement through curriculum-based measures will be explained with a brief history and how it is currently being implemented. Following curriculum-based
measures, another look at measurement, specifically through oral reading rate will also be addressed. The last section of the literature review will be the focus of this research paper, how does social conversational speaking rates correlate with oral reading rates of text and what is there a difference with gender?

Specifics of Oral Reading Fluency

According to scholars, teachers have used oral reading fluency to measure how well students decode words, recognize high frequency words, use expression, and comprehend what they read (Klauda, 2008; Kuhn, Schwanenflugel, & Meisinger, 2010; Miller & Schwanenflugel, 2008; Rasinski, 2004; Schwanenflugl et al., 2006). Scholars also state students who spend more time decoding words (lack of automaticity) read less of a passage or text and their minds have less capacity for understanding what they read (Hudson, Lane, & Pullen, 2005). Thus, students who struggle with reading fluently struggle more with comprehending what they read and show less motivation to continue reading (Morgan & Fuchs, 2007).

Oral reading fluency has been an instrumental part of reading instruction for many years (Deno & Marston, 2006; Hiebert & Fisher, 2005; Hudson et al., 2005; Martens et al., 2007). Often it has been taught as a separate part of the regular reading curriculum (Hudson et al., 2005; Martens et al, 2007; Rasinski, 2012). When listening to students read aloud, depending on the age of the student and the difficulty of the text, students sound choppy, smooth, slow, or fast. They also add inflection in their voices. These characteristics all indicate parts of oral reading fluency (Hiebert & Fisher, 2005; Hudson et al., 2005; Rasinski, 2012; Valencia et al., 2010). For the purpose of this study, rate was
defined as the reading of words at a student’s grade level text within a specific time frame (Hudson et al., 2005; Rasinski, 2012). Accuracy was defined as reading words correctly as written in print. As part of both rate and accuracy, automaticity was the reading of words with minimal decoding. Prosody was defined as the use of tone, inflection, and volume of voice.

Some research has examined oral reading fluency in terms of rate and accuracy (Allington, 2006; Morris et al., 2017). In addition, further research investigated the definition or redefining oral reading fluency as rate or speed, accuracy, and expression or prosody (Hiebert & Fisher, 2005; Hudson et al., 2005; Valencia et al., 2010), with the understanding of reading like conversation (Benjamin & Schwanenflugel, 2010; Kuhn et al., 2010; Rasinski et al., 2009; Schwanenflugel & Benjamin, 2017). Further expansion of that definition includes all the components, rate, accuracy and prosody, with determining meaning of text (Morris et al., 2013; Stahl & Kuhn, 2002). With the understanding of the relationship between fluency and comprehension, educators look for meaningful ways to identify students who need additional supportive instruction, assess reading progress, and make data-based decisions to help students become more successful (Bishop & League, 2006; Hasbrouck & Tindal, 2006; Hudson et al., 2005).

**Curriculum-Based Measures**

One method schools use to gain access to how students show progress in reading is a screening process involving curriculum-based measures (CBM). Curriculum-based measures have been hot topics for research and many schools use them going back many years and for a variety of purposes (Tindal, 2013). Some of those purposes include a check of student skills (screening), monitoring student progress, and identifying potential
students at-risk for learning difficulties (Tindal, 2013). These CBMs are timed checks of
skills that typically last no more than two minutes. Curriculum-based measures in reading
primarily focus on determining a student’s rate of reading (Deno & Marston, 2006). 
Students with slow reading rates often struggle to complete their work, get bored, and
rarely choose to read for pleasure (Moats, 2001). With the concern and a crusade for
reading proficiency, states set in motion a push to use oral reading rates as one way to
determine if students are on track for reading proficiency as well as determining if there
needs to be a change in instruction (Martens et al., 2007; Nese et al., 2011; Schilling,
Carlisle, Scott, & Zeng, 2007).

