Examining Classroom Talk
in the San Diego Unified School District

Nonie K. Lesaux
Perla B. Gámez

The Senior Urban Education Research Fellowship Series
Volume X

Examining Classroom Talk in the San Diego Unified School District

Nonie K. Lesaux and Perla B. Gámez

Fall 2012

CONTENTS

TABLES

FIGURES

OVERVIEW

THE SENIOR URBAN EDUCATION RESEARCH FELLOWSHIP PROGRAM

Large urban public school districts play a significant role in the American education system. The largest 67 urban school systems in the country – comprising less than one half of one percent of the nearly seventeen thousand school districts that exist across the United States – educate about 14 percent of the nation's K-12 public school students, including over 20 percent of the nation's economically disadvantaged students, 28 percent of its African American students, about a quarter of its Hispanic students, and a quarter of its English Language Learners. Clearly, any attempt to improve achievement and to reduce racial and economic achievement gaps across the United States must involve these school districts as a major focus of action.

These school districts face a number of serious, systematic challenges. To better understand the problems in urban education and to develop more effective and sustainable solutions, urban districts need a program of rigorous scientific inquiry focusing on what works to improve academic outcomes in the urban context. Moreover, in order to produce such evidence and to move public education forward generally, the standards of evidence in education research must be raised in such a way as to bring questions regarding the effectiveness of educational interventions and strategies to the fore, and to promote careful scrutiny and rigorous analysis of the causal inferences surrounding attempts to answer them.

It has been argued that, in order to move such an effort forward, a community of researchers, committed to a set of principles regarding evidentiary standards, must be developed and nurtured. We contend further that, in order to produce a base of scientific knowledge that is both rigorously derived and directly relevant to improving achievement in urban school districts, this community of inquiry must be expanded to include both scholars and practitioners in urban education.

Though a great deal of education research is produced every year, there is a genuine dearth of knowledge regarding how to address some of the fundamental challenges urban school districts face in educating children, working to close achievement gaps, and meeting the demands of the public for better results. Moreover, while there is a history of process-related research around issues affecting urban schools, relatively few studies carefully identify key program components, document implementation efforts, and examine the effects of well-designed interventions in important programmatic areas on key student outcomes such as academic achievement. In sum, there is an absence of methodologically sound, policy-relevant research to help guide practice by identifying the conditions, resources, and necessary steps for effectively mounting initiatives to raise student achievement.

In order to address this need, the Council of the Great City Schools, through a grant from the Institute of Education Sciences, established the Senior Urban Education Research Fellowship (SUERF) program.

The Senior Urban Education Research Fellowship was designed to facilitate partnerships between scholars and practitioners focused on producing research that is both rigorous in nature and relevant to the specific challenges facing large urban school districts. We believe such partnerships have the potential to produce better, more practically useful research in at least three ways. First, by deepening researchers' understanding of the contexts within which they are working, the program may help them maximize the impact of their work in the places where it is needed the most. Second, by helping senior staff in urban districts become better consumers of research, we hope to increase the extent to which the available evidence is used to inform policy and practice, and the extent to which urban districts continue to invest in research. Third, by executing well-designed studies aimed at the key challenges identified by the districts themselves, we hope to produce reliable evidence and practical guidance that can help improve student achievement.

The primary goals for the Senior Urban Education Research Fellowship are to:

- promote high quality scientific inquiry into the questions and challenges facing urban school districts;

- facilitate and encourage collaboration, communication, and ongoing partnerships between senior researchers and leaders in urban school districts;

- demonstrate how collaboration between scholars and urban districts can generate reliable results and enrich both research and practice;

- produce a set of high quality studies that yield practical guidance for urban school districts;

- contribute to an ongoing discussion regarding research priorities in urban education; and

- promote the development of a "community of inquiry", including researchers and practitioners alike, committed to both a set of norms and principles regarding standards of evidence and a set of priorities for relevant, applied research in urban education.

The SUERF program benefitted greatly from the guidance and support of a Research Advisory Committee made up of experts and leaders from large urban school districts and the education research community. The committee included Dr. Katherine Blasik, Dr. Carol Johnson, Dr. Kent McGuire, Dr. Richard Murnane, Dr. Andrew Porter, and Dr. Melissa Roderick. This extraordinary group helped to identify and define the objectives and structure of the fellowship program, and we thank them for lending their considerable insight and expertise to this endeavor.

The following volume of the *Senior Urban Education Research Fellowship Series* documents the work of Dr. Nonie Lesaux and Dr. Perla Gámez working in collaboration with the San Diego Unified School District. Both the research and reporting is the sole intellectual property of the authors, and reflect their personal experience and perspective.

Dr. Lesaux and Dr. Gámez's examination of classroom talk in urban middle schools adds to a growing base of research on strategies designed to bolster students' academic language development. We are improving our understanding of the critical role academic literacy plays in determining a student's ability to access rigorous core content across the curriculum. This notion of access for all students to high quality curriculum and instruction is particularly timely with the advent of the Common Core State Standards.

Equally important—and challenging to us as educators—is the finding that even among language minority students, important differences in language skills ultimately determine the utility of various literacy programs and strategies. English language learners are not a monolithic group of students, and our reforms need to be thoughtfully designed and implemented to meet the needs of such a diverse group of learners. The challenge then is to provide the supports and foundation necessary for all students to benefit from the resources we are investing to raise standards and improve the quality of teaching and learning in our nation's public schools.

We hope you will find this report both interesting and relevant to your own work in education.

Michael Casserly
Executive Director
Council of the Great City Schools

Dr. Nonie K. Lesaux is a Professor of Education at the Harvard Graduate School of Education. She leads a research program that focuses on increasing opportunities to learn for students from diverse linguistic, cultural, and economic backgrounds, a growing population in today's classrooms. From 2002–2006, Lesaux was the Senior Research Associate of the National Literacy Panel on Language Minority Children and Youth. In 2007, Lesaux was named one of five WT Grant scholars, earning a $350,000 five-year award from the WT Grant Foundation in support of her research on English language learners in urban public schools. In 2009, she was a recipient of the Presidential Early Career Award for Scientists and Engineers, the highest honor given by the United States government to young professionals beginning their independent research careers. Her studies on reading and vocabulary development, as well as instructional strategies to prevent reading difficulties, have implications for practitioners, researchers, and policymakers. Her research is supported by grants from several organizations, including the Institute of Education Sciences, Eunice Kennedy Shriver National Institute of Child Health and Human Development, the William and Flora Hewlett Foundation, Robert Wood Johnson Foundation, and the Council of the Great City schools. A native of Canada, Lesaux earned her doctorate in educational psychology and special education from the University of British Columbia.

ABOUT PERLA B. GÁMEZ, POST-DOCTORAL FELLOW

Dr. Perla B. Gámez is now an Assistant Professor at Loyola University-Chicago. She received her PhD from the University of Chicago and was a Post-doctoral Fellow at the Harvard Graduate School of Education where she undertook this work. She was also a kindergarten teacher in a bilingual education program. Dr. Gámez is the recipient of an Institute of Education Sciences (IES) Fellowship for support during the dissertation year and a Diversifying Higher Education Faculty in Illinois (DFI) Fellowship for doctoral study. In addition, a William T. Grant Officer's Award and Junior Scholars' Mentoring Supplement supported her postdoctoral training. Dr. Gámez leads a program of research focused on the language and literacy development of at-risk populations, particularly children from homes in which a language other than English is the primary language.

ABOUT THE RESEARCH PARTNERSHIP

This work represents a research partnership with San Diego Unified School District (SDUSD). My partnership with SDUSD allowed me to continue work started in Vancouver, CA, in 1999, studying the educational experiences of children from diverse linguistic backgrounds—those whose primary language of the home is not English—often referred to as language minority (LM) learners. Beginning with two developmental studies conducted between 2005 and 2007, and including a number of other research efforts prior to the large experimental study that was the basis for this study's data set, the seven years spent working with SDUSD helped lay the foundation for a better understanding of LM learners. The work contributed to other research uncovering this vulnerable population's literacy strengths and weaknesses, and also contributed to research on best instructional approaches to advance LM learners' literacy levels.

Establishing a research partnership with SDUSD was mutually beneficial. As mentioned, this urban district serves the type of high-risk population most of interest to me, and the Superintendent, Area Superintendents, and Instructional Leaders in the SDUSD have become increasingly concerned about the need for improving literacy learning, especially for their LM population. Many students in San Diego are U.S.-born children of immigrants, and while their primary home language is not English, they are schooled entirely in the U.S. and most often entirely in English. Yet these children remain academically vulnerable. The SDUSD student population, many from economically disadvantaged households, speaks primarily Spanish (60 percent) at home, although 25 percent of children come from English-speaking households. The remaining 15 percent of students (collectively) speak a variety of other languages, primarily Asian.

The large middle schools in SDUSD, which make up the intermediate educational experience for children in this district, was of considerable concern for the SDUSD administrators and teachers when we began working together in 2004; they were eager for help serving these adolescent students' literacy needs. The middle schools

in San Diego are particularly conducive to study sites for research on LM students, ranging in size from 700 to 1100 students, and serving 45 percent to 75 percent of students of Hispanic background. In addition, between 30 percent and 65 percent of their students receive services to support their English language development and 50 percent to 85 percent qualify for free or reduced lunch.

There were, indeed, many benefits to conducting a study with a large sample that is diverse with respect to ethnicity and language, yet relatively homogeneous with respect to income levels. But of equal importance, the opportunity to partner with the SDUSD administrators was particularly promising because of their seriousness about looking anew at how best to address underdeveloped literacy skills within their student population. In prior work with the district, I had found that individual classroom teachers also had a great awareness of their students' need for literacy instruction, as well as a commitment to building their own capacity for delivering such instruction. This combination of a willing and eager administrator/educator team, and a site that served the LM population, made SDUSD an ideal setting for my research. Ultimately, the collaboration with SDUSD had all parties focused on the specific pressing goal of building capacity for effective vocabulary instruction, particularly at the middle school level, to better meet the needs of SDUSD's students.

During the years I partnered with SDUSD, the work included investigating language minority students' reading trajectories; identifying instructional levers to better meet at-risk students' academic needs; designing a literacy instructional intervention, ALIAS (*Academic Language Instruction for All Students*), based on the science of language learning and focused on vocabulary and knowledge-building; and evaluating the program at scale. As a result of the growing concern and institutional commitment to improving middle school vocabulary instruction in SDUSD, my partners in the district and I decided to conduct a large-scale experimental evaluation of ALIAS in 14 middle schools during the 2008/2009 school year. I believed that the larger experimental study had great potential for long-term sustained instructional

change. The data from this experimental evaluation of ALIAS, which involved 2500 students and 51 teachers, became the basis for this work on classroom talk.

