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## The Relationship Between Teachers' Lexical Diversity and Their Students' Vocabulary Growth in Written Language Samples

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THE FLORIDA STATE UNIVERSITY  
COLLEGE OF COMMUNICATION AND INFORMATION  
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THE RELATIONSHIP BETWEEN TEACHERS' LEXICAL DIVERSITY AND THEIR  
STUDENTS' VOCABULARY GROWTH IN WRITTEN LANGUAGE SAMPLES

By

KATHLEEN COFFEY

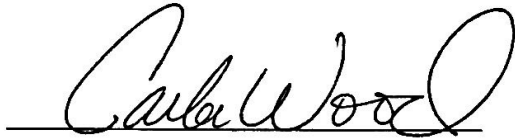
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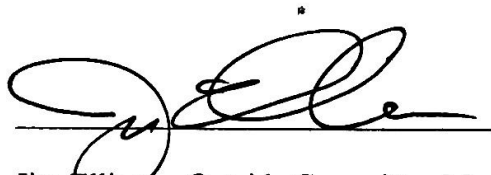
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The members of the Defense Committee approve the thesis of Kathleen Coffey defended on

April 12, 2019.

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### Introduction

Lexical diversity refers to the number of different words (NDW) used in a specific text, with a greater range indicating a higher diversity (McCarthy & Jarvis, 2010). It is one of the many techniques that has been developed to assess an individual's vocabulary in an oral or written language sample (Fergadiotis, Wright, & Green, 2015). The terms lexical diversity and NDW can be used interchangeably in the context of the current study. NDW has been used in a wide variety of areas in the field of communication science and disorders. For example, researchers have used NDW to study the relationship between phonological processing and reading skills, to evaluate individuals with aphasia, to assess the progress of individuals after a cochlear implantation, and to study possible language impairments in bilingual children (Fergadiotis et al., 2015). Studying lexical diversity and the factors that influence it can help in understanding how humans can best learn and use language. This gives speech-language pathologists and other professionals insight into the best therapy interventions.

### *Background Information*

The current study utilized lexical diversity in order to evaluate the impact of teachers' language on their second grade students' language growth throughout the year. The teachers' lexical diversity was measured through oral language samples, while the students' lexical diversity was measured through written language samples. NDW was used in this research because it can indicate text complexity. Past research validates the use of lexical diversity in assessing an individual's vocabulary, but cautions clinicians and researchers to be aware of the different estimation techniques used to measure it (Fergadiotis et al., 2015). Fergadiotis et al. examined the different techniques and discovered that the scores for measure of lexical diversity and moving-average type-token ratio were the strongest ways to measure lexical diversity. The

current study measured lexical diversity by calculating the NDW within each teacher and student language sample in order to see if there was a relationship between the two.

If a relationship between teacher and student language was found, the current study would indicate that there needs to be an emphasis on how teachers communicate with their students. The impact of input may be far greater than previously thought. There is not a lot of prior research that focuses on this relationship, which is a reason why the current study is prevalent. However, there is some research that demonstrates the importance of instruction in a classroom setting. According to Justice, Mashburn, Hamre, and Pianta, it is important for teachers, especially in the preschool setting, to focus on the process of instructional quality in language and literacy (2008). The teachers carried out the procedures well, but this study affirms that it is important for them to implement high quality instruction, as that will help their students to elevate their own language and literacy skills (Justice et al., 2008). A gap in this study exists in that it does not detail if higher quality language and literacy instruction has a relationship with the quality of language and literacy in the children. The current research study seeks to help fill that gap.

### *Influencing Factors*

Many factors can influence children's language. AlHammadi emphasizes how language development is largely influenced by environmental factors (2017). He has found that exposure to environmental factors can have a complex interplay with the biological aspects of communication disorders (AlHammadi, 2017). In addition, it can be influenced by social factors, genetic factors, and other valid predictors of developmental delays (AlHammadi, 2017). AlHammadi argues that the input that children receive at home is more significant in the development of language than the input they receive at school (2017). However, he did not detail

his reasoning behind this argument. The current study will seek to discover if school - specifically, teacher language - has more of an impact on student language than previously thought.