**Oral Reading Fluency Rates**

Most individual oral reading rates are determined using timed readings of grade-
level texts. One important way to keep track of student progress and reading skills
includes the use of oral reading rate measures (Bishop & League, 2006; Hasbrouck &
Tindal, 2006; Hudson et al., 2005; Martens et al., 2007; Nese et al., 2011). As a part of
determining oral reading rate, cut-off scores or benchmarks serve as general guidelines
for teachers at each grade level to help with decisions for instruction, diagnosis,
screenings, and progress monitoring (Bishop & League, 2006; Hasbrouck & Tindal,
2006; Hasbrouck & Tindal, 2017; Hudson et al., 2005; Martens et al., 2007; Nese et al.,
2011; Ray & Zahn, 2009). Oral reading rates are a measurement of a student’s ability to
read text. The reason for using oral reading rate cut-off scores or benchmarks as *general
guidelines* shows in other studies.
Valencia et al. (2010) conducted a study on the norms (rate) of using words correct per minute (WCPM) as a valid predictor of identifying students at risk for reading difficulties. They concluded that using just WCPM provided both false positives and false negatives, thus over identifying as well as not identifying students who need additional reading instruction. Other reviews of some research on the validity of oral reading rates suggests that even though correlations exist between a student’s reading abilities and oral reading rates, other measurement tools also need to be considered when determining a student’s reading proficiency (Bishop & League, 2006; Hiebert & Fisher, 2005; Nese et al., 2011).

Bishop and League (2006) conducted a longitudinal study following Kindergarten students up through fourth grade. They wanted to see if beginning screening measures in Kindergarten could predict reading difficulties. They found that the highest correlation was with oral reading rate however a multivariate screening model was needed, not just oral reading rate to determine long-term reading achievement. Hiebert and Fisher (2005) conducted a review of the National Reading Panel’s study on fluency based on the role of text. They determined that the texts used at the time of the 2000 results, used different vocabulary than current texts when determining oral reading fluency rates. Nese et al. (2011) conducted a study on predictions of high-stakes assessments based on curriculum-based measurement. Their findings show that vocabulary was the best predictor across the grades for relation between easyCBM benchmark measures and statewide reading tests.

Multiple sources of literature are available regarding oral reading rates and these sources show various benchmarks classifying a student as at-risk (Christ, et al., 2018;
Hasbrouck & Tindal, 2017; Morris et al., 2013; Ray & Zahn, 2009; Trainin, Hiebert, & Wilson, 2015). As Hasbrouck and Tindal (2006) state, “It is important to recognize that when fluency-based reading measures are used for screening decisions, the results are not meant to provide a full profile of a student’s overall reading skill level” (p. 640).

Hasbrouck and Tindal (2006) reviewed data regarding screenings for the early childhood ages as well as older students. The term oral reading fluency is used instead of oral reading rate; however, the terms mean the same thing in regard to this study.

Hasbrouck and Tindal (2006) share their recommendations for interpreting screening scores using the oral reading fluency (ORF) norms for grade 1 students. Their article shares how to interpret the ORF scores as well as includes some other assessments that could be implemented. Within this article, they share how, “pushing every student to read the 90th percentile or even the 75th percentile in their grade is not a reasonable or appropriate goal for fluency instruction” (Hasbrouck & Tindal, 2006, p. 642). An updated technical report written by Hasbrouck and Tindal, published in 2017, shows new norm ranges for grades 1 - 8. Hasbrouck and Tindal (2017) gathered data from additional resources (DIBELS, DIBELS Next, and easyCBM) that allowed access to more students across more states. Most of these new grade level norms show an increase in rates as part of oral reading fluency. These norms are based specifically on rate of reading, so it means that students are reading faster than previously collected samplings of data. Does this also mean that students are speaking faster? With the increase in oral reading rates, how do the rates of conversational speech compare?
Social Conversational Speaking Rate

A lack of research between social conversational speaking rate and oral reading rate gave reason that it is an area to pursue (Fiorin, de Ugarte, Capellin, & de Oliveria, 2015). Study of the limited amount of literature on the topic of social conversational speaking rate in terms of correlation to oral reading fluency reveals that more research is needed with updated information based on current standards and practices (Jacewicz, et al., 2009; Jacewicz, et al., 2010). Much of the research surrounding social conversational speaking rates involves speech impairments such as comparing those who stutter with those who do not stutter (Logan, Byrd, Mazzocchi, & Gillam, 2011). Using both syllables per minute and words per minute as measurements of speech, Fiorin, de Ugarte, Capellin, and de Oliveria (2015) compared students ages 8 to 11 who stutter with students who do not stutter using spontaneous talk and text read. Results indicated that students who do not stutter were more fluent at speech than students who do stutter, however students who stutter showed more flow of syllables when reading orally (p. 153).