Together, the partnership with San Diego produced key insights about how best to serve linguistically diverse students in under-resourced schools. I am grateful to have had the opportunity to carry out such in-depth study of the LM student population and their English-speaking classmates, as well as targeted intervention strategies to address literacy needs. As is the case in many urban districts, however, long-term prospects for maintaining literacy growth and increased teacher capacity are tenuous. Structural problems remain for under-resourced schools such as these; throughout the study period, for example, we noted high teacher turnover that made instructional sustainability difficult. Raising literacy rates to higher levels – and keeping them at or above proficient levels – demands continuity and on-going support with updated student and teacher materials and professional development. When we completed our research, we were focused on ensuring that instructional improvements would continue. We provided a video bank to SDUSD for professional development purposes, the ALIAS intervention program itself was made available to all teachers (treatment and control) who participated in the evaluation, and thus we finished knowing that there was district-level capacity to train new teachers to use the program.

ACKNOWLEDGEMENTS

At the outset of the partnership, leaders in the San Diego Unified School District (SDUSD) identified their pressing concerns about the literacy achievement and learning experiences of the district's readers once they had moved beyond elementary school. In particular, administrators and teachers were eager to better serve the population of middle school students growing up in homes where English is not the primary language spoken, often referred to as language minority (LM) learners. Like many of their linguistically diverse peers attending urban middle schools across the United States, many LM learners in SDUSD demonstrated a need for significantly more opportunities to develop the sophisticated, abstract vocabulary needed to support text comprehension and academic writing. Importantly, however, many English-only (EO) learners in SDUSD also demonstrated the same source of difficulty, again mirroring national trends. These common learning needs pointed to the potential of the classroom context as a key mechanism for boosting vocabulary development. This was the basis of the partnership with SDUSD.

At the same time as the partnership with SDUSD was formed, the field of education was becoming increasingly focused on meeting linguistically diverse adolescents' literacy needs. There was a small but growing research base focused on middle school literacy reform, but largely absent from this work was a focus on the inherent features of the classroom setting that may be influencing student achievement, particularly as it relates to language. One of the more salient features of the classroom environment demanding study is the language that teachers use when engaging students – referred to here as classroom talk. Thus, we conducted a large-scale experimental evaluation of ALIAS (*Academic Language Instruction for All Students*), a sixth grade program focused on vocabulary and knowledge-building that was implemented in 14 San Diego middle schools during the 2008/2009 school year. The extensive observational data provided an opportunity to conduct a study focusing on classroom talk in these middle school classrooms. In this work, we have looked at different indicators of classroom talk, including the complexity of teachers' vocabulary and syntax, as well as the overall amount of teacher talk.

To further the field's knowledge of classroom talk and its effects on reading comprehension at the middle school level, and to more specifically inform future reform efforts in SDUSD, we conducted a study that addressed the nature of teachers' talk as both a source of variation in student achievement outcomes, and as a classroom feature apart from instructional strategies and practices that might be a lever for change.

The project was guided by the following objectives:

- To establish how much variability exists in the quality of teachers' classroom talk in mainstream sixth-grade classrooms in urban middle schools.

- To estimate the effects of the quality and quantity of teachers' classroom talk on students' growth in vocabulary and reading skills, including how these effects might differ based on students' language background.

- To investigate whether implementing a vocabulary intervention designed to bolster students' reading and language skills mediates the quality of class-room talk in the urban middle school.

To achieve these objectives, we assessed students' vocabulary and reading comprehension skills at the beginning and end of the school year. In addition to this student-level data, we collected videotaped classroom observations. Using these recorded observations, we transcribed teachers' speech and then coded these transcriptions for their total amount of talk, vocabulary usage, and syntactic complexity.

We then conducted a three-part analysis, resulting in three complementary sets of findings with implications for the field. First, our results suggest that the quality of teacher talk in the middle school classroom plays a significant role in the vocabulary and reading development of both LM and EO adolescent students. In particular, we found that teachers' quality of talk – as indicated by their use of a diverse set of sophisticated words – significantly benefited students' vocabulary and reading development, whereas *quantity* of talk did not.

Second, the effects of classroom talk appear to vary in significant ways for certain groups of students, suggesting that a student's language background and level of vocabulary knowledge are likely to predict the effect of different aspects of teachers' language. For example, EO learners' in classrooms where the teacher used more syntactically complex talk showed greater gains in their vocabulary development than their LM classroom peers. However, follow-up analyses indicated that this was not true for all LM learners. Specifically, we found that those LM learners who had vocabulary scores in the average range, and who had advanced English language proficiency as measured by the state test, showed a positive relation between teachers' syntactic complexity and vocabulary performance. It is worth noting that we consistently found no evidence that syntactic complexity negatively impacted our LM learners.

Third, and finally, we were interested in whether, in fact, the academic vocabulary program designed for and implemented in SDUSD middle schools had an influence on the overall quality of classroom talk, and in turn, student learning. Our findings suggest that the vocabulary program shifted key characteristics of classroom talk, increasing teachers' use of academic words. What's more, the degree of this increase mattered for students' literacy learning outcomes. It appears that more academic words used in treatment classrooms was related to higher growth in students' vocabulary and reading scores.

INTRODUCTION

INTRODUCTION

Advancing adolescent literacy rates has proven to be a tough task. Moving student outcomes ahead en masse has been an anomaly, especially in urban educational settings made up of populations of students who are academically vulnerable. School failure is especially a risk for the growing population of language minority (LM) students, who come from homes where the primary language spoken is not the language of schooling; this population is charged with simultaneously acquiring English while developing academic skills (August & Shanahan, 2006; Fry, 2007; Snow et al., 1998). In particular, LM learners often decode and comprehend the conversational language that conveys ideas and topics in beginner books, but fail to develop the sophisticated, abstract vocabulary necessary to support later text comprehension and production (August & Shanahan, 2006; Mancilla-Martinez & Lesaux, 2011). Moreover, recent research shows this is also the case for many English-only (EO) learners enrolled in high-poverty schools (e.g., Lesaux & Kieffer, 2010). This common vocabulary learning need pointed to the potential for using the classroom context as a place for bolstering language development.

Existing research on vocabulary instruction has been largely conducted with EO children enrolled in primary grade classrooms (for a review see National Reading Panel, 2000); however, current demographic trends and recent reports highlighting the challenge of meeting linguistically diverse adolescents' literacy needs (e.g., Carnegie Council on Advancing Adolescent Literacy, 2010; Short & Fitzsimmons, 2007) have perhaps begun to shift this trend. The past decade has seen a relative surge in evaluation studies focused on vocabulary instruction for LM learners and their EO classmates who are beyond the primary grades (August, Branum-Martin, Cardenas-Hagan, & Francis, 2009; Carlo et al., 2004; Dalton, Proctor, Uccelli, Mo, & Snow, 2011; Lesaux, Kieffer, Faller, & Kelley, 2010; Lubliner & Smetana, 2005; Proctor et al., 2011; Snow, Lawrence, & White, 2009; Townsend & Collins, 2009; Vaughn et al., 2009). These intervention studies, though promising, highlight the complexity of improving adolescent literacy rates.

Largely absent from this body of research is a focus on the inherent features of the classroom setting that may be influencing student achievement. Classroom features— foundational processes of the classroom setting that go beyond the curriculum and teaching strategies (e.g., student-teacher interactions, teacher talk)— are inherent to the teaching and learning experience. Therefore, if we are to influence practice at scale and support at-risk adolescents' literacy development beyond isolated strategies and programs to boost student achievement, we also need to learn what types of classroom features are more likely to encourage higher literacy growth. By combining such information on the classrooms themselves with research on effective strategies, practices, and interventions, we will more adequately create an overall learning environment conducive to promoting literacy, and set adolescents up for academic success.

One of the more salient features of the classroom environment demanding study is the language that teachers use when engaging students – referred to as *classroom talk*. Classroom talk can be described as the complexity of teachers' vocabulary and syntax, as well as the overall amount of teacher talk. It has been estimated that children and youth spend at least 15,000 hours of their lives in school (Rutter, Maughan, Mortimore, Ouston, & Smith, 1979), and their experiences likely include a large range of classroom language environments. As a baseline, we know that the teacher consumes approximately two-thirds of the total talk time that occurs in classrooms (review in Chaudron, 1988; Flanders, 1970; Legaretta, 1977), both with LM learners and monolingual English speakers (referred to as English-only speakers), thus implying that teachers' language is a significant part of the academic experience. We also know from research that the oral discourse that takes place in the classroom may lead to exposure to sophisticated vocabulary and complex syntax (see Schleppegrell, 2003; Snow & Uccelli, 2009), which ultimately supports reading comprehension.

Indeed, there has been some research with young EO speakers that demonstrates the important role the quality of language exposure has on a student's language growth in the early years; this work likewise shows the substantial variation in the quality of teacher talk in early childhood classrooms. The variation can have strong effects on a range of language (e.g., vocabulary and grammar) and academic outcomes for young children (e.g., Huttenlocher, Levine, & Vevea, 1998; Huttenlocher, Vasilyeva, Cymerman, & Levine, 2002; Klibanoff, Levine, Huttenlocher, Vasilyeva, & Hedges, 2006). Specifically, recent research in preschool and kindergarten classrooms shows that the teacher's language children are exposed to influences both early language (Bowers & Vasilyeva, 2011; Dickinson & Porche, 2011; Huttenlocher et al., 2002) and literacy development (Dickinson & Porche, 2011).

For young children, the amount and type of classroom talk clearly makes a difference. What we currently do not know enough about, however, is how much the language environments matter to student academic success at all age and grade levels, especially during the adolescent years. There has not been a systematic exploration of older children's linguistic experiences in classrooms, and therefore the influence of teacher language on adolescent language and literacy development remains unknown. *The question, then, is if teachers' language in middle school classrooms likewise boosts literacy skills, would classrooms with high quality language environments positively affect adolescent literacy rates?*

To further the field's knowledge of classroom talk and its effects on reading comprehension at the middle school level, we conducted a study that addressed the nature of teachers' talk as both a source of variation in student outcomes, and a classroom feature apart from instructional strategies and practices that might be a lever for change. The classroom talk study was part of a large-scale experimental evaluation of ALIAS (*Academic Language Instruction for All Students*), a sixth grade academic vocabulary program focused on vocabulary and knowledge-building that was implemented in 14 middle schools during the 2008/2009 school year. As previously

described, this academic vocabulary intervention was initiated in response to a district request, and addressed the middle school reading comprehension struggles local assessment data indicated were based in large part on students' low vocabulary levels. The extensive observational data provided an opportunity to conduct a study focusing on classroom talk in these middle school classrooms.

The classrooms under study had literacy rates similar to those found in the majority of urban classrooms across the nation, rates that suggest that many are at-risk for academic failure, and in turn, for poor life outcomes in this knowledge-based economy. A recent analysis of data on 11 urban districts from the National Assessment of Educational Progress (NAEP) confirms the low literacy levels for many urban students; in fact, 10 of the 11 districts participating in the NAEP study had high proportions—in some cases staggeringly high—of learners failing to meet established proficiency levels (Lutkus, Grigg, & Donahue, 2007). For example, in six of the 11 urban districts, more than 50 percent of students scored *below basic* in reading as compared to the national rate of 34 percent. For many of these students, including the growing population of LM learners, these low literacy levels are a function of underdeveloped vocabulary and comprehension. This is not to say that these students are not learning some component skills of reading, but rather that both the LM learners that make up 70 percent of the district's student population, and their English-only classmates, were more proficient at reading words than understanding them (Lesaux & Kieffer, 2010).