### *Importance of Input*

There is some research that serves to answer the question of why input matters. Most of the research that currently exists focuses on the parent-child relationship, rather than the teacher-student relationship. In addition, most of the existing research focuses on preschool-aged children. A study done by Cameron-Faulkner, Lieven, and Tomasello demonstrates that children's words and phrases correlate highly with their mother's frequency of use (2003). In addition, Topping, Dekhinet, and Zeedyk provide strong evidence for parental efforts in pre-literacy activities with their children (2012). Since children spend a majority of time with their parents, it makes sense that children may first learn language based on what their parents say. It is not well understood how children then acquire less frequent and more complex constructions (Cameron-Faulkner, Lieven, & Tomasello, 2003). The role of input in the development of child language is a central question for future research. It will help researchers and clinicians to understand how children can learn language most effectively.

Several implications exist for children who do not get the language input that they need. For example, children may fall behind in school, lack pragmatic language skills, struggle with basic vocabulary, or lack social skills. Again, prior research has shown that these implications may be extremely prevalent if children do not get the necessary input from their parents (Topping et al., 2012). However, it is critical to research how teachers' language may impact children, as this could play a role in helping children to reach their full potential in terms of language and literacy.

*Theoretical Framework*

The idea that there may be a relationship between teacher and student language aligns with nurture-inspired language development theories. More specifically, it aligns closely with Vygotsky's Social-Interactionist Theory. This theory argues that social interaction between an infant and another person, such as a parent, teacher, or babysitter, is an important mechanism in the development of child language (Turnbull & Justice, 2012). A critical concept of this theory is the zone of proximal development (ZPD), which is the difference between a child's actual development level and potential development level (Turnbull & Justice, 2012). The Social-Interactionist Theory gives a more dynamic approach to child language development because it emphasizes that children are in the process of learning and maturing (Turnbull & Justice, 2012). As a result of social interactions, cognitive abilities improve over time.

There seems to be a promising relationship between the current study and Vygotsky's Social-Interactionist Theory. If teachers' NDW has a relationship with their students' growth in NDW, it is plausible that social interactions help children to develop their language to their full potential. If researchers can figure out how to optimize children's language development, this could help children to develop exceptional pragmatic skills and stay ahead in school. This study is important because it will help researchers and other professionals figure out how to give the best education, and life in general, to children all around the world.

*Aims*

The current study aimed to discover if there is a relationship between teachers' lexical diversity and their second grade students' growth in lexical diversity throughout the school year. Specific questions may include:



1. What is the average NDW for each teacher in 15 minute samples during the class English Language Arts (ELA)?
2. What is the NDW for children in written samples collected during the fall of 2017?
3. What is the NDW for children in written samples collected during the spring of 2018?
4. Is there a relationship between the teachers' lexical diversity and their students' growth in lexical diversity?

## Methods

### *Participants*

The participants in this study consisted of both teachers and students. All of the data being utilized in this study were gathered from the Learning Environment Analysis (LENA) Project, a descriptive project in cooperation between Florida State University and Vanderbilt University. Twenty-three of the participants in this study were second grade teachers from a variety of schools in the Tallahassee and Nashville areas. They vary in terms of gender, race, ethnicity, age, years of teaching experience, and socioeconomic status (SES).

The second grade students in this study also vary in terms of gender, race, ethnicity, and SES. There were a total of 202 second grade students in the twenty-three classrooms. The number of students in each class ranged from 6 to 13. It is important to note that the students' language abilities varied greatly. Some may be ahead for their age, while some have already fallen behind. The schools themselves also vary in terms of SES and overall reputation. All of the participants in this study have volunteered to do so.

### *Materials*

#### Children's Written Samples

Written samples were collected from the second grade students in order to measure their lexical diversity. The students were asked to compose a written narrative in response to the prompt, “*One day when I got home from school...*” The language samples were then transcribed using the Systematic Analysis of Language Transcripts (SALT) software. SALT calculated the NDW for each written sample. The data for each student, and each classroom overall, was then further analyzed in Microsoft Excel.

### Teachers' Oral Language Samples

The teachers' language samples were taken orally, each teacher wore a LENA recorder on their nametag twice a month in order to capture their spoken language. Their samples were also transcribed using SALT, and were further analyzed in Microsoft Excel. This data helped in discovering if there are any existing relationships between teacher and student language.