Two more studies conducted by Jacewicz et al. (2009) and Jacewicz et al. (2010) compared speech rates between northerners and southerners. Speech rates were defined as articulation rates. Articulation rates were clearly defined as being separate from speaking rate due to speaking rate allowing for pauses and hesitations (Jacewicz, et. al. 2009). These studies conducted research in controlled settings using both read sentences and spontaneous speech. Using the orally read sentences with correct stress placement as measured by syllables per second, results indicated that northerners read faster than southerners. These results carried over into conversational speech as well, indicating a relationship between oral reading of text and conversational speech. Within this study
Jacewicz et al. (2009) further analyzed the data and extended data collection within age groups, regions and gender. Results from both studies showed that people speak at different rates depending on age and region (Jacewicz, et al., 2009; Jacewicz, et al., 2010).

Taking speech rate, a little further, a study by Robb and Gillon (2007) conducted comparisons of speech rates within the English language itself. Robb and Gillon (2007) reported results regarding children between the ages of 2 years 11 months and 3 years and 5 months. The results showed that when comparing Australian, American, British English, and New Zealand English, the New Zealand children spoke slower than American children (Robb & Gillon, 2007, p.173). Part of this research showed that vowel differences played a part in speech rates. This aspect of research was not conducted in this present study.

Gender

As for gender, Jacewicz et al. (2009) found that gender did have a small effect on read sentences and no significant effect on spontaneous speech. Jacewicz et al. (2009) used syllables per second as measurement and showed that males read faster than females. They used a sample size of 94, 38 males and 38 females, with 18 additional participants not identified by gender. Further research by Jacewicz et al. (2010) using a larger sample size showed that gender was not a significant effect on read sentences however, the trend was males were slightly faster than females in one region and females slightly faster than males in another region. Ray and Zahn (2009) conducted a preliminary analysis of adult speech rates within the United States and found that there
was no significant difference between gender and rate. They used a sample of 48 females and 45 males.

In conclusion, as expressed earlier, due to the limited amount of research available comparing both oral reading rates and social conversational speaking rates, it is important to conduct studies surrounding this topic. With the use of oral reading rates as a measuring tool for tracking reading proficiency, along with listening to students read and speak, I noticed fluctuations in rates, tone, and pronunciation. For this study two questions were examined: Is there a correlation between social conversational speaking rate and oral reading fluency rate, using both words per minute and syllables per minute as measurement and second, is there a difference with gender and social conversation speaking rate and oral reading rates?

**Methodology**

For this study the primary emphasis included oral reading rates measured by CBMs, as one part of oral reading fluency, and social conversational speaking rates using the definition by Jacewicz et al. (2010) as articulation rate. Based on the available research already conducted surrounding measurement, this study used Standard English and both syllables per minute and words per minute as measurement for oral reading rate and social conversational speaking rate.

Prior to working with students, I took the Human Participants/Human Subjects Research training through the University of Northern Iowa via the Collaborative Institutional Training Initiative (CITI) online module program (See appendix A). Upon completion of the training, I completed the PreK-12 Classroom Research Exempt
Determination Form and was approved to conduct research through the University of Northern Iowa Institutional Review Board (IRB) process (see Appendix B). Following the training and approval for research I prepared for quantitative data collection. The Microsoft Excel with the Data Analysis ToolPak was chosen as the statistical data analysis tool (Gahunga, 2010; Microsoft, n.d.)

**Setting**

Participating students worked with me, the researcher, at an elementary school, where the researcher is a preschool teacher, in a one-to-one setting in a comfortable environment for the participants. Choices for a comfortable environment included a small corner of a classroom, a small office next to the elementary office, or a corner in the school nurse's office. All participating students chose the small corner of a classroom not in use by other students or teachers.

**Participants**

Parental permission slips including a letter describing the study were distributed to third, fourth, fifth, and sixth grade classrooms at an elementary school in Southern Iowa, through the classroom teacher. This involved students ages 8 – 12 years old. Students were not compensated for their participation. Fifty-nine permission slips were sent out. Twenty-seven permission slips were returned with permission to participate in the study. During the time the data was collected twenty-five students were present for participation. One student was absent, and another had moved prior to the day the speech data was collected. Demographics include 12 male students and 13 female students who participated in the study. Twenty-four students were Caucasian, and one student was African American. Broken down by grade level there were nine third grade students, six
fourth grade students, six fifth grade students, and four sixth grade students. All students spoke Standard English as their first language.

Data Collection

Throughout the collection of data, two different types of data were examined and retrieved from each participating student. Oral reading rates were collected from existing data collected as part of the elementary school screening process using the Formative Assessment System for Teachers (FAST). Social conversational speaking rates were collected through casual, individual student conversations with the investigator. Both types of data and their collection are further described in this section.

