5-2016

THE EFFECT OF A SELF-REGULATED VOCABULARY INTERVENTION ON WORD KNOWLEDGE, READING COMPREHENSION, AND SELF-REGULATED LEARNING FOR ELEMENTARY ENGLISH LANGUAGE LEARNERS

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THE EFFECT OF A SELF-REGULATED VOCABULARY INTERVENTION ON WORD KNOWLEDGE, READING COMPREHENSION, AND SELF-REGULATED LEARNING FOR ELEMENTARY ENGLISH LANGUAGE LEARNERS

by

Qizhen Deng

A DISSERTATION

Presented to the Faculty of
The Graduate College at the University of Nebraska
In Partial Fulfillment of Requirements
For the Degree of Doctor of Philosophy

Major: Educational Studies

Under the Supervision of Professor Guy Trainin

Lincoln, Nebraska

May, 2016
English language learners (ELLs) represent an increasing population in U.S. public schools. Research reports from the past two decades suggest a persistent reading underachievement for ELLs. Academic vocabulary knowledge, due to its frequent use in academic texts, contributes significantly to ELL children’s English language development, reading comprehension, and general academic achievement. However, a gap of vocabulary knowledge exists between ELLs and their mainstream peers. One potential approach to address this issue is to help ELLs become mastery independent and proactive word learners. This study examined the effect of a researcher-led self-regulated vocabulary intervention on word knowledge, reading comprehension, and self-regulated learning in social studies for upper elementary ELLs. Self-regulatory word-learning strategies were guided by Michael Graves’ (2006) discussion of task-specific word learning strategies, and by Barry Zimmerman and Dale Schunk’s (2000) self-regulated learning theory from a social cognitive perspective. Specifically, the intervention instruction involved (1) task-specific cognitive strategies including morphological analysis and contextual analysis (i.e., how to use word parts and context clues to learn words), and (2) metacognitive strategies including goal-setting and monitoring (i.e., set goals and monitor their word learning and reading comprehension). A single-case
experimental design was conducted with multiple-baseline design across subjects with 9 ELL children for 16 sessions, 3 sessions per week, and about 30 minutes per session.
ACKNOWLEDGEMENTS

I would like to thank my husband, Bret Callinan, my parents, mother-in-law, and my siblings for the unyielding love and support, and for always being there.

I am very fortunate to have the best advisor, Guy Trainin, and I am very grateful for the inspiration, wisdom, and knowledge he shares with me and how much he has empowered me for the past few years. I also want to thank my committee, Dr. Kathleen Wilson, Dr. Ali Moeller, and Dr. Roger Bruning, for being supportive and helpful through my whole doctoral program. I cannot express enough how much I value the insights and supports they provided for my dissertation from the idea phase to the final finished version. To Dr. Roger Bruning for being patient and supportive for my research and for being a great mentor who shares knowledge and wisdom that is beyond scholarship. To Dr. Kathy Wilson for providing me some of the best comments and questions for my dissertation that will continue to benefit me as a researcher.

I want to thank my colleagues and friends, past and present, for your support and friendship. I especially want to thank my very special “family” – Dissertation Writing Group, the best group of people I’ve shared my doctoral life with: Karen Kassebaum, Rita Herman, Bonodji Nako, and Anja Roemhild. I also want to thank my very good friends, Laurie Friedrich, Emily Hayden, Kim Snyder, Shuling Yang, Crystal Liu, Carin Appleget, Jia Lv, who have encouraged and helped me tremendously as I prepared my study.
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Chapter I. Introduction

Overview of the Issues

At the national level the population of ELLs, who are in programs for language assistance in U.S. public schools, has increased significantly in the past two decades. The population increased from approximately 2 million in the 1993-94 school year to 3 million in the 1999-20 school year, and to over 4 million in the 2011-12 school year (Kena et al., 2015; Meyer, Madden, & McGrath, 2004). The percentage of ELLs increased from 5% in the 1993-94 school year to 7% in the 1999-00 school year, and to 9% in the 2012-13 school year (Kena et al., 2015; Meyer et al., 2004). At the regional level, the growth and distribution of this population is uneven across geographic regions. For example, the majority of the growth happened in the Midwest and East in the 2012-13 school year. Five out of the six states with the highest percentages of ELLs were distributed in the West. ELLs constituted over 10% of public school students in the states of Alaska, California, Colorado, Nevada, New Mexico, and Texas as well as in the District of Columbia. In California, ELLs constituted about 23% of public school students in the 2012-13 school year.