### *Procedures*

Each teacher in this study wore the recorder twice each month throughout the entire school day. This occurred during the 2017-2018 school year. However, this study will be looking at 15 minute intervals taken during English Language Arts (ELA) twice each month. This will be done in order to keep the type of language being used during class somewhat constant throughout the entire year. After the samples were taken, they were transcribed into the SALT software. Next, SALT calculated the NDW in each sample, and then averaged the NDW for each teacher throughout the entire school year.

Each student's written sample was transcribed into SALT. The students wrote one sample in the fall of 2017 and one sample in the spring of 2018. SALT has calculated the NDW for each student's sample. The current study took the average NDW for each class in the fall and the average NDW for each class in the spring.

All of the data were then put into Microsoft Excel. From there, this study attempted to see if there was a relationship between the teachers' average NDW throughout the school year in ELA and the students' growth in NDW from the fall semester to the spring semester based off of their written samples. It is important to note that each classroom was analyzed separately in order to avoid nesting. However, this study looked within and between each teacher and classroom in an attempt to fully understand the data. This study helps in understanding how much of an impact teachers' language has on students' language growth throughout the length of an entire school year.

### *Analyses*

To answer the first three research questions, we computed descriptive statistics and report means, standard deviations, and the range of NDW for both oral and written samples. To answer the final research question examining the relationship between teachers' NDW and children's' growth in NDW, we conducted correlational analyses. Pearson correlations will be examined to identify and report the strength, direction, and significance of the relationship between teachers' NDW and their students' growth in NDW.

## Results

### *Average NDW for Each Teacher*

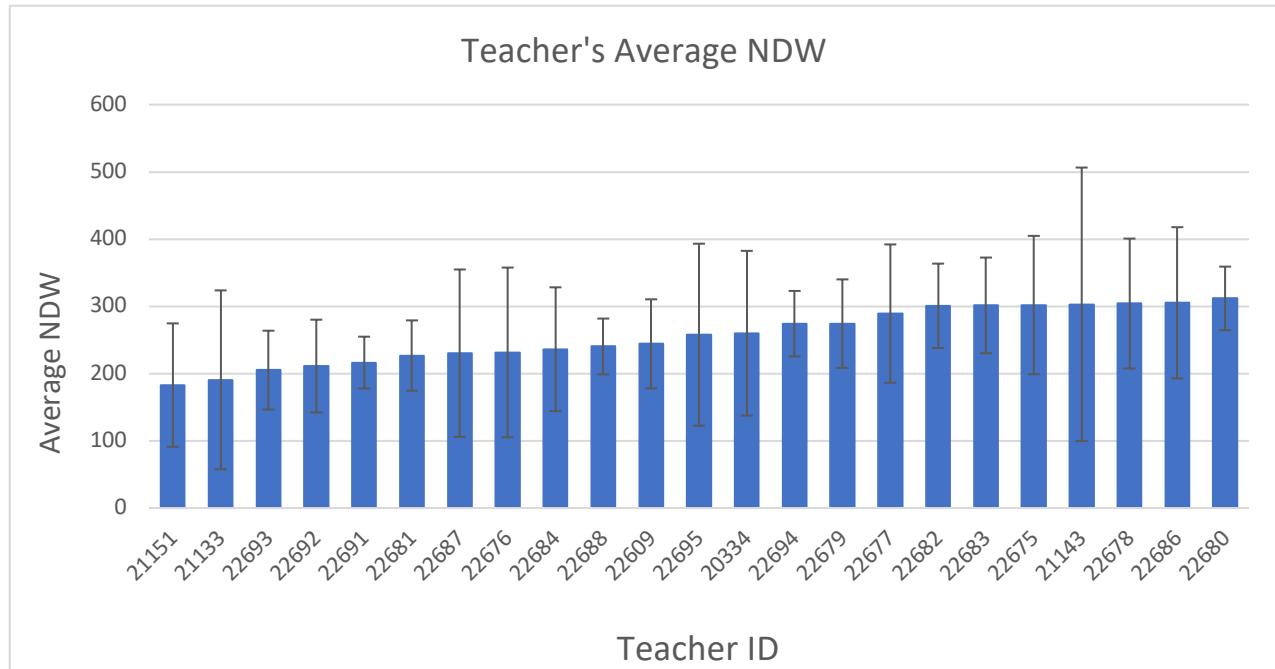
To address research question one examining teachers' lexical diversity and productivity, we analyzed descriptive statistics of oral language samples of 23 different teachers from the Tallahassee and Nashville areas. We examined 165 samples of teachers' oral language during segments of time from English Language Arts. Other segments of time (e.g., math, science) were not examined in order to keep the type of language being used somewhat consistent. The number of samples per teacher ranged from 4 to 13. The mean of the teachers' NDW across their

individual samples ranged from 190 to 305. The means and standard deviations by teacher are displayed in Table 1 and Figure 1 below. Overall, the mean NDW across all the teachers we recorded was 257.77 with a standard deviation of 40.19; however, there was a wide range in variability as demonstrated in Figure 1 below.