Oral reading rates. Existing data from the FAST, oral reading fluency screening (CBM-R) was accessed and used for student oral reading rates (Christ, et al., 2018). Students completed FAST screening in late September as part of the elementary school assessment plan. Student scores in FAST were determined through its system using the median score from three separate fiction passages read at the student’s current grade level for a length of one-minute per passage (Christ, et al., 2018). Words read correct per minute were determined by the FAST system as the student’s oral reading rate. Through the Multi-Tiered System of Supports (MTSS) coach and the school’s curriculum instructor the researcher accessed this data for participating students.

Oral reading rates and the median passage were collected for each participating student. Using the median passage for each participating student, names were removed from each passage and replaced with a corresponding number to the student’s social conversational speech recording. Syllables per minute were counted for the text the student read correctly within one minute on the median passage. It was also counted by a
person other than the researcher to check validity of the syllable count. Words read correctly per minute had already been calculated by the FAST data system. All data was collected in Fall of 2018.

**Social conversational speaking rates.** Following the FAST Screening window in late September, the researcher gave class lists of participating students to their classroom teachers. The researcher worked with the classroom teacher to set up a time to meet with participating students that did not interfere with the classroom teacher’s schedule and the student’s core instruction. All recorded conversations with participating students were conducted on the same day.

To help make students more comfortable I tried to build rapport with the participating students by introducing myself and explaining the procedure for the conversation. An Evistr digital recording device was used to record students’ natural speaking. Prior to recording a student’s speech, I showed the Evistr digital recording device to the participating student and allowed him or her to feel it. I demonstrated how it worked by recording the student’s voice and playing it back for him. After the student listened to his own recorded voice, I asked the participating student the following open-ended prompt: "Talk about a favorite activity, event, or place that you enjoy?" If there was a lag in speech the researcher asked the following open-ended prompts: "Talk about your favorite sport." "Talk about your favorite animal." "Talk about your favorite video game." All sessions were conducted individually with students and lasted no more than five minutes. Each recording was given a number that corresponded with the participating student’s median passage and oral reading rate.
Speech recordings were transcribed. Words such as um, uh, hmmm, and other “thinking” expressions were not counted as words when determining rate. Pauses and “thinking” expressions lasting longer than three seconds were removed from overall time. All transcriptions were counted by a second person for determining number of words and syllables for the purpose of accuracy in count for data. Student social conversational speaking recordings were measured in words per minute and syllables per minute. All data was collected in fall of 2018 (see Table D1).

Data Analysis

Upon initial analysis of the data, as part of descriptive statistics, histograms which show the number of students (frequency) reading at words per minute and syllables per minute were created to identify which type of data analysis was going to be used (see Figure 1). When looking at the histograms it appeared that an outlier existed in the oral reading rate data.

Figure 1. Histograms

Interquartile range was calculated to determine if in fact there was an outlier. Quartiles were calculated using the median of the collected data (Q2) and then the median of the data values that fell below that Q2 median which became Q1 and finding
the median of the data values that fell above the Q2 median which became Q3. The interquartile range was multiplied by 1.5, a typical method to check data for outliers. By looking at the quartiles it was determined that there was no outlier.

Scatter plots were constructed for both words per minute and syllables per minute and regression lines calculated (see Figure 2). When regression analysis was applied to the residuals from the regression line there was in fact an outlier and that outlier was removed from further data analysis. A description of this analysis is explained in the Results.

When looking at the histograms, the data indicated the social conversational speaking rate was normally distributed and the oral reading rate had a bimodal distribution. It was determined to use both parametric and nonparametric data analysis tools due to the different types of data distributions. The use of parametric measures was preferred due to the advantages such as being more sensitive, needing smaller differences, and being more efficient to reject the null hypothesis (Bluman, 2014). Pearson product moment correlation coefficient was the parametric measure used in data analysis within the Microsoft Excel data analysis ToolPak (Microsoft, n.d.).

Knowing the oral reading rate had bimodal distribution, indicated a need to also use nonparametric methods, which is still a valuable tool for data analysis and thus was applied to this study’s data (Bluman, 2014).

For the nonparametric data analysis, Spearman Rank was used. Formulas and tables in Bluman’s Elementary Statistics were used to conduct this analysis (Bluman, 2014).
The results of these data were calculated using two different types of measurement methods. Based on the visual component of the histograms, which are explained in the Discussion section of the paper, it warranted the need to analyze the data in both parametric and nonparametric measurement methods. Results of the data are explained through parametric data analysis first followed by the nonparametric data analysis.