The home languages spoken by ELLs vary greatly at the national and state level (Kindler, 2002; Ruiz Soto, Hooker, & Batalova, 2015). Spanish was the most common home language nationwide in 2013 (71%), followed by Chinese (4%), Vietnamese (3%), French (2%), and Arabic (2%). While most states had Spanish as the top home language (over 60%), a few states had other top home languages (Kindler, 2002; Ruiz Soto et al., 2015). For example, Yupik is the top language in Alaska, German in Montana, and Ilocano in Hawaii (Ruiz Soto et al., 2015).
Every Student Succeeds Act (ESSA) as a recent educational law responded to this large and diverse population. This Act specified the priority for schools to meet the educational needs of ELLs by providing responsive instruction that addresses ELL children’s different proficiency levels, and providing access to a challenging curriculum that are aligned with the State academic standards, in order to prepare them to be “college- and career-ready” (ESSA, 2015). Currently, a variety of programs are available in schools aiming to facilitate ELLs with English language development and academic performance (Genesee, Lindholm-Leary, Saunders, & Christian, 2005). These programs range from bilingual education to English-only immersion (e.g., ESL pullout, structured immersion, sheltered English) (Rolstad, Mahoney, & Glass, 2005). Bilingual education programs are most easily implemented in school districts with students from similar language background, whereas English-only immersion programs happen more often for school districts with students from different language and cultural backgrounds. Program effects differ as a result of varying program models, funding sources, teacher qualification, school facilities, and educational policy (Jimenez-Castellanos & Topper, 2012). However, effective programs do share some characteristics, such as positive school environment, academically challenging and meaningful curriculum, theory-based practice, teachers with theoretical knowledge, and the use of cooperative learning (Genesee et al., 2005).

Despite the effort of various programs, a significant academic achievement gap persists between English language learners and their English-only peers. Reports from many national large-scale assessments and small-scale studies in the past few decades suggest that English language learners lag behind in almost all academic performances
(Kindler, 2002; Mulligan, Halle, & Kinukawa, 2012; National Center for Education Statistics, 2015). The most recent results from the National Assessment of Educational Progress (also known as “The Nation’s Report Card”) indicate that ELLs consistently underperformed in both reading and mathematics at 4th- and 8th-grade levels between 1996 and 2015 compared to English-only students (National Center for Education Statistics, 2015). The overall performance of ELLs on the Report Card has not improved over the past ten years. In 2015 at the 4th-grade level, 85% non-ELLs were at or above basic level in mathematics, compared with 57% for ELLs; 73% non-ELLs were at or above basic level in reading, compared with 32% for ELLs. At the 8th-grade level, 74% non-ELLs were at or above basic level in mathematics, but only 31% for ELLs; 79% non-ELLs were at or above basic level in reading, compared with 29% for ELLs. Another annual survey about ELLs from 41 state education agencies revealed that only 18.7% of ELLs scored above the state-established norm in reading comprehension in the 2001-02 school year (Kindler, 2002).

One longitudinal study (Mulligan et al., 2012) examined 8th-grade achievement in reading, mathematics, and science of ELLs who began kindergarten in the 1998-99 school year. Findings suggested ELLs who entered kindergarten with a lack of English proficiency had significantly lower scores than English-only students in all subject areas. The underachievement continues when ELLs enter high school and is related to several negative outcomes. For example, according to the most recent Fast Facts on college- and career-readiness related programs (Office of English Language Acquisition, 2015), only 2% high school ELLs were in advanced placement programs compared with 5% for
English-only students; only 2% ELLs were enrolled in gifted and talented education programs compared with 7% for English-only students.

In addition, ELLs seem to be at higher risk for being identified as in need of special educational services, especially in the high-incidence categories such as mild mental retardation and specific learning disabilities (Sullivan, 2011). ELLs with cultural diverse backgrounds are disproportionately represented in special education (Zhang, Katsiyannis, Ju, & Roberts, 2012). The percentage of ELLs passing high school mathematics exit exams was 30% to 40% lower than the percentage for mainstream students (70% to 90%) in California; the gap of reading achievement in exit exam was even larger (Xiong & Zhou, 2006). High school graduation rate for ELLs was 59%, significantly lower than the national average of 80% in the school year 2011-12 (Stetser & Stillwell, 2014).