Promoting the language and literacy skills of LM learners, the fastest-growing segment of the U.S. school population, seems especially critical. At school entry in every district, these students are faced with the dual task of acquiring proficiency and developing academic skills in the language of instruction. They are expected to read with comprehension in their second language, but they tend to have even fewer opportunities to learn than their native English-speaking peers within these schools (Gándara & Rumberger, 2003; Hakuta, 1998; Snow et al., 1998). By early adolescence, the LM learner who enrolls in a

U.S. school as a young child rarely needs instruction in conversational English; however, many of these learners lack sufficient academic English vocabulary needed to support text comprehension and school success. As it turns out, their EO classmates who struggle to read have a similar lack of academic English to support more effective reading (Lesaux & Kieffer, 2010; Scarcella, 2003), and thus a vocabulary program targeting this language insufficiency made sense for all students in these classrooms.

The academic vocabulary intervention used text-based explicit instruction in vocabulary and word-learning strategies as part of daily lessons; bolstering students' language and reading skills was inherent in the design and structure of the program. But as a by-product, there was a sense that the program may also alter the quality of the talk within the classroom. Would regularly teaching vocabulary and focusing on how words work influence teachers' language, increasing their use of academic language? Would such routine direct instruction on language tasks change the amount of teacher classroom talk? With these questions in mind, the study was designed to establish the natural variation that exists in the quality of classroom talk in urban middle school classrooms, and then to determine whether, in fact, the intervention had an effect on the quality of classroom talk in participating treatment classrooms.

In addition, the study investigated the role of classroom talk on students' language and literacy development, guided by the overarching goal of improving urban middle school students' literacy outcomes. The results contribute to our efforts to build middle school teachers' capacity to improve adolescent literacy skills, particularly for LM learners and their peers in urban mainstream classrooms.

In summary, the project is guided by the following specific objectives:

- To establish how much variability exists in the quality of teachers' classroom talk in mainstream sixth grade classrooms in urban middle schools.

- To estimate the effects of the quality of teachers' classroom talk on students' growth in vocabulary and reading skills.

- To investigate whether implementing a vocabulary intervention designed to bolster students' reading and language skills mediates the quality of classroom talk in the urban middle school.

METHODOLOGY

METHODOLOGY

This project was part of a large-scale experimental evaluation of a 20-week academic vocabulary program designed for use in mainstream urban middle school programs with high numbers of ELLs. The evaluation includes students (n=2500, 70 percent LM learners) and teachers (n=51) from 14 middle schools in the San Diego Unified School District (SDUSD) and focuses on growth in language and reading skills. Teachers participating were randomly assigned to a treatment or control condition. Fidelity of implementation was assessed using videotaped observations of treatment and control classrooms conducted prior to and during the implementation. In addition, student reading comprehension was assessed before and after the program's implementation. As part of the protocol, high-quality observational data was collected by videotape over the course of one academic year (approx. 175 hrs. from 148 observations), as well as student-level vocabulary and reading comprehension assessments.

This data provided an opportunity to analyze the quality of language that characterizes standard classroom practice, to determine the effect of teacher talk on students' language and reading growth, and to determine whether a vocabulary intervention designed to bolster students' language and reading skills had an effect on the quality of teacher talk.

The following research questions frame the study:

- **Variability in classroom talk**

    1. How much variation in the quality of classroom talk exists in mainstream sixth-grade classrooms in urban middle schools?

    2. Does this quality change over the course of an academic year?

- **The relationship between classroom talk and students' literacy development**

    3. Is the variation in the quality of classroom talk related to growth in students' reading comprehension and vocabulary knowledge?

    4. Does this relationship differ for language minority (LM) learners and their English-only (EO) classmates?

- **The interaction between classroom talk and a vocabulary intervention**

    5. In what ways, if any, does the implementation of the academic vocabulary curriculum alter the quality of classroom talk over the course of the 20-week program?

    6. Is the quality of classroom talk during the implementation of an academic vocabulary program related to the growth in students' reading comprehension and vocabulary knowledge?

    7. Does this relationship differ for language minority (LM) learners and their English-only (EO) classmates?

GATHERING INFORMATION ON STUDENT LEARNING AND THE CLASSROOM CONTEXT

Student-level assessments

To measure students' language and literacy skills, we administered the following assessments in the fall and spring of the academic year.

- **Academic vocabulary assessment.**
  This researcher-developed measure is a 32-item multiple-choice task in which students choose a synonym for a given academic word. The pool of items that appears on the test was derived from the Academic Word List (AWL; Coxhead, 2000). The AWL is an empirically based collection of vocabulary words, compiled from a corpus of 3.5 million words of written academic text by examining the range and frequency of words outside of the first 2,000 most frequently occurring words of English.

- **Gates-MacGinitie reading test–vocabulary.**
  The 45-item subtest of a standardized multiple-choice test, the Gates-MacGinitie Reading Test (GMRT Vocabulary; MacGinitie, MacGinitie, Maria, Dreyer, & Hughes, 2000), was used to assess students' reading vocabulary and served as a measure of students' global word knowledge.

- **Gates-MacGinitie reading test–comprehension.**
  The reading comprehension subtest of a standardized multiple-choice test, the Gates-MacGinitie Reading Test (GMRT Vocabulary; MacGinitie, MacGinitie, Maria, Dreyer, & Hughes, 2000), was used to assess students' overall reading comprehension. This 48-item multiple-choice test measures the ability to read and comprehend written passages of various lengths and genres.

Classroom-level observations

Videotaped classroom observations of approximately the first 45 minutes of the English Language Arts (ELA) period were conducted during the school year. On average, teachers were videotaped two times, resulting in 148 video recordings. Due to audio difficulties (i.e., low/incomprehensible audio, static interference, no playback), 123 of these recordings were transcribed to assess teachers' speech. Following transcription, the *quantity* of talk produced by each teacher was calculated two ways— by utterance and word. As explained in Table 1, an utterance can be defined as a complete unit of speech that is bounded by a pause or turn. This measure of language provided a useful category of teacher talk given that speakers do not always speak in complete sentences. At the word level, quantity of talk was calculated as the total number of words (i.e., word tokens) produced. At the utterance level, quantity of talk was calculated as the sheer number of utterances produced.

Teachers' speech was then coded according to several features of talk, including the kinds of vocabulary and syntax they used. As shown in Table 1, to get a description of teachers' vocabulary use, the *quality* of teachers' vocabulary was measured, and the higher quality academic and sophisticated words were extracted from the total list of words each teacher used. Determining whether words were academic/formal or informal, was done using the Academic Word List (AWL; Coxhead, 2000), a list of words that appear commonly in academic texts, but are specifically not the most frequently occurring 2000 words found on the General Service List (GSL). Whether the word quality was sophisticated was assessed by filtering out all words on a modified version of the Dale-Chall list (Chall & Dale, 1995), a list of common words fourth-graders should know. In the end, the academic vocabulary score reflects teachers' use of specific academic words, whereas the sophisticated vocabulary score represents teachers' use of any low-frequency word.

METHODOLOGY (CONT'D)

We also calculated the *diversity* of teachers' academic and sophisticated word usage, that is, the number of different academic words (i.e., academic word types) and sophisticated words (i.e., sophisticated word types) used by each teacher, as well as the total number of academic words and sophisticated words each teacher produced (i.e., academic word tokens, sophisticated word tokens).

Teachers' utterances were similarly coded for their syntactic/grammatical complexity. That is, individual utterances were coded as either constituting simple sentences or complex sentences. The number of complex utterances and the proportion of complex utterances (over the total number of utterances) were also calculated.

TABLE 1. CATEGORIZING CLASSROOM TALK

MEASURE OF SPEECH	DEFINITION
Tokens	Total number of words
Sophisticated tokens	Total number of rare and low frequency words
Academic tokens	Total number of academic words
Types	Total number of unique words (i.e., diversity of words)
Sophisticated types	Total number of unique, rare and low-frequency words
Academic types	Total number of unique academic words (e.g. communicate, foundation, rational, specify)
Utterance	A complete unit of speech that is separated from the next by conversational turn-taking or a pause (can be a complete or incomplete sentence)
Simple utterances	The number of utterances that contain only one clause
Complex utterances	The number of utterances that contain multiple clauses (i.e., compound and complex sentences)

Estimating Classroom Talk

Given the large amount of observational data and the extensive speech analysis carried out for this study, a two-stage analytic approach was taken with the video observations. In the first stage, we focused on determining how to accurately sample a portion of each video to obtain a reliable estimate of teacher language use, and in the second stage, we applied the strategy from the first stage to the full dataset.

At the first stage, a subset of the *full* video dataset was randomly selected, including both treatment (n = 22) and control (n = 22) classrooms. These two video samples were fully transcribed and coded for teachers' amount of talk, vocabulary and syntax, as detailed above. An important next step was to obtain a smaller sample of teacher speech from each of the remaining videos. In order to serve as a representative sample of the language teachers use for instruction, the language sample not only had to be smaller, but also had to be a reliable estimate of teachers' language use. We therefore employed a time-sampling technique, in which we compared teachers' speech at different time intervals against the full transcript. These time intervals included the entire length of the transcript (all utterances and all minutes), as compared to only portions of the transcript (increments of five minutes).

To systematically evaluate the time intervals in terms of providing reliable estimates of teacher talk, a series of simple regression analyses was fitted where we predicted teachers' syntactic complexity scores from the full transcript. Comparing the "value added" of the different models, that is, the difference in the percent of variance explained between models, we found that the most "value added" came from predicting syntactic complexity using a random interval of 20 minutes of talk. These analyses are detailed in a paper currently under review.

The 20-minute time sample determined to be appropriate at Stage 1 informed the procedure for the analyses performed at Stage 2. Thus, the corresponding 20-minute portions of the videotaped lessons (per the analysis of a reliable estimate) were transcribed and coded in the full dataset. The teacher talk measures derived from the reliable portions of the transcripts were used to answer the study's research questions about the variability in classroom talk and its influence on growth in students' language and literacy skills, both in the absence of intervention and during implementation of the vocabulary program.

RESULTS

RESULTS PART 1: VARIABILITY IN CLASSROOM TALK

RESEARCH QUESTION 1:
How Much Variation in the Quality of
Classroom Talk Exists in Mainstream Sixth-Grade
Classrooms in Urban Middle Schools?