**Table 1**

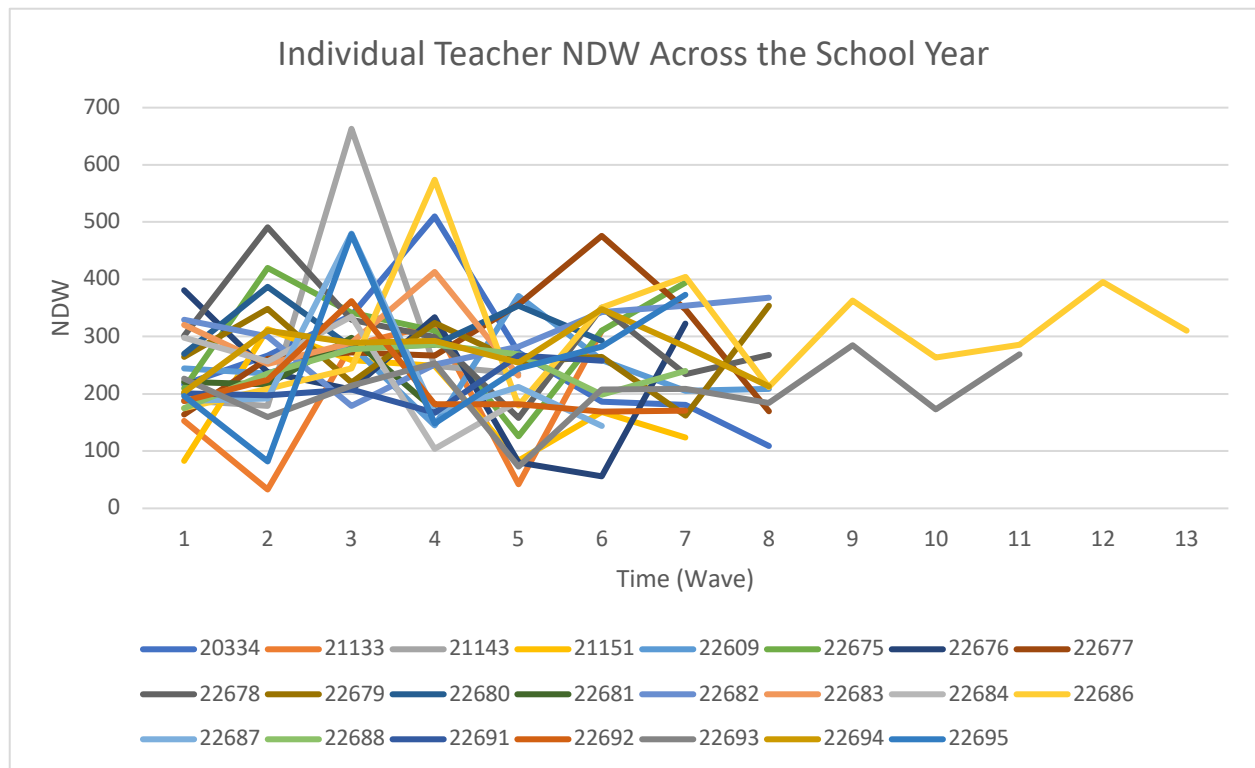
Mean and Standard Deviations of Lexical Diversity by Teacher Across the School Year

<u>Teacher ID</u>	<u>Number of ELA Samples</u>	<u>Average NDW</u>	<u>Standard Deviation</u>
20334	8	260.00	122.48
21133	6	190.67	133.05
21143	5	303.00	203.42
21151	7	182.86	91.78
22609	8	244.25	66.19
22675	7	301.86	102.93
22676	7	231.43	126.21
22677	8	289.13	102.93
22678	8	304.125	96.65
22679	8	274.25	65.82
22680	6	311.83	47.22
22681	4	226.75	52.35
22682	8	300.75	62.78
22683	5	301.4	71.15
22684	5	236.2	92.07
22686	13	305.23	112.47
22687	6	230.33	124.48
22688	7	240.29	41.5
22691	6	216.33	38.51
22692	7	211.14	68.97
22693	11	205.09	58.65
22694	8	274.25	48.64
22695	7	257.86	135.28