Academic Language

This academic achievement gap can be partially ascribed to the lack of academic English proficiency for ELLs. For instance, ELLs who entered kindergarten with proficient English performed as well as English-only students in 8th grade reading, mathematics, and science; however, ELLs who entered kindergarten with low English proficiency scored significantly lower than English-only students in all three subject areas in 8th grade (Mulligan et al., 2012). Academic English is critical for ELLs to understand both academic conversations and academic content knowledge (August & Shanahan, 2006; Snow & Uccelli, 2009; Schleppegrell & Colombi, 2002; Townsend, Filippini, Colins, & Biancarosa, 2012). At the upper elementary grade level, students are expected to comprehend new information from content area texts. The lack of academic
English for these texts can be a serious obstacle to ELLs’ access to academic conversations and content knowledge. It is not surprising that academic English proficiency is significantly related to ELLs’ overall academic achievement (Townsend, et al., 2012).

**Academic Vocabulary**

Academic vocabulary knowledge is essential for the development of academic language skills (Baumann & Graves, 2010; Nagy & Townsend, 2012; Snow & Uccelli, 2009). The critical role of academic vocabulary for literacy development and academic achievement is well documented for mainstream students (Elleman, Lindo, Morphy, & Compton, 2009; National Reading Panel, 2000; Stahl & Nagy, 2006). A growing body of research suggests that academic vocabulary knowledge is also critical for ELLs within the context of K-12 education (August et al., 2005; Burgoyne, Whiteley, Spooner, 2009; Carlo, August, McLaughlin & Snow, 2004; DiCerbo, Anstrom, Baker, & Rivera, 2014; Graves, August, & Mancilla-Martinez, 2012; Helman, 2008; Snow & Uccelli, 2009). The lack of sufficient vocabulary knowledge is perhaps the greatest challenge for ELLs to comprehend academic content knowledge at appropriate grade levels and to read extensively beyond content area texts (Wallace, 2008).

Academic vocabulary acquisition is a tremendous challenge for ELLs. The processes of vocabulary acquisition are difficult in itself due to the complexity of vocabulary knowledge (Beck, McKeown, & Omanson, 1987; Dale, 1965; Nagy & Scott, 2000). For instance, the most current discussion suggests five dimensions of a person’s understanding of word knowledge, including incrementality, multidimensionality, polysemy, interrelatedness, and heterogeneity (Nagy & Scott, 2000). While ELLs may
appear to acquire non-academic vocabulary fast, they can be well behind in academic vocabulary acquisition compared with their English-only peers who experience steady vocabulary growth with cumulative and rich language exposure (DiCerbo, Anstrom, Baker, & Rivera, 2014; Snow & Uccelli, 2009). ELLs have generally less width and depth of vocabulary knowledge than non-ELL students. ELLs have a smaller academic vocabulary size, of which they know the meanings less well compared with non-ELL students (August et al., 2005; Wallace, 2008). With limited vocabulary knowledge, ELLs can be cognitively overloaded as they read academic texts because they have to split attention for both unknown words and the information necessary for comprehending academic content knowledge. The task becomes even more complicated when the unknown words bear critical information for the comprehension of content knowledge.

ELLs are challenged to acquire a large number of words. Non-ELL children enter school with a relatively small size of reading vocabulary; once in school, a child’s reading vocabulary develops at a rate of 3,000 to 4,000 words a year or about 10 words a day, leading to a reading vocabulary of about 25,000 words by the time they are in eighth grade, and about 40,000 to 50,000 word in twelfth grade for those who are at average and above average reading level (Graves, 2009; Herman, 1987; Stahl & Nagy, 2006). Only a few hundred words are directly taught each year, and students learn the rest on their own (Graves, 2009). ELLs, who start learning English even only a few years late, must speed up their learning rate through both direct instruction and independent learning if they are to match the vocabulary knowledge of non-ELL students.

To help ELLs meet the challenge, teachers and researchers have developed a number of research-based vocabulary intervention programs, such as Success for All, and
Help with English Language Proficiency “HELP” program (Carlo et al., 2004; Gersten et al., 2007; Slavin et al., 2009; What Works Clearinghouse, 2006, 2012a, 2012b). These programs shared several recommendations for effective instruction to ELLs: (1) providing rich and authentic language experience, (2) teaching vocabulary learning strategies (e.g., morphological strategies, contextual analysis, and dictionary use), (3) teaching general as well as content-specific words explicitly, (4) fostering word consciousness, (5) providing repeated exposure, and (6) using first language effectively (Calderon et al., 2005; Graves et al., 2012; Mancilla-Martinez, 2010; Wagner, Muse, & Tannenbaum, 2007; What Works Clearinghouse, 2007). The development of these effective instructions is challenged by the limited time available for direct instruction in the classroom and the importance for ELLs to continue word learning out-of-school settings (August et al., 2005). Though vocabulary research experts suggest the possibility of accelerated vocabulary growth for ELLs to catch up and keep up with their non-ELL peers through systematic and long-term vocabulary intervention (Carlo, August, Snow, 2005), existing literature of vocabulary instruction programs is far away from bridging the persistent gap of vocabulary knowledge. One promising approach to helping ELLs increase the width and depth of their vocabulary knowledge is to teach effective word-learning strategies (Carlo, August, & Snow, 2005; Graves, 2000, 2009; Nagy & Scott, 2001) so that they might reinforce their knowledge of learned words and learn new words during the school day, as well as continue the learning beyond school time. In the current study, I focused on the instruction of two types of word-learning strategies, including the use of task-specific strategies and metacognitive strategies.
Statement of the Problem