To begin, as illustrated in Table 2, our data show substantial variation across classrooms in the amount and type of language used. Overall, teachers varied widely in how much they talked, as measured by the total number of utterances, and in their use of sophisticated vocabulary and complex utterances. Some teachers used multiple times as many unique, sophisticated words as others (shown in the table as "Sophisticated Types"). In fact, teachers ranged in their use of sophisticated types from a low of 44 to a high of 140. Likewise, the number of complex utterances (i.e., units of speech that contain multiple clauses) ranged from 74 to 201, showing that there were teachers who demonstrated much higher use of complex utterances than other teachers, on average. .

This variability is further highlighted in Figures 1 and 2.

For example, whereas some teachers talked a lot, some teachers talked much less. In fact, the teacher who produced the highest amount of talk, Teacher # 21, used more than twice as many words as the teacher who scored the lowest in amount of talk, Teacher #5. Figure 2 also shows that the total number of words teachers used did not always relate to the number of sophisticated words spoken. For example, Figure 1 shows that Teacher #4 used a relatively low number of total word tokens, but Figure 2 indicates that this same teacher used a relatively high amount of sophisticated vocabulary. Teacher #21, meanwhile, used the highest number of total word tokens, but used only an average amount of sophisticated vocabulary. Despite these disparities, these two measures are highly correlated ($Tokens_{Total}$ & $Types_{Sophisticated}$ r = .82, p < 0.001, n = 22), indicating that, in general, the more a teacher talks, the more high quality her speech may become.

TABLE 2. DESCRIBING CLASSROOM TALK IN THE ABSENCE OF INTERVENTION

FEATURES OF CLASSROOM TALK	N	MEAN	SD	MIN	MAX
TOTAL UTTERANCES	22	637.23	169.36	395	981
COMPLEX UTTERANCES	22	121.55	30.63	74	201
"OTHER" UTTERANCES	22	515.68	152.74	316	804
TOTAL TOKENS	22	3834.82	889.30	2453	5873
SOPHISTICATED TYPES	22	96.05	25.51	44	140

FIGURE 1. VARIABILITY IN QUANTITY OF TEACHERS' TALK IN THE ABSENCE OF INTERVENTION

VARIATION IN WORD TOKENS USED
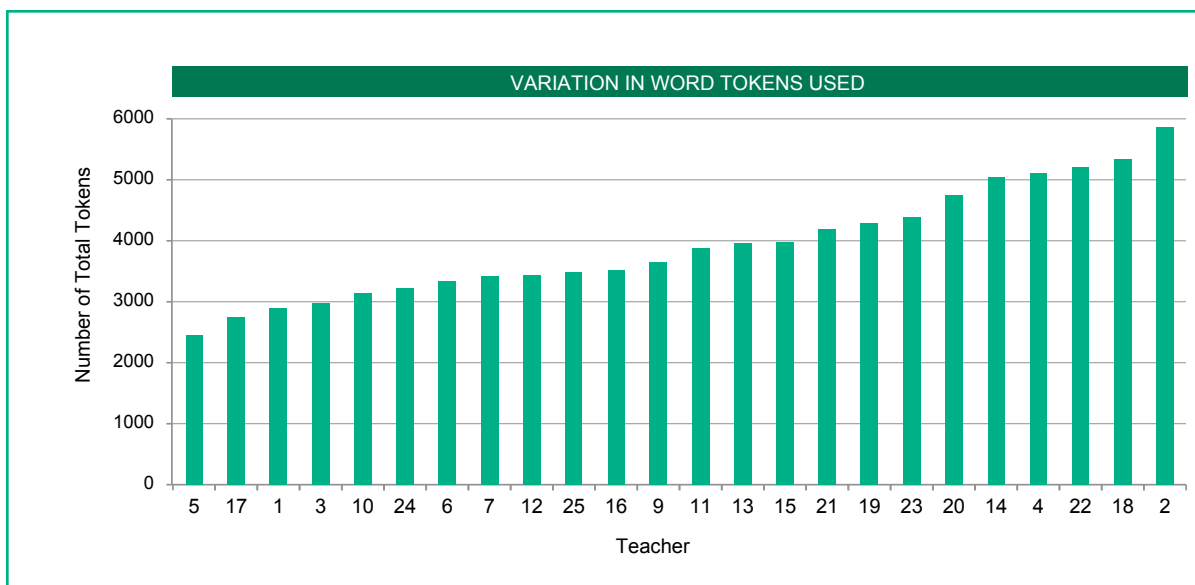
FIGURE 2. VARIABILITY IN QUALITY OF TEACHERS' TALK IN THE ABSENCE OF INTERVENTION

VARIATION IN SOPHISTICATED VOCABULARY USED
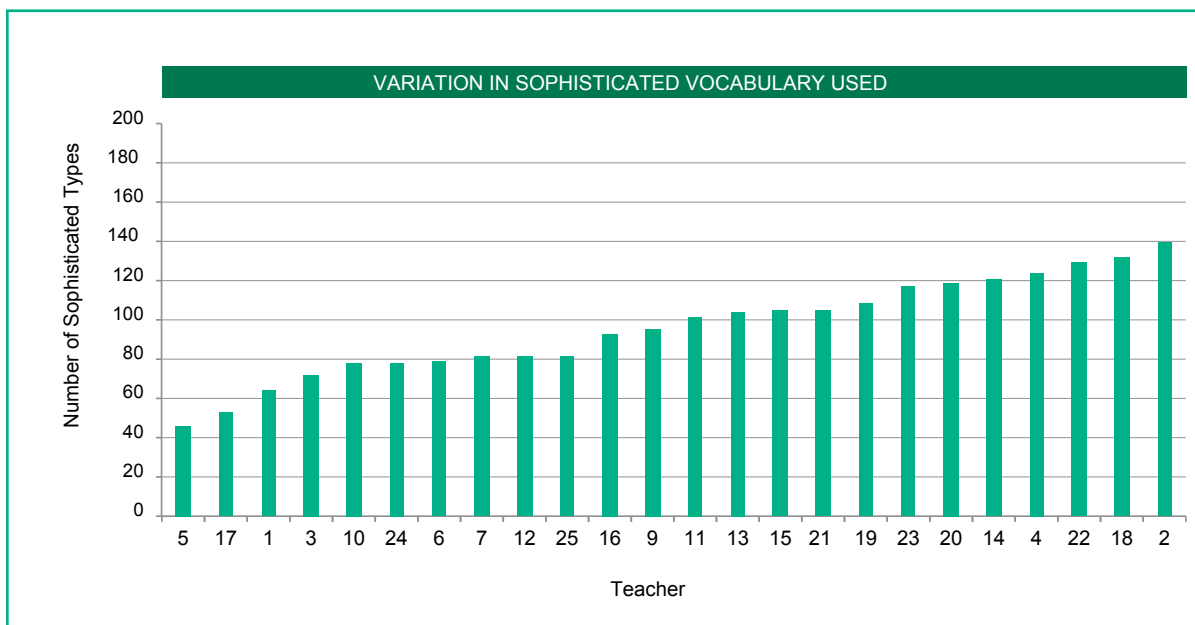
RESEARCH QUESTION 2:
Does This Quality Change Over the Course
of an Academic Year?

There is some reason to believe that perhaps teachers' speech changes over the course of a year, particularly in a setting with high numbers of LM learners. For example, one could imagine that a teacher might use less complex speech in the beginning of the year, but might increase this complexity by the spring. Given that this study was conducted over the course of an academic year, we were interested in addressing this question of change in speech across the year.

To begin to estimate whether talk changes over time, we were able to address this question two ways. One way was to use individual growth modeling for those teachers for whom we had three or more observations (n = 5). For these teachers, we relied primarily on the 20-minute speech samples, and in turn, generated the growth trajectories shown in Figure 3. A visual inspection of these trajectories indicated substantial variation in their shape. When considering growth based on months, none of the trajectories were linear and they did not follow a particular curvilinear pattern. Instead, individual teachers' speech was variable; there was no pattern in quality of speech as a function of the time in the school year.

The second way we addressed this question of change over time was to use the data for teachers (n=8) for whom we had speech input at the beginning, middle, and end of the school year.[1] Our analyses did not reveal a significant difference in speech at each of these time points for the quantity of sophisticated words used (F (1, 7) = .417, p = .417) or total utterances (F (1, 7) = 1.182, p = .313), indicating that there were no significant increases or decreases between either teacher speech measure across the three time points.

In fact, teachers' use of sophisticated words during the 20-minute samples hovered around 30 (sample mean Time I = 30.00; Time II = 32.00; Time III = 20.00) and teachers' total utterances hovered around 180 (sample mean Time I = 184; Time II = 186; Time III = 170).

Finally, to include the remaining teachers who did not have three time points, but had at least two, we compared the number of unique sophisticated words used (i.e., sophisticated types) and total number of utterances between the two time points. Our analyses showed there was no significant difference in teachers' use of sophisticated types between the beginning-of-the-year (mean = 68.50) and a middle-of-the-year (mean = 50.90) observation (t (9) = 1.792, p = .107) or between the middle-of-the-school-year (mean = 50.95) and end-of-the-school-year (mean = 46.50) observation (t (9) = .430, p = .677). Similarly, there was no significant difference in the number of utterances teachers used between the beginning-of-the-year (mean = 297.55) and a middle-of-the-year (mean = 289.25) observation (t (9) = .269, p = .794) or between middle-of-the-school-year (mean = 287.95) and end-of-the-school-year (mean = 349.5) observation (t (9) = -1.507, p = .166). These analyses are detailed in a paper currently under review.

---

1 It should be noted that the speech scores obtained within a month of each other for teachers who had four observation points were combined to yield an "average" speech score in order to fit the scores into the three distinct beginning, middle and end categories.

