

2023

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Recommended Citation

Danwah, Apryl (2023). Strategies for Increasing Long-Term Language Comprehension in English Learners Abstract. *Undergraduate Review*, 17, p. 29-40.

Available at: https://vc.bridgew.edu/undergrad_rev/vol17/iss1/7

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Strategies for Increasing Long-Term Language Comprehension in English Learners Abstract

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Abstract

The current literature on young English learners identifies that these students often struggle academically in comparison to English-speaking students, revealing a significant need for teaching strategies geared toward English learners. Previous research also shows that English learners require additional resources and strategies to promote their comprehension and retention of information. In this article, effective strategies for increasing long-term language comprehension in English learners will be explored across science, social studies, and math content areas with consideration to memory research. The purpose of this article is to convey the importance of comprehension strategies for English learners and to describe the themes between the best teaching practices in science, social studies, and math. English learners show increased language and content comprehension when teachers' lessons incorporate strategies that address and account for their academic challenges. This article concludes with the implications of this research on English learner education and recommendations for future research.

Keywords: English Learners, Long Term Comprehension, Memory, and Language Comprehension.

Introduction

Across the country, approximately 5 million children and adolescents are considered ELs, making up 10 percent of K-12 public school students (Mavrogordato et al., 2021). In schools, the term English learner (EL) or English language learner (ELL) refers to students with limited English language proficiency and whose first language is not English. ELs represent a growing population of culturally and linguistically diverse students in public schools in the United States. In the classroom, ELs face many academic challenges that their English-speaking counterparts do not face, which is in part shown through the tendency for ELs, on average, to earn lower scores than English speakers on academic tests (Valentino & Reardon, 2015). The clear achievement gap between ELs and other students calls for greater attention to identifying the strategies, methods, and language programs that are most effective for EL instruction. Along with the growing population of English learners in schools across the United States, there is a critical need for forming connections between recent research on ELs and the current state of EL education.

This article is separated into the following sections: introduction, multidisciplinary challenges and supports, science, social studies, math, implications,

recommendations for future research, and conclusion. The section on multidisciplinary challenges and supports will describe common challenges ELs face in all subjects and the current teaching methods used to support ELs. An understanding of the multidisciplinary challenges faced by ELs and the supports already available is needed to conclude how EL instruction can improve, especially regarding students' English language comprehension. In the following sections on science, social studies, and math, findings of relevant research specific to EL education in each of the content areas will be presented and discussed in conjunction with the available literature on memory and cognition. Additionally, frequently cited strategies and teaching methods for effectively increasing comprehension in ELs will be outlined in each content area section. The significance of this research on educational practice, the development of EL instruction, and teachers will be provided in the implications section. Lastly, suggestions for future studies based on the gaps in the literature and a further explanation of the importance of this research will be included in the recommendations for future research and conclusion sections.

Multidisciplinary Challenges and Supports

English learners face challenges related to academic language and background knowledge across all content areas introduced at the elementary school level. These challenges can be especially hard to overcome in content areas other than English because the focus of the instruction is taken off explicit English language learning. Thus far, most of the relevant research on EL education has been done through the lens of English Language Arts (ELA), mainly due to the strong focus this subject has on English instruction. The lack of literature on direct English

language instruction in content areas has inspired this research on strategies for increasing long-term language comprehension in ELs and will be further addressed in the following sections on science, social studies, and math. Academic language refers to the language needed for students to be successful in school, which includes content-specific vocabulary, unfamiliar uses of everyday words, and the sophisticated language of textbooks and assessments (DeLuca, 2010). Compared to social English, the type of language used in everyday conversations characterized by simple sentences and widely used vocabulary, academic language takes much longer to develop (Barrow, 2014). Although ELs may quickly develop social English, they likely continue to lack the academic language needed to comprehend textbooks, assignment directions, and test questions until years later (Barrow, 2014).

Another challenge for ELs that includes and expands upon issues with academic language is the absence of the prior knowledge authors often assume all students have. In many cases, students need to have a certain level of background knowledge to understand subject-specific textbooks and articles. Comprehension of a text can be significantly diminished when the student has little to no relevant background knowledge for the text to activate, indicating that there is value in teaching the necessary background information beforehand or finding ways to activate the prior knowledge ELs do possess (Hwang & Duke, 2020). Furthermore, the challenges of learning an academic language, reading comprehension, and building background knowledge can be reduced as teachers target these problems in their instruction of ELs.