Teaching effective word-learning strategies is a powerful way that allows ELLs to maximize their academic vocabulary acquisition. Morphological analysis is one research-supported strategy to learn words (Anglin, 1993; Baumann et al, 2003; Graves, 2006; Kieffer et al., 2014). Contextual analysis, or the use of context clues, is another widely recommended word-learning strategy (Baumann et al., 2003; Nagy & Scott, 2000). With effective word learning strategies, academic vocabulary acquisition goes beyond direct instruction in the classroom. ELLs may continue to build up their vocabulary through independent learning when they encounter new or unfamiliar words.

Being able to identify and label strategies is not the end goal for vocabulary acquisition (Baker, 2008). Metacognitive skills are critical for word learning (Nagy & Scott, 2000). Dignath, Buettner, and Langfeldt (2008) found interventions focusing mainly on domain- or task-specific strategies reached lower effects than those combining both domain-specific strategies and metacognitive factors. Indeed, teaching a variety of strategies is not enough because learners not only need declarative knowledge (what strategy) but also procedural knowledge (How to use) and conditional knowledge (when and why to use) (Lipson & Wixson, 2008). ELLs should be able to consciously and purposefully monitor and reflect their word learning processes, flexibly use task-appropriate strategies and transfer the strategies to new tasks. For example, it is important to know when and how to use morphological analysis as well as the skills of monitoring and adjusting their use of strategies when they read academic texts with morphologically complex words (Kieffer, 2008). As ELLs become more skilled and automated in using the strategy of morphological analysis to decide the meanings of unfamiliar words, they
may free up their working memory for the information of content area texts, which is a key for academic success. If students overly focus on unknown words, they pay less attention to key ideas in reading text (McKeown, Beck, & Black, 2008).

The motivational beliefs about word learning are critical. Students are less likely to learn words if they are not motivated to learn new words. The development of an affective and efficacious stance toward word learning is as important as a cognitive aspect (Graves & Watts, 2008). ELLs who are more motivated tend to perform better on vocabulary knowledge (Taboada et al, 2011).

Though vocabulary acquisition scholars do agree on the potential role of motivational factors (Graves & Watts, 2008; Taboada et al, 2011), metacognitive skills (Graves & Watts, 2008; Nagy & Scott, 2000), and cognitive vocabulary learning strategies (Baumann, et al., 2003; Graves 2009) for vocabulary acquisition, little, if any, has been studied about the effect of instruction that incorporates these three components simultaneously. Existing principles of vocabulary acquisition mainly focus on direct vocabulary instruction. Direct instruction with carefully selected words provide ELLs a useful repertoire of words; if ELLs are to catch up and keep up with English native speakers, they should also acquire some effective word-learning strategies and know how to regulate their learning, so that they can continue learning academic words after receiving direct instructions. I suggested in the current study that ELLs should be strategic, motivated, efficacious, and persistent life-long word learners who continue to make progress in their journey of vocabulary acquisition. The skills are important considering Common Core State Standards (CCSS, 2012) requires students to read more expository texts in areas such as science and social studies that features complex
academic words. CCSS also requires students to “determine the meaning of general academic and domain-specific words and phrases in a text” relevant to grade-level topics or content areas (CCSS, 2002, p. 14).