FIGURE 3. VARIATION IN TEACHERS' TALK ACROSS THE SCHOOL YEAR
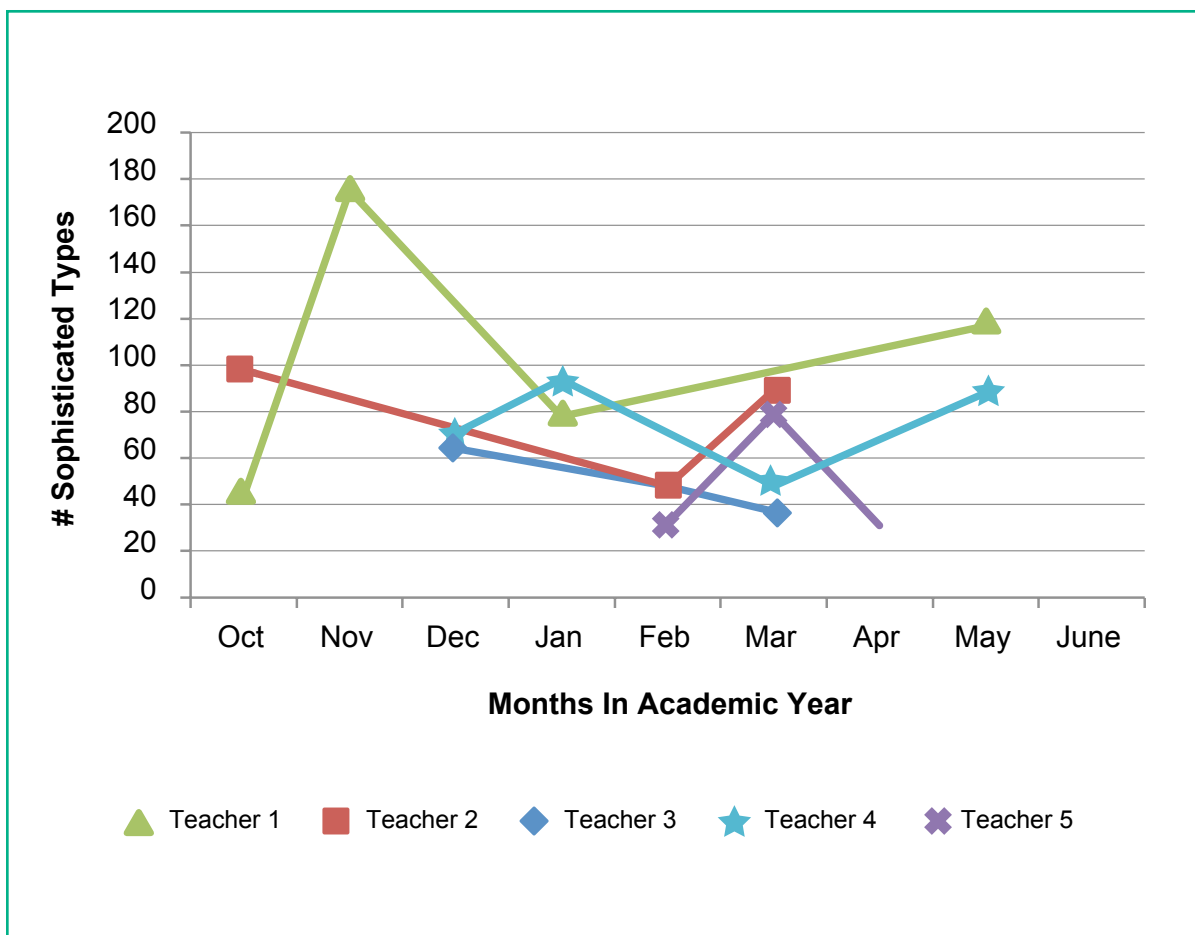
RESEARCH QUESTIONS 3 & 4:

• Is the Variation in the Quality Of Classroom Talk Related to Growth in Students' Reading Comprehension and Vocabulary Knowledge?

• Does this Relationship Differ for LM Learners and Their EO Classmates?

Given the apparent consistency in teachers' speech across time, we relied on teachers' scores from the middle-of-the-school year observations to conduct the next part of our analysis because not only do they reflect full transcripts, their inclusion results in a greater number of teachers being included in the final analysis sample (in comparison to any other time point). Given the nested nature of the data used in the present study—that is, that students were nested within classrooms —we investigated the relation between teacher input and student score gains using HLM analyses (Raudenbush & Bryk, 2002). We built separate models for each of our outcomes, reading comprehension and vocabulary.

Reading Comprehension

The approach we took in modeling student gains is to include the student grade six posttest score as the outcome variable and predict which of our main teacher speech measures (i.e., number of sophisticated types, total number of utterances) explained the most variance in student scores. In succession, we built models controlling for students' pretest scores, both reading comprehension and vocabulary. We also included students' language

minority (LM) status (i.e., whether the student is a non-native English speaker or is English-only—EO) in order to investigate whether teacher talk impacts the difference in scores between LM and EO students.

As can be seen in Table 3, our first model represented the predicted posttest reading comprehension score for the "average" student in the sample, that is, when the pretest is held at the class mean. The language status slope showed the differential between LM and EO students on the posttest. This model showed that after controlling for GMRT (Gates-MacGinitie Reading Test) reading comprehension pretest scores, the average LM student was expected to score lower than the average EO student on the GMRT reading comprehension posttest.

As Table 4 shows, the final model, in which we controlled for teachers' amount of talk, revealed that the diversity of sophisticated words (i.e., sophisticated types) used by teachers had a significant impact on students' end-of-the-year GMRT reading comprehension scores in a positive direction. Meaning, on average, the more teachers used a varied set of rare words, the more students' reading comprehension improved. However, teachers' use of sophisticated types did not significantly impact the relationship between language status and end-of-year scores, indicating that teachers' language use did not significantly lessen the gap between EO and LM student scores, instead, it benefited both groups of students.

TABLE 3. DIFFERENTIAL BETWEEN LM AND EO STUDENTS ON READING COMPREHENSION

FINAL ESTIMATION OF FIXED-EFFECTS	COEFFICIENT	SE	T-RATIO	df
Intercept, γ_{00}	500.27***	2.85	175.76	23
Language Status Slope				
Intercept, γ_{10}	-5.28**	1.91	-2.77	848
Reading Comprehension Pre-test Slope				
Intercept, γ_{20}	0.62***	0.03	19.48	173

* $p < 0.05$, **$p < 0.01$, ***$p < 0.001$

TABLE 4. TEACHER TALK IMPACT ON READING COMPREHENSION

FINAL ESTIMATION OF FIXED-EFFECTS	COEFFICIENT	SE	T-RATIO	df
Intercept, γ_{00}	500.09***	2.55	196.33	21
Number of Utterances, γ_{01}	-0.01	0.02	-0.79	21
Number of Sophisticated Types, γ_{02}	0.22*	0.09	2.40	21
Language Status Slope				
Intercept, γ_{10}	-3.11	1.95	-1.60	843
Number of Utterances, γ_{11}	0.00	0.01	0.16	843
Number of Sophisticated Types, γ_{12}	-0.01	0.07	-0.19	841
Reading Comprehension Pre-test Slope				
Intercept, γ_{20}	0.52***	0.04	14.49	286
Vocabulary Pre-test Slope				
Intercept, γ_{30}	0.18***	0.03	5.18	843

$* p < 0.05, ** p < 0.01, *** p < 0.001$

To maximize practical interpretability, we interpreted our results in terms of effect sizes (Cohen, 1988), d = 0.21. The effect size of sophisticated vocabulary usage can be assessed in the following way: The range of sophisticated vocabulary usage was about 100 (44–104). An increase in sophisticated vocabulary usage of about a quarter of that range (a standard deviation) would be associated with a change in achievement gain of 0.21 or roughly six extended-scale points, which Cohen considered a small effect.[2]

Vocabulary

To predict which of our main teacher speech measures explained the most variance in students' vocabulary scores, we built models in which we controlled for students' vocabulary pretest scores and also included students' language minority (LM) status, in order to investigate whether teacher talk impacts the difference in scores between LM

and EO students. We also controlled for the percentage of students deemed eligible for a free or reduced-price lunch (FRL), data we had at the school level. It should be noted that previous research has revealed a significant relation between school-level FRL and student outcomes (see Borman & Dowling, 2003; White, 1982). More importantly, it has been well documented that vocabulary development is positively associated with socioeconomic status (SES), an indicator of children's income backgrounds.

The first model in Table 5 depicts the predicted posttest reading vocabulary score for the "average" student in the sample, that is, when the pretest is held at the mean. The language status slope shows the differential between LM and EO students on the posttest, which reveals that, after controlling for pretest scores, EO students were expected to score higher than LM students on the vocabulary posttest.

---

2   The effect sizes were calculated by dividing the main teacher input coefficient from Table 4 (0.22) by the SD of the student outcome score (30.95) and multiplying this number by the SD of the main teacher input (29.95).

RESULTS PART 2 (CONT'D.)

TABLE 5. DIFFERENTIAL BETWEEN LM AND EO ON VOCABULARY KNOWLEDGE

FINAL ESTIMATION OF FIXED-EFFECTS	COEFFICIENT	SE	T-RATIO	df
Intercept, γ_{000}	21.054***	0.72	29.22	13
Language Status Slope				
Intercept, γ_{100}	0.919**	0.30	3.06	779
Academic Vocabulary Pre-test Slope				
Intercept, γ_{200}	0.630***	0.03	22.90	779

* $p < 0.05$, **$p < 0.01$, ***$p < 0.001$

We also built models to predict how student vocabulary was impacted by teachers' word-level measures and utterance-level measures, separately. As Table 6 shows, the results of the word-level model revealed that with all other variables controlled for, teachers' use of a varied set of sophisticated words (i.e., sophisticated types) significantly impacted LM learners' end-of-the-year vocabulary scores in a positive direction, whereas total amount of tokens was not a significant factor. However, teacher sophisticated types or total tokens did not significantly impact the relationship between language status and end-of-year vocabulary skills, indicating that teachers' language did not significantly lessen the gap between EO and LM student scores.

To maximize practical interpretability, we interpreted our results in terms of effect sizes (Cohen, 1988), d = 0.205. These results indicated that, while controlling for all other variables, for an increase of one standard deviation in the average teacher's sophisticated word usage (going from about 99 to 126 words), it is expected that there would be about a 1.17 point increase in the predicted vocabulary posttest score. Of note, this model showed a negative association between the variable "percentage of LM students" and end-of-the-year vocabulary, indicating lower outcomes for classrooms in which there was a larger percentage of LM students.

As Table 7 illustrates, the results of the utterance-level model showed that with all other variables controlled for, teachers' use of complex utterances did not significantly impact LM learners' end-of-the-year vocabulary scores. However, teachers' use of complex utterances did significantly impact the relationship between language status and end-of-year vocabulary scores. That is, teachers' use of complex utterances significantly increased the gap between EO and LM student scores, indicating that as teachers' syntactic complexity increased, EO children scored relatively higher than LM learners on our measure of academic vocabulary, d = 0.139.

TABLE 6. SOPHISTICATED VOCABULARY IMPACT ON ACADEMIC VOCABULARY

FINAL ESTIMATION OF FIXED-EFFECTS	COEFFICIENT	SE	T-RATIO	df
INTERCEPT, γ_{000}	21.152***	0.377	56.066	12
% FREE OR REDUCED LUNCH ELIGIBILITY (FRL), γ_{001}	-0.022	0.018	-1.206	12
% LM STUDENTS, γ_{010}	-0.104*	0.037	-2.821	18
TOTAL TOKENS, γ_{020}	-0.001	0.001	-1.352	18
SOPHISTICATED TYPES, γ_{030}	0.043*	0.020	2.227	18
Language Status Slope				
INTERCEPT, γ_{100}	1.163**	0.356	3.268	771
% FREE OR REDUCED LUNCH ELIGIBILITY (FRL), γ_{101}	0.011	0.015	0.722	771
% LM STUDENTS, γ_{110}	0.037	0.032	1.175	771
TOTAL TOKENS, γ_{120}	0.001	0.001	0.965	771
SOPHISTICATED TYPES, γ_{130}	0.002	0.018	0.112	771
Academic Vocabulary Pre-test Slope				
INTERCEPT, γ_{200}	0.631***	0.027	22.952	771

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

RESULTS PART 2 (CONT'D.)