In support of developing academic language and promoting reading comprehension in ELs, extensive

vocabulary instruction is commonly implemented in the classroom. Relevant literature has established a positive correlation between vocabulary instruction and reading comprehension, partly explained by acknowledging that ELs are less likely to use context clues to decipher the definition of new words since several words in the text may be unfamiliar to them (Hunt & Feng, 2016). Directly teaching unfamiliar words is an effective strategy for increasing word knowledge, which is supported by Hunt and Feng's (2016) findings that elementary school ELs scored significantly higher on a posttest of vocabulary knowledge after receiving direct vocabulary instruction through read-aloud.

While teaching vocabulary has been effective in increasing student comprehension, research suggests that the way students are grouped during instruction also has an impact on their learning. Small group instruction (SGI) where a few students have additional instruction from the teacher has been correlated with academic and social benefits for students (Mavrogordato et al., 2021). One study exemplifies this by showing that students who received SGI on reading performed better on a test of reading comprehension than students who did not (Ardasheva et al., 2019). The literature specific to SGI with ELs does support the notion that this differentiated teaching method is beneficial to ELs as well. A study done with Spanish-speaking ELs revealed that students were more engaged in class work when in SGI than in whole-class instruction (Brooks & Thurston, 2010). Evidently, the environment of small groups is beneficial for student learning, regardless of English proficiency.

Other studies reveal that heterogeneous/mixed-ability SGI, or grouping of ELs and non-ELs together, is beneficial to students because it allows for peer modeling,

the formation of personal connections, and academic peer discussions (Ardasheva et al., 2019; Dussling, 2020). Much more research is needed to identify the effectiveness of SGI in each content area, but research has shown that SGI improves English learners' literacy and numeracy skills (Ardasheva et al., 2019; Dussling, 2020; Mavrogordato et al., 2021). During lessons, vocabulary instruction, background knowledge, and small group instruction have been shown to support language comprehension. However, establishing additional comprehension strategies specific to the challenges in each content area is needed to fully support ELs.

Science

A review of the literature specific to EL instruction in science revealed best practices and effective comprehension strategies that both include and expand upon those presented in the section on multidisciplinary challenges and supports. Commonalities between the best practices outlined in the literature can be parsed out into the following overarching ideas: direct and meaningful vocabulary instruction, utilization and activation of students' background knowledge, the opportunity for hands-on science learning and repeated practice, and the use of visuals. These teaching methods are not separate from each other and the research highlights that they are all elements of effective science lessons. In this section, a discussion of the difficulties ELs face in science, the importance of vocabulary instruction, inquiry-based learning, and connections to memory research will be offered.

The literature surrounding teaching science to English learners acknowledges that the nature of science content presents many challenges for students. A portion

of these challenges can be attributed to the fact that language instruction is often not a focus during science lessons (Lee & Paz, 2021). ELs struggle with science texts because of unfamiliar terms, difficult or abstract concepts, and complex sentence structures that can overwhelm students and disrupt their comprehension of the material (Estrella et al., 2018; Flaggella-Luby et al., 2016). Without additional instruction or building of background knowledge, ELs may lack the content-specific vocabulary needed for comprehension of science assignments, articles, and tests (Wessels, 2013). Science is especially difficult for all students due to the notion that many everyday words take on new meanings when used in a science context, as well as the need to learn new subject-specific strategies such as hypothesis testing and data table construction (Flaggella-Luby et al., 2016; Wessels, 2013). The challenges presented above communicate the additional support and scaffolding that ELs require during science instruction, especially surrounding vocabulary and reading comprehension.

Direct vocabulary instruction is one common thread connecting most of the existing research on effective methods of teaching science to ELs. The vocabulary strategies mentioned in the literature seek to help students form meaningful connections to the words and understand the relationship between vocabulary and science concepts (Wessels, 2013). A vocabulary foldable is a strategy for organizing vocabulary where students use paper to create one organizer with flaps or sections for each word (Wessels, 2013). As students' progress through their science lesson, they can add drawings and write notes that utilize their prior knowledge, helping them form personal connections to the material, and encode information more elaborately, which is also helpful for

comprehension and memory formation (Rinne et al., 2010; Wessels, 2013). Another strategy that encourages the activation of student background knowledge and the identification of the relationships between concepts is science journals/notebooks (Lindquist & Loynachan, 2016). The use of scientific journals in the classroom to aid hands-on science learning helps develop writing skills, academic language use, and science-specific skills such as creating data tables (Lindquist & Loynachan, 2016). Teachers can use science journals to assess comprehension and retention of information through students' writing. The strategies presented in this paragraph help students to comprehend complex science concepts and vocabulary using methods that especially assist in long-term memory formation.