The current study focused on the development of self-regulated word-learning strategies from a social cognitive perspective (Bandura, 1986; Boekaerts, Pintrich, & Zeidner, 2000; Zimmerman & Schunk, 1989, 2011). The theoretical foundation is a combination of self-regulatory processes (Bandura, 1986; Zimmerman, 1986, 2001) and vocabulary learning processes (Carlisle, 2007; Nagy & Scott, 2000; Nagy & Townsend, 2012; Graves, 2009). This approach involved three aspects: cognitive learning strategies, metacognitive strategies, and motivational beliefs. The task-specific cognitive strategies included morphological analysis and contextual analysis, two of the highly recommended word-learning strategies in vocabulary research literature (Baumann, et al., 2003; Graves, 2009; Nagy & Scott, 2000). These two strategies are limited to the particular tasks of learning words; they are not general in nature according to the discussion on strategy research (Alexander, Graham, & Harris, 1998; Pressley et al., 1989). The metacognitive strategies included goal setting and monitoring of one’s word learning processes. The motivational beliefs included self-efficacy and task values of word learning.

Purpose of the Study

The purpose of this study was to examine the effectiveness of a self-regulated word-learning intervention on word knowledge, reading comprehension, and self-regulated word learning. This intervention approach attempted to tackle the challenge of word learning for ELLs and prepare them to be proactive, effective, and motivated lifelong learners of words. To address the issue, the research questions included:
1. Did the instruction improve word knowledge for ELLs? If so, how?

2. Did the instruction improve reading comprehension for ELLs? If so, how?

3. Did the instruction enhance cognitive strategy use of morphological analysis and contextual analysis for ELLs? If so, how?

4. Did the instruction enhance metacognitive word-learning skills for ELLs? If so, how?

5. Did the instruction increase the motivational beliefs for word learning for ELLs? If so, how?

**Significance of the Study**

The significance of the problem included four aspects. It added to the current discussion of vocabulary acquisition and vocabulary instruction for ELLs at upper elementary level, especially in integrating self-regulated learning into the teaching and learning of words.

It added to the discussion of self-regulated learning in academic settings in the area of vocabulary acquisition for ELLs. As mentioned earlier, most existing vocabulary interventions emphasized direct instruction or task-specific word learning strategies, leaving less examined the metacognitive and motivational aspects.

The results of current study provided us an increased understanding on how we might better serve ELLs in terms of acquiring academic vocabulary effectively. Self-regulated word learning can provide ELLs with skills to face the challenge of acquiring a large vocabulary size independently. Teaching morphological analysis allows ELLs to build a solid foundation for independent word learning. Contextual analysis provides ELLs a useful tool to infer and learn word meanings from reading text. Metacognitive
skills allow ELLs to monitor, reflect, and adjust their word learning processes as they perceive fit. More importantly, metacognitive skills allow ELLs to transfer their word learning skills to different learning contexts. The importance of motivational beliefs involves the fostering of interest and self-efficacy in learning words.

**Definitions of Terms**

Several terms are key to the understanding of the present study. Among them are English language learners (ELLs), academic vocabulary, and self-regulated learning.

**English Language Learners**

English language learners (ELLs) refer to students who have adequate difficulty understanding, reading, speaking, or writing English language to be denied the opportunity to learn successfully in classrooms where English is the language of instruction or the opportunity to participate fully in larger U.S. society (U.S. Department of Education, NCES, 2014). ELLs usually participate in certain programs of language assistance, such as English as a second language (ESL) pullout program, content-based ESL program, or bilingual instructional program.

**Academic Vocabulary**

Academic vocabulary is generally referred as technical words necessary for academic learning and performance (e.g., reading comprehension, writing) (Hiebert & Lubliner, 2008). Academic vocabulary is a specific aspect of academic language, and academic language refers to “the specialized language, both oral and written, of academic settings that facilitates communication and thinking about disciplinary content” (Nagy & Townsend, p.91). Nagy and Townsend (2012) used the metaphor of “words as tools” to suggest that academic vocabulary instruction must approach words as means for
“communicating and thinking” about disciplinary content knowledge and must therefore provide students with ample opportunities to apply the instructed words for these two purposes. Academic vocabulary words typically include two categories: domain-specific and general (Baumann & Graves, 2010; Hiebert & Lubliner, 2008). Domain-specific academic vocabulary refers to “content-specific words used in disciplines like biology, geometry, civics, and geography”, whereas general academic vocabulary involves “the broad, all-purpose terms that appear across content areas but that may vary in meaning because of the discipline itself” (Baumann & Graves, 2010, p. 6). General academic words are frequently used in academic language and shared across disciplines (e.g., demonstrate, predict, approximate).