TABLE 7. SYNTACTIC COMPLEXITY IMPACT ON ACADEMIC VOCABULARY KNOWLEDGE

FINAL ESTIMATION OF FIXED-EFFECTS	COEFFICIENT	SE	T-RATIO	df
Intercept, γ_{000}	21.136**	.372	56.759	12
% Free or Reduced Lunch Eligibility (FRL), γ_{001}	-0.032	0.018	-1.719	12
% LM Students, γ_{010}	-0.128*	.037	-3.354	18
"Other" Utterances, γ_{020}	-0.004	0.003	-1.445	18
Complex Utterances, γ_{030}	0.019	0.014	1.330	18
Language Status Slope				
Intercept, γ_{100}	1.151**	0.356	3.236	771
% Free or Reduced Lunch Eligibility (FRL), γ_{101}	0.001	0.016	0.084	771
% LM Students, γ_{110}	0.030	0.032	0.953	771
"Other" Utterances, γ_{120}	-0.002	0.002	-0.790	771
Complex Utterances, γ_{130}	0.026*	0.012	2.054	771
Academic Vocabulary Pre-test Slope				
Intercept, γ_{200}	0.631**	0.027	22.974	771

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$*

It is worth pointing out that these analyses did not show a negative relation between complex speech and LM learners' vocabulary and thus, complex speech does not appear to impede LM learners' vocabulary; at the same time, complex speech was not significantly related to LM learners' vocabulary. Instead, what our results mean is that while controlling for all other variables, it would be expected that an increase of one standard deviation in the average teachers' complex utterances (going from about 121 to about 151) would result in an increase of approximately one point in the mean difference between EO and LM students' posttest scores.

Given that we did not find a significant relationship between teacher's complex utterances and LM students' vocabulary, we were interested in more closely examining the LM group. We suspected that perhaps those LM learners whose English skills were on par with their English-only counterparts would benefit positively from teachers'

complex speech. Thus, we focused specifically on LM children who were deemed as having above "Intermediate" proficiency levels. In this final sample, we included only those children who scored above the standard 25th percentile on their reading comprehension test because the majority of EO students scored above this level. Given that the number of students decreased dramatically (n = 40) and we were left with only 16 classrooms and 11 schools, we maintained an acceptable ratio between the number of predictors and observations by relying on the proportion of complex utterances as our main predictor,

along with the percentage of students receiving FRL. The results revealed a significant and positive association between the proportion of complex utterances and LM students' vocabulary (Coeff: 41.82, SE = 14.75, T-ratio = 2.836, df = 13, p = 0.015), specifically, LM students who have either "Early Advanced" or "Advanced" language skills, and score at least above the 25th percentile in reading vocabulary, would likely positively benefit from teachers' complex speech. A summary of main results is provided in Table 8.

TABLE 8. SUMMARY OF LANGUAGE FEATURES IMPACTING STUDENT OUTCOMES

	LANGUAGE FEATURES THAT MAKE A SIGNIFICANT IMPACT ON STUDENT OUTCOMES
Reading Comprehension	
Sophisticated Vocabulary	✔
Amount of Talk	--
Vocabulary	
Sophisticated Vocabulary	✔
Complex Utterances	✔
Amount of Talk	--
Percentage of LM Learners	✔

✔ = *analyses show a significant impact on student outcomes; -- = no significant impact observed*

RESULTS PART 3: THE INTERACTION BETWEEN CLASSROOM TALK AND A VOCABULARY INTERVENTION

RESEARCH QUESTION 5:
In What Ways, If Any, Does The Implementation of the Vocabulary Program Alter the Quality of Classroom Talk over the Course of the 20-Week Program?

As shown in Table 9, there was substantial variability in both control and treatment teachers' speech. This was the case for all measures: teachers' total number of words used and their use of sophisticated and academic words. However, it should be noted that we found greater variability within the control group, than the treatment group, as is evidenced by the standard deviations of each group.

To determine whether teachers' talk was altered as a result of the vocabulary intervention, we conducted a within-group comparison of treatment teachers' speech. There were eight teachers who had at least three observations, which allowed us to look at the shape of these growth curves across the school year. When considering growth based on the number of months since the beginning of the school year, none of the growth trajectories was linear and or followed a particular curvilinear pattern. (see Figure 4)

Therefore, we relied on a comparison of treatment teachers' speech to control teachers' speech, with control teachers serving as our baseline. We compared speech at the beginning (n treatment = 8, n control = 10), middle (n treatment = 22; n control = 22) and end of the school year (n treatment = 14; n control = 14). Given slight systematic differences in observation times between treatment and control classrooms, comparisons were made from the randomly selected 20-minute time samples for each transcript. At baseline, we found no significant difference between treatment and control teachers on any of our measures, that is, for teachers' total talk (m treatment = 1807.57, SD = 638.42; m control = 1895.33, SD = 359.61, ns.), use of academic words (m treatment = 28.29, SD = 17.86; m control = 31.83, SD = 17.86; ns.) or use of sophisticated words (m treatment = 138.86, SD = 62.03; m control = 132.00; SD = 54.18, ns.).

However, teachers in the treatment and control groups did differ significantly on certain speech measures at the middle and end of the school year. Comparing the treatment and control groups at the middle of the school year, we found that teachers in the control classrooms used a greater number of sophisticated words (i.e., rare, low-frequency words; m treatment = 107.50, SD = 41.33; m control = 137.54, SD = 55.79; $F_{(47)} = 4.490$, p = 0.040), while treatment teachers used a greater number of academic words (m treatment = 50.84, SD = 19.94; m control = 30.13, SD = 15.35; $F_{(47)} = 16.273$, p = 0.000). By the end of the school year, teachers differed only in their use of total number of academic words used ($F_{(26)} = 6.89$, p = 0.014), with treatment teachers using more academic words (m = 49.21, SD = 24.41) than control teachers (m = 29.36, SD = 14.32). Teachers did not differ in their use of sophisticated words by the end of the school year (m treatment = 131.86, SD = 69.50; m control = 104.69, SD = 46.85; $F_{(26)} = 1.472$, p = 0.236). In other words, by the end of the year, treatment teachers were at the same level as control teachers in their use of sophisticated words while maintaining their higher level of academic word use, resulting in what could be considered a higher quality language environment.

TABLE 9. DESCRIBING CLASSROOM TALK POST INTERVENTION

FEATURES OF CLASSROOM TALK	CONTROL			TREATMENT		
	N	MEAN	SD	N	MEAN	SD
Sophisticated Types	24	137.54	55.79	24	107.50	41.33
Academic Tokens	24	30.13	15.35	24	50.84	19.94
Total Tokens	24	1840.00	547.84	24	1385.71	640.13

FIGURE 4. VARIATION IN TEACHERS' TALK POST INTERVENTION
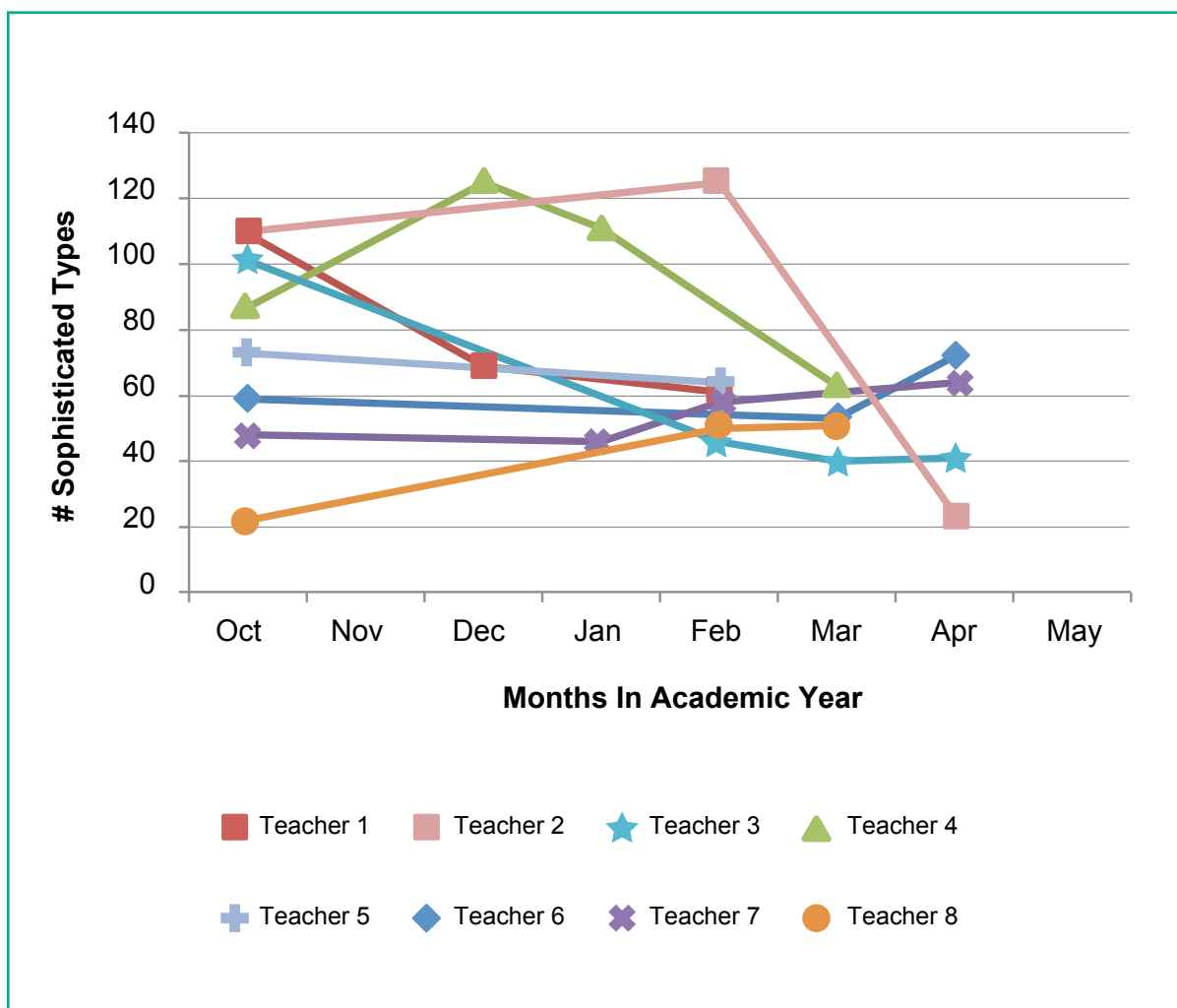
RESULTS PART 3 (CONT'D.)

RESEARCH QUESTION 6 & 7:

• Is the Quality of Classroom Talk during the Implementation of an Academic Vocabulary Program Related to the Growth in Students' Reading Comprehension and Vocabulary Knowledge?

• Does this Relationship Differ for LM Learners and Their EO Classmates?