**Figure 1.** Display of Variability in Average Lexical Diversity Across Teachers

Below, in Figure 2, is a graph depicting each teacher's NDW for individual recording sessions in order by month of the year. As demonstrated in Figure 2, there was a large variability in NDW across days of recording throughout the school year. It was expected that the teachers' NDW would steadily increase throughout the school year. However, these results highlighted that this is not necessarily the case. It appeared to be more dependent on the class's activities for that day. For example, the teacher may not speak as frequently on a test day.



**Figure 2.** Individual NDW of Teachers Displayed by Time Point Across the School Year

#### *Children's Average Fall NDW*

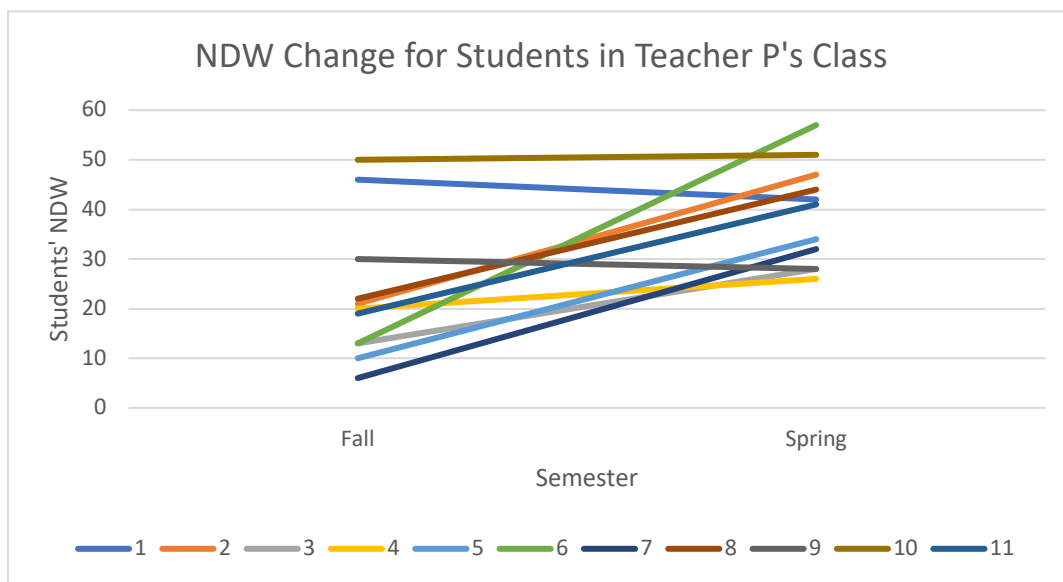
To address research question two which aimed to describe children's lexical diversity and productivity, we analyzed descriptive statistics on children's narrative writing measures. Based on the children's written samples in the fall of 2017, it was found that their average NDW was 33.35 with a standard deviation of 14.65. However, this is the average NDW for all of the children tested in the fall of 2017, not just the 202 children from the teacher's classrooms that we looked at in this study. It is relevant to note that their average total number of words (TNW), which is a measure of productivity, was 55.75 with a standard deviation of 27.95.

#### *Children's Average Spring NDW*

In order to answer research question three, we found that the average NDW for children's written samples in the spring of 2018 was 41.37 with a standard deviation of 15.56. Again, this is

the average NDW for all children tested in the spring of 2018. The children's average TNW was 69.70 with a standard deviation of 31.73.

Overall, there was a significant increase ( $p < .05$ ) in the children's average NDW and TNW from fall to spring. These results are positive, but it is still unclear as to which factors are most influential in this increase. Figure 3 illustrates an example of one of the class's results from fall to spring.