**Self-regulated Learning**

Self-regulated learning generally refers to the process where students activate and sustain cognitions, behaviors, and affects that are systematically oriented toward attainment of their goals (Schunk, 2008; Zimmerman, 1989; 2001, 2013). In the present study I referred to a social cognitive model of self-regulated learning developed by Barry Zimmerman (1989) partially based on Albert Bandura’s (1986) triadic analysis of human functioning in terms of personal, behavior and the environmental components, and partially on the role of strategies and feedback. Specifically, self-regulated learning in the present study included the concept of cognitive strategy use (i.e., task-specific strategies of morphological analysis and contextual analysis) metacognitive strategy use (i.e., goal setting and monitoring), and motivational beliefs (i.e., task values and self-efficacy).
Chapter II. Literature Review

Introduction

The discussion in this chapter is organized into the following sections: (1) academic vocabulary acquisition, (2) word-learning strategies, (3) self-regulated word learning, (4) metacognitive strategies, (5) motivational beliefs, (6) principles of academic vocabulary intervention, and (7) summary for literature review.

Academic Vocabulary Acquisition

Importance of Academic Vocabulary Knowledge

The importance of academic vocabulary knowledge for reading comprehension and academic achievement is well-documented particularly for students in upper elementary grade levels and beyond (Anderson & Freebody, 1981; Baumann & Graves, 2010; Beck, Perfetti, & McKeown, 1982; Carlisle, 2007; Perfetti & Stafura, 2014; McKeown, Beck, Omanson, & Perfetti, 1983; Nagy & Townsend, 2012; National Reading Panel, 2000; Townsend, Filippini, Collins, & Biancarosa, 2012). A number of experimental studies provide evidence for the notion that word learning affects both vocabulary knowledge development and reading comprehension. In the earliest study, Beck et al. (1982) examined the relationship between word knowledge and semantic processes through an in-depth and varied vocabulary instruction experiment with 4th-grade students over a five-month period. Results revealed that, after controlling students’ pre-intervention word knowledge and comprehension, students in experimental group outperformed those in control group on the tasks of single-word semantic decision, knowledge of the instructed words, reading comprehension of texts with words taught,
and the ability to transfer word knowledge to standardized tests. Similar findings were found in a replicated study a year later (McKeown et al., 1983).

Correlational studies also have established the relationship between word knowledge and reading comprehension for both English-only students and ELLs. Adlof, Hugh, and Little (2006) used structural equation modeling to determine whether fluency accounted for unique variance in reading comprehension after controlling for word recognition and listening comprehension with 604 children followed from second through eighth grade. Results showed fluency did not account for unique variance in reading comprehension; however, word recognition uniquely accounted for 35%, 19%, and 62% variance in reading comprehension in 2nd, 4th, and 8th grade, respectively. The authors argued that the development of word recognition, besides listening comprehension, should be the central foci of any intervention program. Another study tested a structural equation model of English reading comprehension with 135 Spanish-speaking 4th grade ELLs (Proctor, Carlo, August, & Snow, 2005). Results suggested that, given basic decoding skills, word knowledge is vital for reading comprehension; it affected reading comprehension directly, but also indirectly through listening comprehension. Similarly, Townsend et al. (2012) examined the variance in standardized academic achievement explained by academic word knowledge for ELLs in 7th and 8th grade. Results revealed general academic word knowledge explained between 19% and 34% variance in achievement performances across content areas and across standardized tests. Even after controlling for overall breadth of vocabulary knowledge, general academic word knowledge still accounted for between 2% to 7% variance in achievement.
Recent models of reading comprehension emphasize the role of word knowledge. For example, the construction-integration model (Kintsch, 1988) values both knowledge-driven (top-down) and word-based (bottom-up) processes. Cromley and Azevedo (2007) developed the direct and inferential mediation model of reading comprehension. According to this model, vocabulary knowledge directly affects comprehension because not knowing word meanings can hinder or mislead the comprehension of information; vocabulary knowledge also indirectly affects comprehension mediated by inference. The model was tested with 175 students in 9th grade and results indicated vocabulary knowledge made the largest contributions to comprehension with a total effect size of .41. Cromley and his team re-tested the model with 737 undergraduate students (Cromley, Snyder-Hogan, Luciw-Dubas, 2010). They modified the model by adding a path from vocabulary knowledge to reading strategies, indicating undergraduate students with sufficient vocabulary knowledge can immediately proceed to using reading strategies instead of focusing mental resources on deciphering the meanings of new words. More recently, Perfetti and Stafura (2014) introduced the Reading Systems Framework to account for the process of reading comprehension. Word knowledge is placed in the center of this framework and word meaning processes are assumed to be causal components in comprehension skills. A few other reading models have also granted word knowledge a central role because it is directly and indirectly related reading comprehension through its influencing on various reading-related processes, including phonological, orthographic, and morphological processes (Anglin, 1993; Wang & Geva, 2003). Overall, word knowledge is critical for reading comprehension and academic achievement (Graves, 2006, 2009; Nagy & Townsend, 2012).
**What it Means to Know a Word**