To analyze the effect of treatment teachers' speech on their students' vocabulary and reading comprehension, we computed an aggregate teacher speech score taking into account teacher's speech across the school year. That is, we combined teachers' speech scores across time to yield an "average" speech measure. We focused primarily on teachers' use of academic words, as this was the factor on which treatment and control teachers continued to differ throughout the school year, after baseline. We also included analyses of teachers' total amount of talk given the trend towards a decrease in teachers' talk.

To predict whether the change in teachers' speech predicted students' reading comprehension and vocabulary scores, we built models in which we controlled for students' pretest scores. We also included students' language minority (LM) status (i.e., whether the student is a non-native English speaker or is English-only—EO) in order to investigate whether teacher talk impacts the difference in scores between LM and EO students. Table 10 shows the intercept of the Level 1 models, representing the predicted posttest vocabulary/reading comprehension score for an LM student, when the pretest is held at the mean. The language status slope shows the differential between LM and EO students on the posttest, after controlling for pretest scores. This result indicates that after controlling for pretest scores, EO students are expected to score higher than LM students on both the vocabulary and reading comprehension posttest.

TABLE 10. DIFFERENTIAL BETWEEN LM AND EO STUDENTS ON VOCABULARY AND READING COMPREHENSION

FINAL ESTIMATION OF FIXED-EFFECTS	VOCABULARY OUTCOME				READING COMPREHENSION OUTCOME			
	CO-EFFICIENT	SE	T-RATIO	df	CO-EFFICIENT	SE	T-RATIO	df
Intercept, γ_{000}	25.13**	0.59	4.52	12	498.37**	4.54	109.71	11
Language Status Slope								
Intercept, γ_{100}	-0.68*	0.31	-2.20	731	-4.18*	2.01	-2.08	632
Academic Vocabulary Pre-test Slope								
INTERCEPT, γ_{200}	0.63**	0.03	22.60	12	0.62**	0.04	16.19	11

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Next, we estimated full HLMs by including our teacher/ classroom-level variables, that is, teachers' academic tokens and total tokens, to predict students' end-of-year scores and the relationship between language status and end-of-year vocabulary scores. Further, we included FRL as a control variable (at the school level) separately for vocabulary and reading comprehension.

Reading Comprehension Model

Table 11 shows that LM students' end-of-the-year reading comprehension scores were significantly impacted by teachers' total academic word usage (i.e., academic tokens) in a positive direction, and in a negative direction by teachers' total tokens when all other factors are controlled for, $d_{Academic\ Tokens} = .629$; $d_{Total\ Tokens} = -.729$. Also, the relationship between language status and end-of-year vocabulary skills was not significantly impacted

by teachers' use of academic tokens or total tokens, indicating that these teacher speech measures did not significantly lessen the gap between EO and LM student scores. These results indicate that for an increase of one standard deviation in the average teacher's academic token usage (going from about 59 to 93 academic tokens), it is expected that there would be about a 22 point *increase* in the predicted reading comprehension posttest score for the average student when the pretest is held at the mean. It is also expected that when the pretest is held at the mean, there would be a 25 point *decrease* in the predicted posttest score of the average student after an increase of one standard deviation in teachers' total tokens (going from about 1706 to 2516 total tokens).

TABLE 11. CHANGE IN TEACHER TALK IMPACT ON READING COMPREHENSION

FINAL ESTIMATION OF FIXED-EFFECTS	COEFFICIENT	SE	T-RATIO	df
Intercept, γ_{000}	496.52**	4.57	108.72	10
% Free/Reduced Lunch Eligibility (FRL), γ_{001}	-0.15	0.17	-0.89	10
Total Tokens, γ_{010}	-0.03*	0.01	-3.24	17
Academic Tokens, γ_{020}	0.62*	0.22	2.79	17
Language Status Slope				
Intercept, γ_{100}	-5.57	3.42	-1.63	10
% Free/Reduced Lunch Eligibility (FRL), γ_{101}	-0.09	0.13	-0.68	10
Total Tokens, γ_{110}	0.00	0.01	-0.87	17
Academic Tokens, γ_{120}	0.12	0.17	0.70	17
Academic Vocabulary Pre-test Slope				
Intercept, γ_{200}	0.63**	0.03	21.23	632

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Vocabulary Model

As Table 12 shows, the results of our vocabulary model revealed that with all other variables controlled for, LM students' end-of-the-year vocabulary scores were significantly impacted by teachers' total number of academic words used (i.e., academic tokens) in a positive direction, and in a negative direction by teachers' total tokens, $d_{Academic\ Tokens} = .461$; $d_{Total\ Tokens} = -.449$. However, neither an average teacher's use of academic tokens nor total tokens had a significant impact on the relationship between language status and end-of-year vocabulary skills, indicating that these teacher speech measures did not significantly lessen the gap between EO and LM student scores. These results indicate that for an increase of one standard deviation in the average teacher's academic token usage (going from about 59 to 93 tokens), it is expected that there would be about a two point *increase* in the predicted vocabulary posttest score of the average student when the pretest is held at the mean. Further, it is expected that for an increase of one standard deviation in the average teacher's total token usage (going from about 1710 to 2500 tokens), it is expected that there would be about a two point *decrease* in the predicted vocabulary posttest score of the average student when the pretest is held at the mean.

TABLE 12. CHANGE IN TEACHER TALK IMPACT ON ACADEMIC VOCABULARY KNOWLEDGE

Final Estimation of Fixed-Effects	Coefficient	SE	T-ratio	df
Intercept, γ_{000}	24.97**	0.54	46.00	11
% Free/Reduced Lunch Eligibility (FRL), γ_{001}	-0.04	0.02	-1.83	11
Total Tokens, γ_{010}	-0.003*	0.01	-3.35	18
Academic Tokens, γ_{020}	0.07*	0.02	3.11	18
Language Status Slope				
Intercept, γ_{100}	-0.67	0.35	-1.92	11
% Free/Reduced Lunch Eligibility (FRL), γ_{101}	0.02	0.01	1.28	11
Total Tokens, γ_{110}	0.00	0.01	-1.05	18
Academic Tokens, γ_{120}	0.00	0.03	0.11	18
Academic Vocabulary Pre-test Slope				
Intercept, γ_{200}	0.62	0.03	24.17	731

* p < 0.05, **p < 0.01, ***p < 0.001

DISCUSSION

DISCUSSION

Undeniably, teachers have a formidable task in promoting language development and literacy proficiency for the diverse groups of English-only (EO) and language minority (LM) students entering their classrooms. In the school district that took part in this study and in urban districts throughout the country, problematic literacy achievement levels reflect the challenge of addressing an often at-risk, and increasingly diverse, student population.

Indeed, differences in student achievement by demographic background and school context are topics regularly discussed in the field, as are questions about effective classroom instruction to improve reading performance for these under-served urban populations. Unfortunately, for several decades it has been documented that most classrooms, particularly middle and high school classes, incorporate little of the kind of systematic and explicit vocabulary and reading comprehension instruction that would improve the curriculum (Durkin, 1978; Lesaux et al., 2010; Scott, Jamieson-Noel, & Asselin, 2003; Watts, 1995; Roser & Juel, 1982) for these vulnerable populations.

Thus, there is a press for the development of effective instructional practices to promote adolescents' vocabulary development as it relates to comprehending and analyzing texts in middle and high school. There is likewise an eagerness to determine if any other classroom features could impact student vocabulary and overall literacy levels, and therefore maximize learning opportunities over the course of each school day.

To that end, in this project, we analyzed the quality of language that characterizes standard classroom practice, and in turn, determined the effect of classroom talk on students' language and reading growth. We then investigated whether a vocabulary intervention designed to bolster students' language and reading skills had an effect on the quality of classroom talk, as well as how this interaction may influence student outcomes. Together, our results shed light on five key implications for the field.

Classroom Talk Varies (a lot)

Our results make clear that there is substantial variation across classrooms in the amount and type of language used. Overall, teachers varied widely in how much they talked, the variety of sophisticated words that they used, and in the syntactic complexity of their speech.

The Nature of Classroom Talk Matters for Students' Literacy Development

After careful analysis of sixth-grade teachers' speech, our data show that the classroom language environment can positively affect student learning. More specifically, the *quality* of teacher talk in the middle school classroom may, in fact, play a significant role in the vocabulary and reading development of early adolescents, including both LM and EO students. In particular, we found that teachers' use of a diverse set of sophisticated vocabulary significantly benefited students' vocabulary and reading development, whereas *quantity* of talk did not.

Particularly salient to note is that teacher's input was a significant source of variation in spite of the fact that the middle school is organized such that students rotate among teachers; thus, the ELA block in the present study was somewhere between only 90 and 120 min of the overall day, yet nevertheless significantly impacted students' vocabulary outcomes in the span of an academic year.

The Relationship between Classroom Talk and Literacy Development Differs by Students' Language Backgrounds and Vocabulary Knowledge

The effects of classroom talk appear to vary in significant ways for certain groups of students, suggesting that a student's language background and level of vocabulary knowledge are likely to predict the effect of different aspects of teachers' language. EO learners' in classrooms where the teacher used more syntactically-complex talk showed greater gains in their vocabulary development than their LM classroom peers. However, follow-up analyses indicated that this was not true for all LM learners, highlighting the degree of diversity within this group as well as how these individual differences impact responses to features of the instructional context. Specifically, we found a positive relation between teachers' syntactic complexity and vocabulary performance for those LM learners who had vocabulary scores in the average range and who had advanced English language proficiency as measured by the state test. It is worth noting that we consistently found

no evidence that syntactic complexity negatively impacted our LM learners.

Our findings suggest that in order to take advantage of the benefits of complex syntax, children's language skills must be sufficiently advanced. That is, our follow-up analyses suggest that syntactic complexity may only benefit LM learners who bring enough English proficiency to the learning situation. Thus, we hypothesize that those LM learners early in their English proficiency development, and who were not able to exploit such input, had likely not had enough exposure and scaffolding to be familiar with these complex structures. In contrast, English-proficient LM learners' and EO students were sufficiently skilled in English to allow for classroom exposure to complex language to serve as a vehicle for advancing their vocabulary knowledge.

This differential impact on LM learners' vocabulary based on English-proficiency also highlights the importance of building teachers' capacity to strategically scaffold their instructional conversations—rather than diluting or lessening the quality of the language they use in the classroom— so that they most effectively meet the language-learning needs of their classroom populations. Regardless of language background, every student should have unrestricted access to content information and academic rigor. This is particularly important as the field strives to ensure that the Common Core State Standards are truly accessible and sufficiently rigorous for all students. In addition, these findings highlight the need to study, and design interventions for, language minority (LM) students as a heterogeneous group requiring differing levels of support.

The Vocabulary Program Shows Promise for: 1) Narrowing Variability among Classrooms, and 2) Shifting Characteristics of Classroom Talk

As part of this project, we were interested in whether, in fact, the academic vocabulary program had an influence on the overall quality of classroom talk, defined as the complexity of teachers' vocabulary and syntax, including academic language use, as well as the overall amount of talk.