**Parametric Data Analysis**

Summary statistics were obtained using the descriptive statistic tool in Excel’s Data Analysis ToolPak (see Table E1). Data were analyzed using the regression tool in Microsoft Excel’s Data Analysis ToolPak (Microsoft, n.d.). The two hypotheses are: $H_0 =$ There is no correlation between social conversational speaking rate and oral reading rate when measured in words per minute. $H_1 =$ There is a correlation between social conversational speaking rate and oral reading rate when measured in words per minute.

As stated, a scatter plot was constructed, and initial analysis indicated there was an outlier. One method for identifying outliers is using the interquartile range, but this did
not show an outlier. However, further analysis of the measures obtained through the residuals as a result of the regression analysis, indicated there was an outlier.

The residuals are the difference between the actual data and what the regression equation predicted. When the residuals were placed on the normal curve it indicated there was an outlier. That outlier was the only outlier and almost three standard deviations below the mean residual. Due to the outlier being alone and almost three standard deviations below the mean, that outlier was removed from the data when it was further analyzed.

Social conversational speaking rate words per minute and syllables per minute were inputted as the independent variable in two separate analyses and oral reading rate words per minute and syllables per minute were inputted as the dependent variable. When looking at the histograms, the natural speaking rate appeared normally distributed so parametric analysis was appropriate. However, the oral reading rate was bimodal in appearance, therefore, nonparametric analysis was used as described later. The Pearson Product Moment Correlation coefficient (PPMC) was the parametric measure used to determine if there was a strong relationship between the variables.

**Words per minute.** A regression analysis was performed on the hypotheses using the Microsoft Excel Data Analysis ToolPak. P-values were found to be 0.035, allowing a 3.5% margin of error when using the regression equation: \( \text{oral reading rate} = 0.640 \times \text{social conversational speaking rate} + 78.77 \) (see Table E1). In the regression equation, the coefficient of the independent variable had a P-value of 0.035 and the y-intercept had a P-value of 0.013. The small P-values indicated valid coefficients in the regression equation. Significance F was shown to be 0.035.
PPMC critical R is 0.406 for n=24 and α=0.05 according to Table I (Bluman, 2014, pp.797). The R-value for the 24 pairs in this data was determined as 0.431. Thus, since R of 0.431 was greater than PPMC critical R of 0.406, H₀ stating there is no correlation between social conversational speaking rate and oral reading rate, was rejected. Moreover, the P-value indicated the statement, “There is a significant correlation between social conversational speaking rate and oral reading rate when measured in words per minute,” was only in error 3.5% of the time.

**Syllables per minute.** A regression analysis was performed on the hypotheses using the Microsoft Excel Data Analysis ToolPak. P-values were found to be 0.052, allowing a 5.2% margin of error when using the regression equation:

\[
\text{oral reading rate} = 0.615 \times \text{social conversational speaking rate} + 105.59 \text{ (see Table E1)}.
\]

In the regression equation, the coefficient of the independent variable had a P-value of 0.013 and the y-intercept had a P-value of 0.052. Once again, the small P-values indicated valid coefficients in the regression equation. Significance F was shown to be 0.052.

PPMC critical R is 0.406 for n=24 and α=0.05 according to Table I (Bluman, 2014, pp.797). The R-value for the 24 pairs in this data was determined as 0.401 thus since R of 0.401 is less than PPMC critical R of 0.406, H₀ stating there is no correlation between social conversational speaking rate and oral reading rate, was not rejected. However, the P-value indicated the statement, “There is a significant correlation between social conversational speaking rate and oral reading rate when measured in syllables per minute,” was only in error 5.2% of the time.

**Non-Parametric Data Analysis**
The bimodal appearance of the oral reading rate histograms for both words per minute and syllables per minute indicated that parametric measures may be doubted. Thus, the data was also analyzed using the non-parametric Spearman Rank to look for correlation (see Table F1). As stated earlier in parametric measurements, an outlier was found at almost three standard deviations, therefore, was removed for data analysis. In continuing with nonparametric measurement that same outlier was removed.

**Words per minute.** Data were ranked and then the difference between the ranks (d) was used to compute the Spearman Rank Correlation Coefficient, \( r = 1 - \frac{6 \sum d^2}{n(n^2-1)} \).