A large portion of the research on science instruction for ELs references using hands-on learning, or an inquiry-based approach, to teach ELs. A meta-analysis of the research concluded that inquiry instruction is related to increased science learning in ELs (Estrella et al., 2018). However, studies show that the effectiveness of inquiry instruction may rely on students' literacy skills. The research suggests that ELs may not be successful in primarily self-guided explorative classrooms because they lack relevant prior knowledge and/or cannot communicate their findings, proposing that solely using inquiry instruction is more suited for higher grades (Estrella et al., 2018). The findings of a longitudinal study with ELs done by Tong et al. suggest that literacy intervention is important when paired with inquiry-based science instruction because it prepares older students for science-centered instruction (2014). It is also inferred that success in science in later grades is a product of the long-term retention of skills developed in elementary

school. Hands-on science learning further creates personal connections and contributes to ELs' formation of episodic memory, or their memory of events, which is cited in memory research as influential in student recall of content information presented during the memorable event ((Fandakova & Bunge, 2016; Markant et al., 2016). Furthermore, previous literature exemplifies that long-term comprehension of language and literacy skills plays a distinct role in ELs' science learning and conceptual understanding. Many of the struggles ELs face in comprehending science content can also be applied to social studies content, leading to some overlap ineffective strategies.

Social Studies

Even though research on content area instruction for ELs is limited, there is an even greater lack of literature that focuses specifically on social studies instruction. The available research reveals some overlap with interdisciplinary supports and the best practices for science instruction. Direct vocabulary instruction with visual aids is one of the effective comprehension strategies presented in the literature that was also identified as an important teaching practice in science instruction. Along with direct vocabulary instruction, the following practices characterize the effective strategies described in the subject-specific research: activating background knowledge, increasing engagement and motivation for reading, and the organization of main ideas or concepts. This section will describe the common challenges for ELs in social studies lessons and the teaching practices that have been implicated in the development of student comprehension in this subject.

Much like in science, social studies texts can

be difficult for ELs to understand because of unfamiliar vocabulary and a lack of critical background knowledge. Additionally, social studies texts are decontextualized and make use of the passive voice, which is a challenge for ELs because it is different from conversational language (Brown, 2007). The wording and syntax of the sentences have the potential to confuse ELs and lead to misinterpretation of important ideas within the text, including timelines (Brown, 2007). More broadly, most ELs come from other countries and/or cultures that they do possess a rich background knowledge of, but this knowledge is underutilized in classrooms and is not helpful for readings that assume readers' knowledge of U.S specific information (Weisman & Hansen). Previous research addresses that another challenge of social studies instruction is engaging students in lessons, especially because students may perceive the content as boring and removed from their everyday lives (Barber et al., 2015). Given these challenges, the research on strategies for improved comprehension in social studies highlights vocabulary learning, forming connections between ideas, and increasing engagement.

Strategies that visually show the relationship between concepts and main ideas are linked to improvements in reading comprehension (Brown, 2007). Graphic organizers such as Venn diagrams, t-charts, and content maps are a traditional way to organize main ideas and vocabulary (Weisman & Hansen, 2007). Options for scaffolding in social studies lessons include using guiding questions and providing ELs with an outline of the text before reading (Brown, 2007). When introducing vocabulary, ELs benefit from direct instruction with visual aids and chances for repeated exposure and practice with the words (Weisman & Hansen, 2007). A study that looked

at building comprehension in social studies lessons through media, graphic organizers, and vocabulary instruction revealed that students who received this intervention performed better in assessments of comprehension and vocabulary than students who did not receive the intervention (Vaughn et al., 2010). The results of this study support the overall findings of the literature regarding the effectiveness of graphic organizers and direct vocabulary instruction in content area instruction.

In addition to opportunities for visualizing vocabulary and social studies content, research suggests that the level of engagement is influential in student learning. A study aimed at investigating reading comprehension in social studies used an intervention approach named USHER, which stands for United States History for Engaged Reading (Barber, 2015). The intervention incorporated a teaching model focused on supporting student motivation for reading and scaffolding comprehension strategies. After the intervention, ELs showed a significant increase on a test of reading comprehension, increased reading self-efficacy beliefs, and teacher support was revealed as a predictive factor in behavioral and emotional engagement changes (Barber, 2015). Engagement and interest in social studies may also be fostered by connecting new information to students' experiences and conveying meaning with pictures, charts, or real objects (Weisman & Hansen, 2007). Memory research cites that the formation of episodic memory and overall memory consolidation is partly facilitated through personal connections and emotional arousal, further implicating student interest in the lesson and utilization of prior knowledge as effective strategies for long-term comprehension (Shing & Brod, 2016). Overall, long-term retention and comprehension of social

studies concepts are supported by the efforts of teaching methods to organize concepts, explain vocabulary, promote participation, and form connections to students' perceived realities. Some of the teaching methods found to be effective in social studies can be translated to fit the nature of math content, while others are not relevant to the unique challenges ELs face in the subject.