As mentioned above, there is significant variation in the quality and quantity in teachers' talk across classrooms, and this variation appears to have more to do with teacher characteristics than with a systematic effort to tailor classroom language use to students' language learning needs. Because our findings suggest that classroom talk significantly affects students' learning, this variation may, in part, play a role in the gaps evident in learning opportunities. As such, decreasing variability and raising quality across classrooms holds promise for improving adolescent literacy rates.

Our findings suggest that within the context of the vocabulary program, the variation in classroom talk decreases, suggesting that students' in different treatment classrooms were more likely to experience comparable talk than students in different control classrooms. What's more, our findings suggest that the language environment improved over the course of the program, highlighting a potentially developmental story. That is, when we compared classroom talk in treatment and control classrooms in the middle of the school year, we found that teachers in the control classrooms used a greater number of sophisticated words, while treatment teachers used a greater number of academic words. But, by the end of the school year, teachers differed only in their use of total number of academic words used, with treatment teachers using more academic words than control teachers. Teachers did not differ in their use of sophisticated words by the end of the school year. These results suggest that, over time, implementing a vocabulary program spurred teachers to change the words they used in the classroom such that by the end of the year, their classroom talk was comparably sophisticated while also more academic.

Shifting Characteristics of Classroom Talk Makes a Difference for Student Learning

The results of this study indicate that the quality of classroom talk during the implementation of the academic vocabulary program mattered for students' literacy learning outcomes. Specifically, the higher number of academic words used in treatment classrooms was related to higher growth in students' vocabulary and reading scores—for both LM and EO alike. This finding suggests that in the context of an academic vocabulary intervention, teachers'

increased use of academic vocabulary— including and beyond the specific words being studied— may further accelerate literacy development. In the case of students' increased growth on the measure of academic vocabulary, it stands to reason that if teachers are using the program's target words with greater frequency, students would perform better on this measure of words taught.

The relationship between increased academic words in teachers' talk and students' performance on a global measure of reading comprehension provided evidence that teachers' academic vocabulary use has benefits for students' broader literacy development, with the qualification that teachers' talk needed to sufficiently shift such that academic words were increasingly used. In interpreting this finding, we surmise that the word-learning skills gained through the intervention sufficiently allowed for exposure to a greater number of academic words to serve as a vehicle for advancing students' reading comprehension.

Interestingly, whereas in control classrooms the total amount of talk was not significantly related to achievement, in treatment classrooms, we found that a greater amount of teacher talk was related to decreased growth in students' vocabulary and reading scores. We interpret our results as further support for the notion that quality of talk is a key ingredient for positively influencing adolescent learners' literacy development. However, this finding underscores the notion that more teacher talk, and thus less student talk, does not lead to better student learning. Instead, in response to this finding, we hypothesize that student learning is promoted by an optimal amount of total talk through which the teacher exposes her students to academic language, and provides opportunities for students to then produce such speech.

REFERENCES

REFERENCES

August, D., Branum-Martin, L., Cardenas-Hagan, E., & Francis, D.J. (2009). The impact of an instructional intervention on the science and language learning of middle grade English language learners. *Journal of Research on Educational Effectiveness, 2*(4), 345-376.

August, D., & Shanahan, T. (Eds.). (2006). *Developing literacy in second-language learners: Report of the National Literacy Panel on language-minority children and youth.* Mahwah, NJ: Lawrence Erlbaum.

Borman, G. D. & Dowling, N. M. (2010). Schools and inequality: A multilevel analysis of Coleman's Equality of Educational Opportunity data. *Teachers College Record, 112*(5): 1201-1246.

Bowers, E. & Vasilyeva, M. (2011). The relation between teacher input and lexical growth of preschoolers. *Applied Psycholinguistics, 32*(1), 221-241.

Carlo, M.S., August, D., McLaughlin, B., Snow, C.E., Dressler, C., Lippman, D.N., et al. (2004). Closing the gap: Addressing the vocabulary needs of English-language learners in bilingual and mainstream classrooms. *Reading Research Quarterly*, *39*(2), 188– 215.

Carnegie Council on Advancing Adolescent Literacy. (2010). *Time to act: An agenda for advancing adolescent literacy for college and career success.* New York, NY: Carnegie Corporation of New York.

Chall, J., & Dale, E. (1995). *Readability revisited: The new Dale-Chall readability formula.* Cambridge, MA: Brookline Books.

Chaudron, C. (1988). S*econd language classrooms: Research on teaching and learning.* New York, NY: Cambridge University Press.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Coxhead, A. (2000). A new academic word list. *TESOL Quarterly*, *34*(2), 213-238.

Dalton, B., Proctor, C.P., Uccelli, P., Mo E., & Snow, C.E. (2011). Designing for diversity: The role of reading strategies and interactive vocabulary in a digital reading environment for fifth-grade monolingual English and bilingual students. *Journal of Literacy Research, 43*(1), 68-100.

Dickinson, D. K. & Porche, M. V. (2011). Relationship between language experiences in preschool classrooms and children's kindergarten and fourth grade language and reading abilities. *Child Development*, *82*(3), 870– 886.

Durkin, D. (1978). What classroom observations reveal about comprehension instruction. *Reading Research Quarterly*, *14*(4), 481–533.

Flanders, N. A. (1970). *Analyzing teacher behavior.* Reading, MA: Addison Wesley.

Fry, R. (2007). *How Far Behind in Math and Reading are English Language Learners?* Washington, DC: Pew Hispanic Center.

Gándara, P., Rumberger, R., Maxwell-Jolly, J., & Callahan, R. (2003). English learners in California schools: Unequal resources, unequal outcomes. *Education Policy Analysis Archives*, **11**(36), Retrieved on October 7, 2003, from http:epaa.asu.eduepaav11n36.

Hakuta, K. (1998). Improving education for all children: Meeting the needs of language minority children. In D. Clark (Ed.), *Education and the development of American youth* (pp. 35–39). Washington, DC: The Aspen Institute.

Huttenlocher, J., Haight, W., Bryk, A., Seltzer, M., & Lyons, T. (1991). Early vocabulary growth: Relation to language input and gender. *Developmental Psychology, 27*(2), 236-248.

Huttenlocher, J., Levine, S. and Vevea, J. (1998), Environmental Input and Cognitive Growth: A Study Using Time-Period Comparisons. *Child Development*, 69: 1012–1029.

Huttenlocher, J., Vasilyeva, M., Cymerman, E., & Levine, S. C. (2002). Language input at home and at school: Relation to syntax. *Cognitive Psychology, 45*(3), 337-374.

Klibanoff, R., Levine, S.C., & Huttenlocher, J., Vasilyeva, M. & Hedges, L. (2006). Preschool children's mathematical knowledge: The effect of teacher "math talk". *Developmental Psychology, 42*(1), 59-69.

Legaretta, D. (1977). Language choice in bilingual classrooms. *TESOL Quarterly*, 11, 9-16.

Lesaux, N.K. & Kieffer, M.J. (2010). Exploring sources of reading comprehension difficulties among language minority learners and their classmates in early adolescence. *American Educational Research Journal, 47*(3) 596-632.

Lesaux, N.K., Kieffer, M.J., Faller, S.E., & Kelley, J.G. (2010). The effectiveness and ease of implementation of an academic vocabulary intervention for urban middle school students. *Reading Research Quarterly, 45*(2), 196-228.

Lubliner, S. & Smetana, L. (2005). The effects of comprehensive vocabulary instruction on Title 1 students' metacognitive word-learning skills and reading comprehension, *Journal of Literacy Research*, *37*,163199.

Lutkus, A., Grigg, W., & Donahue, P. (2007). *The Nation's Report Card: Trial Urban District Assessment Reading 2007 (NCES 2008455)*. Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

MacGinitie, W., MacGinitie, R., Maria, K., Dreyer, L., & Hughes, K. E. (2000). *Gates-MacGinitie reading test.* (4th ed.). Itasca, IL: Riverside Publishing Company.

Mancilla-Martinez, J., & Lesaux, N. K. (2011). The gap between Spanish-speakers' word reading and word knowledge: A longitudinal study. *Child Development, 82*, 1544–1560.

National Reading Panel. (2000). *Teaching Children to Read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction* (National Institute of Health Publication No. 00-4769). Washington, DC: National Institute of Child Health and Human Development.

REFERENCES (CONT'D)

Proctor, C.P., Dalton, B., Uccelli, P., Biancarosa, G., Mo, E., Snow, C., & Neugebauer, S. (2011). Improving comprehension online: effects of deep vocabulary instruction with bilingual and monolingual fifth graders. *Reading and Writing: An Interdisciplinary Journal, 24*, 517-544.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Roser, N., & Juel, C. (1982). Effects of vocabulary instruction on reading comprehension. In J.A. Niles & L.A. Harris (Eds.), *New inquiries in reading research and instruction (31st yearbook of the National Reading Conference*, pp. 110–118). Rochester, NY: National Reading Conference.

Rutter, M., Maughan, B., Mortimore, P., Ouston, J., & Smith, A. (1979). *Fifteen thousand hours*. Cambridge, MA: Harvard University.

Scarcella, R. (2003). *Academic English: A conceptual framework*. Los Angeles: Language Minority Research Institute.

Schleppegrell, M. J. (2003). *Grammar for writing: Academic language and the ELD standards.* Santa Barbara, CA: University of California Linguistic Minority Research Institute.

Scott, J.A., Jamieson-Noel, D., & Asselin, M. (2003). Vocabulary instruction throughout the day in twenty-three Canadian upper-elementary classrooms. *The Elementary School Journal*, *103*(3), 269–283.

Short, D. & Fitzsimmons, S. (2007). *Double the work: Challenges and solutions to acquiring language and academic literacy for adolescent English language learners.* New York: Carnegie Corporation.

Snow, C., Burns, M., & Griffin P. (Eds.). (1998). *Preventing reading difficulties in young children.* Washington, DC: National Academy Press.

Snow, C.E., Lawrence, J.F., & White, C. (2009). Generating knowledge of academic language among urban middle school students, *Journal of Research on Educational Effectiveness*, *2*(4), 325-344.

Snow, C. E., & Uccelli, P. (2009). The challenge of academic language. In D. R. Olson & N. Torrance (Eds.), *The Cambridge Handbook of Literacy* (pp. 112-133). New York: Cambridge University Press.

Townsend, D. & Collins, P. (2009). Academic vocabulary and middle school English learners: An intervention study. *Reading and Writing*, *22*(9)*,* 993-1019.

Vaughn, S., Martinez, L.R., Linan-Thompson, S., Reutebuch, C.K., Carlson, C.D., & Francis, D.J. (2009). Enhancing social studies vocabulary and comprehension for seventh-grade English language learners: Findings from two experimental studies. *Journal of Research on Educational Effectiveness, 2*(4), 297-324.

Watts, S.M. (1995). Vocabulary instruction during reading lessons in six classrooms. *Journal of Reading Behavior*, *27*(3), 399–424.

White, K. R. (1982). The relation between socioeconomic status and academic achievement. *Psychological Bulletin*, *91*, 461-481.

**Council of the
Great City Schools**