Using data from this research \( n = 24 \) and \( \sum d^2 = 1335.00 \) (see Table F1), the test value \( r_s = 0.4196 \) was calculated. Using Table L from Bluman’s Elementary Statistics at a significance of \( \alpha = 0.05 \), \( r_s \text{ Crit} = 0.409 \) (Bluman, 2014, pp.798). Thus, since \( r_s \) of 0.4196 was greater than \( r_s \) critical of 0.409, \( H_0 \) stating there is no correlation between social conversational speaking rate and oral reading rate, was rejected. Further analysis by interpolation showed the evidence supported the claim that there is a correlation between social conversational speaking rates and oral reading rates was significant at a level of \( \alpha = 0.045 \). This equates to the P-value.

**Syllables per minute.** Data were ranked and then the difference between the ranks (d) was used to compute the Spearman Rank Correlation Coefficient, \( r = 1 - \frac{6 \sum d^2}{n(n^2-1)} \).

Using data from this research \( n = 24 \) and \( \sum d^2 = 1460.00 \) (see Table F1), the test value \( r_s = 0.3652 \) was calculated. Using Table L from Bluman’s Elementary Statistics at a significance of \( \alpha = 0.05 \), \( r_s \text{ Crit} = 0.409 \) (Bluman, 2014, pp.798). Thus, since \( r_s \) of 0.3652 was less than \( r_s \) critical of 0.409, \( H_0 \) stating there is no correlation between social conversational speaking rate and oral reading rate, was not rejected. Further analysis by
interpolation showed the evidence supported the claim that there is a correlation between social conversational speaking rates and oral reading rates was significant at a level of $\alpha = 0.067$. This equates to the P-value.

**Gender Data Analysis**

Parametric measures were used through the Microsoft Excel Data Analysis ToolPak to analyze gender differences in oral reading rates and social conversational speaking rates.

*Words per minute.* A two-tailed t-test was conducted to determine if there is a difference in oral reading rates between males and females using words per minute as measurement. $H_0$ states there is no difference in oral reading rates between male and female students. $H_1$ states there is a difference in oral reading rates between male and female students. For females the mean was 102.07 wpm and for males the mean was 98.67, thus looked like females read slightly faster than males. A P-value of 0.73 was calculated (see Table H1). Thus, $H_0$ was not rejected.

Another two-tailed t-test was also conducted to determine if gender affected social conversational speaking rates. $H_0$ states there is no difference in social conversational speaking rates between male and female students. $H_1$ states there is a difference in social conversational speaking rates between male and female students. For females the mean was 138.85 and for males the mean was 137.33. A P-value of 0.93 was calculated (see Table H2). Thus, $H_0$ was not rejected.

*Syllables per minute.* A two-tailed t-test was conducted to determine if there is a difference in oral reading rates between males and females using syllables per minute as measurement. $H_0$ states there is no difference in oral reading rates between male and
female students. H$_1$ states there is a difference in oral reading rates between male and female students. For females the mean was 178.38 spm and for males the mean was 176.58, thus looked like females read slightly faster than males. A P-value of 0.94 was calculated (see Table H3). Thus, H$_0$ was not rejected.

Another two-tailed t-test was also conducted to determine if gender affected social conversational speaking rates. H$_0$ states there is no difference in social conversational speaking rates between male and female students. H$_1$ states there is a difference in social conversational speaking rates between male and female students. For females the mean was 127.62 spm and for males the mean was 126.67 spm. A P-value of 0.94 was calculated (see Table H4). Thus, H$_0$ was not rejected.

**Discussion**

A correlation between oral reading rate and social conversational speaking rate was found when measured in words per minute. Looking closely at the results led to further discussion about the data. Parts of this discussion included looking at the original sample of participants, the statistical findings, the lone outlier, and gender comparisons. A final part of this discussion included looking at the limitations within this current study and research.

**Sample Participants**

One aspect of discussion included the sample size of participants. The data indicated that the sample of 25 students, 13 males and 12 females, represented a small portion of a population in one elementary building in Southern Iowa. It also included a range of ages from 8 years old to 12 years old. With the knowledge that the ages were grouped together and not separated by grade levels or individual ages the question, of
whether data were grouped by grade level or individual ages, would it effect the
correlation between oral reading rates and social conversational speaking rates? Another
aspect of the use of one elementary building in the Southern Iowa geographic region
within this sample opened the door for the possibility that a larger sample of students
from a variety of geographic areas may provide further and new evidence surrounding
this topic. Looking at previous research on a similar topic through Jacewicz et al. (2010)
that showed that populations living in different regions did have different rates of
speaking but that research didn’t share about any correlation between oral reading and
social conversational speaking rates. This leads to the question, does the geographical
area in which students reside have an impact on the oral reading rate or social
conversational speaking rate and their correlation to each other? Having raised these
questions, it was also important to look further into the statistical findings based on the
analyzed data.