Math

Research on math instruction for ELs has increased in recent years, leading to a more established, yet still limited body of literature on the effective strategies for math instruction. A common comprehension strategy stated in the available literature was direct instruction on how to comprehend and solve word problems. Other teaching strategies that were found effective for increasing comprehension in ELs are the use of visuals, peer discussions, and hands-on learning to make abstract concepts more concrete. Additional effective practices mentioned involved supporting the efficient functioning of students' working memory, direct vocabulary instruction, addressing common errors, and conducting frequent checks for understanding. This section will review the specific difficulties ELs frequently face during math instruction and elaborate on the teaching methods that lead to greater language and content comprehension in math lessons.

Several of the challenges ELs face in math overlap with what has already been stated in the social studies and science sections. However, there are difficulties with vocabulary and language comprehension that are largely specific to math content. For example, science and social studies instruction may incorporate words that take on a new meaning different from the everyday language in

the context of that content area, but, in math, several words have multiple meanings within the context of the subject itself as well (Arizmendi et al., 2021; Swanson et al., 2021). Likewise, previous literature recognizes that there is a 'language of math' that students must learn to be successful in the subject, demonstrated in part by the concept that mathematical symbols hold meaning and can be verbalized in numerous ways (Arizmendi et al., 2021; Swanson et al., 2021). Another challenge presented by math content is the common use of word problems, which first require ELs to comprehend the academic language contained within the problem and then proceed with mathematical calculations (Barrow, 2014). Based on the challenges continually referenced in the relevant literature, direct instruction of language comprehension skills and vocabulary is necessary for math instruction, despite misconceptions that language does not influence math learning.

Most of the teaching practices agreed upon throughout the research on EL instruction in math center on vocabulary development and conceptual understanding. Explicit vocabulary instruction using visuals, language modeling, and methods conducive to schema development such as chunking, a strategy of teaching words alongside other related vocabulary, is recommended in the literature (Barrow, 2014; Arizmendi et al., 2021; Merritt et al., 2017). In addition to vocabulary development, the research presents a discussion of ways to increase comprehension of math concepts through strategies for making abstract concepts more concrete, specifically using gestures, pictures or diagrams, real-life objects, hands-on activities, and opportunities for peer discussions (Barrow, 2014; Merritt et al., 2017). One study observed teaching practices in two fifth-grade classrooms

with high-achieving ELs, finding that both teachers consistently focused on building vocabulary, providing multiple representations of math concepts, explicitly teaching learning strategies, addressing common errors, and conducting checks for understanding (Merritt et al., 2017). The results of this study imply that math-based vocabulary instruction, among other strategies, is essential to the long-term comprehension of language needed for high achievement in math.

As an extension of math vocabulary development, considerable attention has been given to the relationship between comprehension and word problems. The use of word problems in classrooms has been shown to increase students' frequency and accuracy of spoken content-specific vocabulary (Valley, 2019). Another study showed that DSM (Dynamic Strategic Math) intervention resulted in a significant increase in word problem-solving accuracy among Latino ELs and a sustained accuracy in the lessons following the intervention (Orosco, 2014). The DSM intervention involved connecting concepts and vocabulary to everyday words, building knowledge for solving word problems, time for math discussion and practice, and scaffolding (Orosco, 2014). Findings of previous research like this study conclude that word problem-solving abilities both depend on and impact comprehension of math vocabulary and concepts.

Relatively recently, research has emerged on working memory in relation to math problem-solving. The research proposes that besides language barriers, ELs may score lower than monolingual English speakers because of the high demands for processing multiple pieces of information at once, heightened by the cognitive load of multiple meanings in math vocabulary (Swanson et al., 2021). The study used a longitudinal

research design and found that growth in the executive components of working memory related to math problem-solving (Swanson et al., 2021). Recent research on this topic suggests that working memory functions do affect ELs' performance on math problems and their potential to comprehend complex information during math instruction. Given the described findings, it can be inferred that activating background knowledge allows for improved memory processing because it accesses information in students' mental schemas (in long-term memory), lightening the cognitive load on working memory. Continuing to integrate memory research into considerations for educational practice for ELs will help to evolve our understanding of supports for long-term comprehension of the language across all disciplines taught at the elementary school level.