**Figure 3.** An Example of One Class's NDW Changes from Fall to Spring

#### *The Relationship Between Teachers' NDW and their Student's Growth in NDW*

To address research question four, regression analysis was performed in order to predict variability in child growth in lexical diversity in written samples. At first glance, it may seem like a significant relationship between the 23 teachers' lexical diversity and their students' growth in lexical diversity throughout the school year was discovered ( $p = .034$ ). However, it was not a meaningful substantial amount in that it explains a trivial amount of the variability by itself. In this case,  $R^2 = .02$ , which means the mean NDW of teachers (by itself) explains 2% of the variability in child NDW change. Therefore, teachers' NDW was not a significant positive

predictor of children's growth in NDW. In other words, some children showed little or no change despite high teacher NDW; others showed large average change despite low teacher NDW. It is important to note that the students who did not show change in their NDW may have still performed well in their written language samples. If little to no change was shown, that does not necessarily mean that the child performed poorly.

Although teacher's NDW by itself was not a significant predictor of children's growth, when researchers took into account TNW (total number of words) and TTR (the ratio of different words to total words), along with NDW for each teacher, it was found that there was a small positive predictive relationship between teachers' average NDW, TNW, and TTR and their students' average growth in NDW written narratives ( $f(1, 23)=2.429, p=.001$ ). About 15% of the variability in children's NDW growth was accounted for by the NDW, TNW, and TTR combined. Individually, there were not significant correlations. Although the three factors predicted a small portion of variability, the large amount of unexplained variability substantiates that other factors likely contribute to variability in students' growth in NDW.

## Discussion

### *Key Findings*

We found that the mean NDW across all the teachers was 257.77 with a standard deviation of 40.19. The students' average NDW in the fall was 33.35 with a standard deviation of 14.65. Their average NDW in the spring was 41.37 with a standard deviation of 15.56. There was a significant increase ( $p<.05$ ) in the children's average NDW from fall to spring, but it is unclear which factors were most influential in this increase. Overall, teachers' NDW did not predict a substantial amount of the variability in students' change in NDW. However, when researchers took into account TNW, TTR, and NDW for each teacher, it was found that there



was a small positive predictive relationship between teachers' average NDW, TNW, and TTR and their students' average growth in NDW written narratives ( $f(1, 23)=2.429, p=.001$ ). These three factors accounted for about 15% of the variability in children's growth in NDW across the school year.

### *Comparison to Literature*

Our results seem to align fairly well with prior research. Justice et al. emphasizes that it is important for teachers, especially in the preschool setting, to focus on the process of instructional quality in language and literacy (2008). Our results indicated that teacher language accounted for about 15% of the variability in children's growth in NDW, which may seem like a relatively small impact. However, we believe that it is important for teachers to continue learning how they can use their language to best implement their lessons in a classroom setting, as Justice et al. suggests (2008). Even small changes in instruction may make a positive difference in the lives of the students.

Alternatively, since there seems to be a relatively small amount of variability explained by teacher input, it may be that home influence matters more. This is what AlHammadi believes, arguing that the input that children receive at home is more significant in the development of language than the input they receive at school (2017). After discovering that the impact of teacher language on student language may not be as substantial as we originally thought, we believe it would be worthwhile to continue looking into the impact of both parent and teacher language on child language. AlHammadi's argument may be valid, but because his reasoning is seemingly unclear, more research in the area of parent language would be beneficial.

It has been well-established that input matters for children. However, in this study, we found that NDW may not be the best measure of input. Other research has measured different

outputs of vocabulary such as productivity, sophisticated words, and morphologically complex words. Teachers lexical input is also constrained by task demands, routines, and schedule control. Therefore, it may prove beneficial to measure input in a variety of other ways in order to learn more about child language development.

It is still not well understood how children acquire less frequent and more sophisticated vocabulary (Cameron-Faulkner et al., 2003). Prior to beginning this study, we thought that teacher language may help children acquire these complex constructions. Since we found that the impact is relatively small, future research should look into other factors that may influence children's language.

Although it was beyond the scope of the current study to try to identify other factors that may explain additional variability in child growth, the literature review highlights studies that nominate other potential influencing factors. For example, some of the studies (AlHammedi, 2017; Justice et al., 2008) recommended examining factors such as socioeconomic status (SES), at-risk students, teachers' implementations of lessons focusing on language and literacy, student/teacher attendance, family history, and other environmental aspects that children may encounter.