**Statistical findings**

In the statistical findings the data analyzed using parametric measures concluded
there was evidence that showed a correlation between oral reading rates and social
conversational speaking rates when measured in words per minute. The findings
suggested that when measured with syllables per minute the correlation was found with a
higher level of error. As the data were analyzed with nonparametric measures, it
indicated the same results with the correlation being significant at a level of $\alpha = 0.05$ for
words per minute, it raised a question about the passages read. The passages read were
taken from an existing system and were not analyzed in detail by the researcher. This
would be another area to look at when using the syllables per minute measurement.
Further analysis of the passages could shed light on more details such as the number of syllables per word read based on the reading level of the passage. Could it be that the passages selected for the oral reading rate contained fewer syllables per word read versus the words spoken by the participants? Thus, with that question the correlation between oral reading rate and social conversational speaking rate, when measured in syllables per minute, would benefit from further research with an analyzed passage sampling.

**Outlier**

Another area examined when discussing the statistical findings was the lone outlier in the data that was removed from the data sampling. The outlier showed extreme differences in the oral reading rate when compared with the other participants. Going back to the original sample of participants, there was no other specifications about participating other than being in the age range of 8-12 years old. No demographic information was collected regarding information about students identified with or without specific learning disabilities in the areas of reading and speech. With this knowledge it led to the question: What caused this student’s data to be so different from the rest of the sample? Could it have been that the outlier was a student with an already identified reading disability and had no identified speech disabilities or had an unidentified disability? This led to questions about conducting further research with the possibility of examining other categories such as students with identified reading disabilities and no identified speech disabilities, and vice versa, students with identified speech disabilities and no identified reading disabilities. Some research surrounding this topic has been conducted by multiple scholars on the subject of stuttering (Davidow & Ingham, 2013; Fiorin et al., 2015; Logan et al., 2011). Another type of research has been conducted by
scholars surrounding a similar topic utilizing visual components of reading and how it is processed in the brain and affects speech (Erdener & Burnham, 2013; Holloway, van Atteveldt, Ansari & Blomert, 2015; Shankweiler, 2008; Wijnants, Hasselman, Cox, Bosman, & Van Orden, 2012). The evidence of the outlier at almost three standard deviations from the mean again indicated a need for further research surrounding the topic of oral reading rates as it is correlated with social conversational speaking rate and the possibility of learning disabilities. When looking at the questions brought forth in discussion there were several limitations within this research.

Gender Comparisons

The data from this research showed that there was no effect of genders on oral reading rate and social conversational speaking rate. Thus, saying that girls did not read or speak faster or slower than boys or that boys did not read or speak faster or slower than girls. This was similar to the results in the area of speech in the study by Ray and Zahn (2009). It also differed from the research gathered earlier by Jacewicz et al. (2010). This study’s research sample was a small sample in one elementary building in Southern Iowa; Jacewicz et al. (2010) had a larger sample and a broader age range, with these conditions it could further explain why the results differ.

Limitations

The environment in which the students gave their social conversational speaking sample may have produced a different rate if students were speaking with peers, relatives, or other types of non-relative adults. As mentioned earlier, the sample size taken from one elementary building in Southern Iowa could have had an effect on the type of data collected and how oral reading rate and social conversational speaking rate correlated to
each other. When looking at the existence of an outlier it is possible that due to the small sample of data, a larger sample may have more outliers, or this type of outlier may not have existed. Not collecting demographic information stating known reading or speech disabilities of students could have also impacted the results.

Conclusion

In conclusion with this research, the sample size, and the data analyzed, showed there is a correlation between oral reading rate and social conversational speaking rate as measured in words per minute. The questions brought out in discussion suggest further research surrounding this topic. As for educators, when students are assessed with oral reading rate benchmarks based on this research it is also important to look at their social conversational speaking rate to make instructional decisions.
References


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DOI:10.1086/431888

children’s reading ability 1 year later? Journal of Educational Psychology, 102(2),


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**Appendix A**

CITI Completion Page 1

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### COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

**COMPLETION REPORT - PART 1 OF 2**

**COURSEWORK REQUIREMENTS**

*NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See transcript report for more recent quiz scores, including those on optional (supplemental) course elements.*

- **Name:** Sarah Mason (ID: 6660937)
- **Institution Affiliation:** University of Northern Iowa (ID: 1814)
- **Institution Email:** masonsa@uni.edu
- **Institution Unit:** Literacy Education
- **Phone:** 6418642532

- **Curriculum Group:** Other Groups
- **Course Learner Group:** Same as Curriculum Group
- **Stage:** Stage 1 - Basic Course

- **Record ID:** 24742185
- **Completion Date:** 22-Dec-2017
- **Expiration Date:** N/A
- **Minimum Passing:** 80
- **Reported Score:** 96

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For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid independent learner.