Implications

The effective teaching practices revealed within the relevant literature and outlined in this paper are significant to the future of EL instruction and the countless factors involved in their education. Educators are likely to feel more supported and confident in teaching ELs once they are aware of which strategies have been most effective with students. The focus of this article on instruction in content areas besides English is particularly useful for supporting teachers who are unsure how to incorporate language instruction into subjects like math or science. Furthermore, the success of lesson plans and modifications for English learners can benefit from teachers adopting effective strategies and teaching methods that best fit the students in their classroom.

English proficiency in English learners will also be positively impacted as they receive more support

in comprehending English across all subject areas. Additionally, ELs may feel more comfortable and included in the classroom by having more opportunities to speak with peers and having teachers directly address their academic challenges. English learners' mental health may improve as their classroom environment becomes more inclusive to their specific needs and they are encouraged to both learn from and educate their classmates. Especially amidst the challenges resulting from the COVID-19 pandemic, effective teaching strategies backed by research are needed to ensure the academic success and mental well-being of ELs and all students.

Beyond the day-to-day impact on English learners' classroom experiences, the effective practices for long-term comprehension presented by the literature also provide implications for English learners' test performance. The themes and teaching methods mentioned in the sections on math, science, and social studies focus on how long-term language comprehension and retention of content can be increased in students. Therefore, by being exposed to the strategies mentioned, students will be better equipped to recall what they learned while taking a test or other assessment. Comprehension of the test directions and questions may improve as well because of the attention to English instruction that ELs would receive during all lessons. Scores on standardized testing could likewise be positively impacted and there is potential for the achievement gap between English learners and English-speaking students to begin to shrink. If the evolving challenges for ELs and the current research continue to inform the development of best teaching practices, then the classroom environment will become a space more conducive to the academic success of both monolingual students and English learners.

Recommendations for Future Research

Several avenues for future research would be useful to form a greater understanding of how to best support the education of young English learners. These avenues for additional research on ELs include, but are not limited to the following:

- Further exploration of the instruction of ELs in the subject areas besides English, especially in math and social studies. The current research on content area instruction for ELs is limited and there is even less research on social studies and math than there is on science instruction. More research in this area would aid in establishing the differences and similarities between the effective practices in each content area.
- Studying the relationship between memory strategies and teaching strategies geared at increasing comprehension in ELs. There is a surplus of articles that identify the impact of memory and cognition on student learning, but memory research is rarely integrated into the literature on effective EL instruction. Studies that test long-term memory formation in students will potentially propel the development of effective comprehension strategies for English learners.
- The effect of different grouping methods and language programs on the effectiveness and use of comprehension strategies. Certain types of language programs for ELs will include some instruction in the students' first language and others are intended for English-only instruction, which proposes that language comprehension strategies may vary depending on the language program. Likewise, some classrooms may be grouped with only ELs or a majority of ELs, possibly influencing best

practices due to the differences in homogeneous and heterogeneous grouping.

- The impact of the COVID-19 pandemic on English learners' social-emotional learning and instruction. The pandemic has greatly impacted students by shifting instruction to an online delivery model and/or highly unfamiliar in-person experience. Research on this topic would be useful for evaluating effective practices for EL instruction and studying social-emotional factors in an online or hybrid academic environment.

Conclusion

Clearly, there needs to be much more research on how to best instruct English learners in all subjects, but especially in science, math, and social studies. However, the available literature does identify that effective comprehension strategies share the foundation of providing explicit English language instruction and encouraging meaningful connections. Considering the research on memory and cognition in learning can help contextualize the effectiveness of strategies for long-term comprehension of language and content, as well as inform future strategies.

There is also a need for more guidance in how teachers can create and adjust lesson plans to account for their English learner students. The themes found between effective teaching methods and comprehension strategies outlined in this article help create natural guidelines for teachers to use in crafting lesson plans that best support English learners. In pursuit of an equitable, enjoyable, and successful education for English learners, educators must attend to their students' long-term comprehension and strive to ensure students are

receiving appropriate English instruction in every subject. Investing in the improvement of EL education is ultimately investing in the future of the country and its economy as ELs and multilingual speakers begin to account for more and more of the American population.

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Apryl Danwah graduated with a double major in Elementary Education and Psychology. This article, along with lesson plans and a Google site, was written in the completion of her honors thesis. Her thesis was completed during the Spring 2022 semester under the mentorship of Dr. Jacquelynne Boivin (Elementary & Early Childhood Education). After graduating, Apryl plans to pursue a master's degree in Elementary Education at BSU before teaching at an elementary school. She also hopes to later pursue a Ph.D. in Education or a career in psychology after several years of teaching.