### *Limitations*

The current study had several limitations that should be considered. For example, there was an unequal number of language samples per teacher. The number of oral language samples ranged from 4 to 13. The language samples were also varied by the class activity for that day. If the children were taking a spelling test that day, the teacher language sample may not be as language-rich as a day when he or she was telling a story. In retrospect, it may have been helpful to group the students' and teachers' language samples by the collection limitations that we

encountered throughout the study. Additionally, there was just one writing sample at each time point for students. This could lead to statistical regression to the mean. It may be difficult to obtain a large number of writing samples from each student, but it would be beneficial to obtain as many as possible in order to understand the true impact of teacher language on student language.

It is also important to acknowledge that NDW and TNW do not capture all of the important elements of language. It may be useful to look at other factors such as word frequency and words tied to the curriculum when analyzing the language samples. We also did not measure the instructional quality of each teacher's sample, responsiveness toward students, or students' engagements. Looking into these factors may help in understanding the most influential factors on child language.

Another limitation within this study is that we compared the teachers' oral language samples to the students' written language samples. The students' written samples were also limited to a specific prompt, while the teachers could talk about anything during their 15 minute sample. In the future, it may be advantageous to compare written samples to written samples, and oral samples to oral samples. It is possible that written NDW is just not very sensitive to growth in the same way that oral NDW might be. In other words, they may have learned new words throughout the school year, but still cannot write them out or do not know how to write them. Therefore, they may have used a simpler or more common word instead. While this study had several limitations, it did provide us with an overall better idea of how teacher language may be related to student language, which was the original objective.

*Implications*

This study has made it clear that we need to continue to research the different factors that may influence children's language. The more information we gather, the better we can prepare children for the next steps of their lives. This would help prevent the gaps that we frequently see in the education system, such as the word gap.

Even though NDW, TNW, and TTR predicted a small portion of variability, it might be helpful to implement more training for teachers on vocabulary instruction. This could help with overall curriculum development. Small changes could make big differences in these children in the long run (Justice et al., 2008). Additionally, we could continue to implement more effective language training for parents. Giving proper instruction to everyone the child interacts with will help the child to live up to his or her full potential.

#### *Recommendations for Future Studies*

This study has revealed several areas that we can continue to research in order to provide the best possible environment for children. It would be advantageous to replicate this study with a greater number of written samples from the sample of students. This may be difficult to execute, but it would give us a better picture of how the children are being impacted by their teachers' language. It would also be beneficial to look at the different aspects of the vocabulary in the teachers' and students' language samples, such as tier two words.

In this study, both the schools and the participants varied in terms of socioeconomic status (SES). It would be worthwhile to look into the variability between SES groups in order to figure out how much of a role SES may play in terms of child language development.

There are several other factors that would be interesting to look into that may impact child language in order to understand how we can give them the most language-rich environment. For example, it may be beneficial to look at differences between genders, or

between children's academic performance (as measured by the grades the children receive). In addition, we only looked at the teachers' language samples from ELA. It would be interesting to see how their language changed for the different subjects that they teach.

In the future, it would be advantageous to analyze not just what is being said, but how it is being said. Are the teachers facilitating conversations, being encouraging toward their students, and implementing interactive activities throughout the class? Or are teachers using directives most of the time? Finding the answer to these follow-up questions may help in finding other factors that could impact rate of child language development.

## References

- AlHammadi, F. S. (2017). Prediction of language development: A review of literature in early childhood communication disorders. *Lingua, 199*, 27-35.
- Cameron-Faulkner, T., Lieven, E., & Tomasello, M. (2003). A construction based analysis of child directed speech. *Cognitive Science, 27*, 843-873.
- Fergadiotis, G., Wright, H. H., & Green, S. B. (2015). Psychometric evaluation of lexical diversity indices: Assessing length effects. *Journal of Speech, Language, and Hearing Research, 58*, 840-852.
- Justice, L. M., Mashburn, A. J., Hamre, B. K., & Pianta, R. C. (2008). Quality of language and literacy instruction in preschool classrooms serving at-risk pupils. *Early Childhood Research Quarterly, 23*, 51-68.
- McCarthy, P. M., & Jarvis, S. (2010). MTL-D, voc-D, and HD-D: A validation study of sophisticated approaches to lexical diversity assessment. *Behavior Research Methods, 42*(2), 381-392.
- Topping, K., Dekhinet, R., & Zeedyk, S. (2012). Parent-infant interaction and children's language development. *Educational Psychology, 33*(4), 391-426.
- Turnbull, K. L. P., & Justice, L. M. (2012). *Language development from theory to practice*. Upper Saddle River, NJ: Pearson Education, Inc.