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Collaborative Institutional Training Initiative (CITI Program)

Email: support@citiprogram.org

Phone: 888-629-5929

Web: [https://www.citiprogram.org](https://www.citiprogram.org)
COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

COMPLETION REPORT - PART 2 OF 2
COURSEWORK TRANSCRIPT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- Name: Sarah Mason (ID: 6660937)
- Institution Affiliation: University of Northern Iowa (ID: 1814)
- Institution Email: masonsab@uni.edu
- Institution Unit: Literacy Education
- Phone: 6416423532

- Curriculum Group: Other Groups
- Course Learner Group: Same as Curriculum Group
- Stage: Stage 1 - Basic Course

- Record ID: 24742185
- Report Date: 08-Feb-2019
- Current Score**: 100

REQUAED, ELECTIVE, AND SUPPLEMENTAL MODULES

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For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid independent learner.

Verify at: www.citiprogram.org/verify/?k=2d317eeb-2833-4a6d-a7d9-32e6957f5912-24742185

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Phone: 888-529-5929
Web: https://www.citiprogram.org
Appendix C

IRB PreK-12 Exempt Determination Eligibility

University of Northern Iowa

IRB PreK-12 Exempt 1 Determination

Anita M Gordon <anita.gordon@uni.edu>
To: masonsab@uni.edu
Cc: Timothy Weih <Timothy.Weih@uni.edu>

Wed, Oct 3, 2018 at 2:33 PM

Dear Investigator(s):

Your IRB form has been received by the UNI IRB, and your study, *Is There a Correlation Between Oral Reading Rate and Natural Speaking Rate?*, has been determined to meet the criteria for Exempt status, category I. You may begin recruitment, data collection, and/or analysis for your project.

You are required to adhere to the study procedures reported in your IRB form, and to monitor the project to ensure that the rights and privacy of the participants in your study are protected.

**If you need to make any changes** to the study, you must request approval of the changes before continuing with the research. Requests for modifications should be emailed to the IRB Administrator at anita.gordon@uni.edu.

Your study will **not require annual review or closure**.

**If during the study you observe any problems** or events pertaining to participation in your study that are **serious and unexpected**, you must pause data collection and report this to the IRB immediately (at least **within 10 days**) to receive guidance on next steps. Examples include unexpected injury or emotional stress, missteps in the consent documentation, or breaches of confidentiality.

**If you need a signed determination letter**, contact the IRB office and one will be provided for your records.

Best wishes for your project success.

Anita Gordon
IRB Administrator

---

Anita M. Gordon, PhD
IRB Administrator
Director of Research Ethics
Office of Research & Sponsored Programs
University of Northern Iowa
213 East Bartlett
Cedar Falls, IA 50614-0394
319-273-6148
Appendix D

Table 1

Social Conversational Speaking and Oral Reading Rates

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Note. WPM = words per minute; SPM = syllables per minute.
Appendix E

Table 1

Speaking and Reading Rates Regression

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Note. WPM = words per minute; SPM = syllables per minute; CI = confidence interval
** p ≤ 0.04. *** p ≤ 0.05
### Appendix F

**Table 1**

<table>
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<tr>
<th>Student</th>
<th>Speech WPM &lt;sup&gt;(xi)&lt;/sup&gt;</th>
<th>Reading WPM &lt;sup&gt;(yi)&lt;/sup&gt;</th>
<th>Difference &lt;sup&gt;(D = xi - yi)&lt;/sup&gt;</th>
<th>D&lt;sup&gt;2&lt;/sup&gt;</th>
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Σd<sup>2</sup> = 1335

Note. WPM = words per minute.
Appendix G

Table 1

Speaking and Reading Rates Rank SPM

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<th>Student</th>
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Σd^2 = 1460

Note. SPM = syllables per minute.
Appendix H

Table 1

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<th>t-crit</th>
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