Considering the importance of vocabulary knowledge, if we are to discuss appropriate and effective vocabulary instruction, it is necessary to better understand what it means to know a word, or the characteristics of word knowledge. Traditionally, word knowledge tends to be presented in an all-or-nothing fashion, and vocabulary instruction and assessment were mostly decontextualized. In the past half century, a number of scholars have explored this question (e.g., Beck, Mckeown, & Omanson, 1987; Dale, 1965; Nagy & Scott, 2000); they agree upon on the idea that word knowledge is not an all-or-nothing matter. Scholars have conceptualized word knowledge in various ways, including but not limited to stage-like, continuum-like, and dimensional forms. One of the earliest conceptualization of word knowledge involved four stages on a continuum (Dale, 1965, p. 898): (1) Never saw it before; (2) Heard it, but doesn’t know what it means; (3) Recognize it in context as having something to do with__; (4) Know it well and would recognize it again. The details of the classifications are not intended to imply there are only four discrete stages of word knowledge, rather, it emphasizes word knowledge is not a matter of all-or-nothing but a matter of degree. Even beyond the fourth stage, we still have room to make finer discriminations between words we already know well. About twenty years later, Beck, et al. (1987) represented the degree of word knowledge on an another continuum: (1) No knowledge; (2) General sense such as knowing *mendacious* has a negative connotation; (3) Narrow, context-bound knowledge, such as knowing that a *radiant bride* is beautiful and happy, but unable to describe an individual in a different context as *radiant*; (4) Having the knowledge of a word but not being able to recall it readily enough to use it in appropriate situations; and (5) Rich and
The most current and comprehensive account of word knowledge is Nagy and Scott’s (2000) five key dimensions of word knowledge: incrementality, multidimensionality, polysemy, interrelatedness, and heterogeneity. *Incrementality* refers to the incremental nature of word learning. That is, knowing a word is not the case that one either knows or does not know a word. Rather, learning a word is an incremental process from an initial state of incomplete knowledge of a word, with more exposures over time, to a more complete and refined one. Dale’s (1965) stage-like conceptualization of word knowledge resonates with the incrementality nature on a linear scale. The incremental view of word learning process helps explain the incidental learning of word knowledge in rich and diverse contexts. However, less is known about the degree to which word learning is incremental and the quality and quantity of encounters necessary for students to acquire deep word knowledge in natural contexts. This idea of incrementality is supported by empirical studies. For instance, Frishkoff, Perfetti, and Collins-Thompson (2011) reported a study of the incremental learning of new word meanings over multiple episodes by tracking learning through assessment of learner-generated definitions. They found word knowledge scores increased with each extra encounter, suggesting that vocabulary acquisition is incremental.

*Multidimensionality* represents the multiple aspects of vocabulary knowledge (Henriksen, 1999; Nation, 1990). Nation (1990) defined three dimensions with nine components for lexical competence including knowledge of spoken form, written form,
and word parts, form and meaning, concept and referents, associations with other words, grammatical behavior, collocational behavior (what words are this word commonly used with), and constraints on use. Henriksen (1999) proposed three dimensions of lexical competence: partial to precise knowledge, depth of knowledge, and the ability of receptive to productive use. Bogaards (2000) divided word knowledge into six categories: form, meaning, morphology, syntax, collocates, and discourse. One issue about the multidimensionality is whether multiple aspects can be reducible to a single continuum if there are strong relations between them. Research shows that different aspects are relatively independent. For instance, one may recognize a word but have no sense of its meaning; or one may not remember previous encounters of a word but understand its meaning (Schmitt, 1998). To sum, word knowledge should be characterized in terms of multiple aspects.

Interrelatedness suggests word meanings are not perceived in isolation. For instance, how well a person knows the meaning of “cold” depends in part on their knowledge of snowy, chilly, or burning. The concept of interrelatedness is based on the theory of latent semantic analysis (Landauer, McNamara, Dennis, & Kintsch, 2013). Latent semantic analysis is a theory and method for extracting and representing word meanings by using statistical computations. Their simulation of word learning from context has been shown to reflect human knowledge in forms of standard vocabulary test score, human word sorting and category judgments, and passage coherence (Landauer et al., 2013). In simulations, the change of any single word can potentially change the representation of word meanings and configuration of relationships of the whole system (Landauer et al., 2013; Landauer & Dumais, 1997). While one must be cautious in
applying this simulation to human learning, as Nagy and Scott (2000) proposed, it at least raised the possibility that word interconnectedness in human memory is far more complex and interrelated than what we currently present in dictionary definitions.

**Polysemy** describes the phenomenon that a word often has multiple meanings. Word meanings are flexible and nuanced to a degree by the context in which the words are imbedded (Baumann et al., 2002; Schatz & Baldwin, 1986). If students are to learn this aspect of complexity of vocabulary knowledge, teachers must teach students to choose the right meaning of word in dictionary and to be aware of potential new usage of familiar words during reading. The last dimension of word knowledge complexity is **heterogeneity**, which indicates the fact that what it means to know a word depends on what kind of word one refers to. For instance, word knowledge is subjective to its function (e.g., noun vs. verb function of the word “enter”).

Nagy and Scott (2000) further argued that “word knowledge is primarily procedural rather than declarative, a matter of knowing how rather than knowing that” (p. 273). The declarative component of word knowledge mostly exists for technical or content-specific knowledge whereas the procedural component is mainly for nontechnical vocabulary. In other words, knowing a nontechnical word means the awareness of the five aspects of word knowledge as well as the ability to do things with it (Lubliner & Smetana, 2005).

The complexity of word knowledge suggests that word knowledge is a formidable task for both English-only learners and English language learners (Graves, 2009; Nation, 2001). The breadth and depth of word knowledge acquired by students are far more complex than could be covered by direct instructions that focus primarily on a small
number of words. Not only are there too many words to teach directly (Nagy & Anderson, 1984), the multidimensionality of word knowledge is too complex for teachers to cover within limited instructional time (Nagy & Scott, 2000). To encounter this issue, teachers must not only teach specific well-selected words, but also emphasize generative word knowledge that allows students to transfer to the independent learning of other words (Scott & Nagy, 2004). According to Scott and Nagy, word-learning strategies is one important aspect of generative word knowledge to understand how children learn new words.

**Word-Learning Strategies**

One approach to facilitate students’ word learning is to teach them effective word learning strategies so that they can independently deal with new words they will encounter (Blachowicz, Fisher, Ogle & Watts-Taffe, 2006; Graves, 2009). Morphological analysis and contextual analysis have been shown to be among the most effective strategies for both ELLs and English-only students to build up their vocabulary repertoire (Edwards, Font, Baumann, & Boland, 2004; Kieffer & Lesaux, 2008; National Reading Panel, 2000).

**Morphological Analysis**

Morphological awareness refers to children’s “conscious awareness of the morphemic structure of words and their ability to reflect on and manipulate that structure” (Carlisle, 1995, p. 194). Morphemes are the smallest meaningful units in a word that can be prefixes, suffixes, word roots/bases, inflected endings, and compounds. For example, the word *photosynthetic* is made up of three morphemes: the compound *photo-*-, the root *-synthet-*-, and the suffix *-ic*. The meaning of unknown words can
sometimes be ascertained by examining the morphemes known by students (Nation, 2001; Schmitt, 2010). Morphological analysis refers to deriving the meaning of a word by examining its morphemes. Instruction in morphological analysis usually involves teaching students to disassemble words into corresponding morphemes, learn the meanings of roots or affixes, and reassemble morphemes to understand word meanings (Edwards, et al., 2004).

Children’s engagement in morphological analysis begins as early as they are in preschool. By the time they enter first grade they have normally acquired the basic knowledge of morphological rules (e.g., plurals, verb tenses, possessives, compounds, and derivations) (Berko, 1958). For the following three or four years in school, their morphological awareness continues to develop at a fast pace beside phonological and orthographic awareness (Berninger, Abbott, & Nagy, 2010). Whereas the growth of phonological and orthographic awareness often reaches ceiling in fourth grade with some additional growth thereafter, morphological knowledge, particularly derivational, continues to develop substantially as students progress into upper elementary grades (Berninger et al., 2010; Carlisle, 1988), middle school (Goodwin & Ahn, 2013), high school (Mahony, 1994; Nagy & Scott, 1990), and college (Cromley, et al., 2010). The overall developmental trajectory of morphological awareness has a much longer span than phonological and orthographic awareness. This is partially due to an increasing number of academic words in reading texts at upper elementary grades (Anglin, 1993; Nagy & Anderson, 1984; Nagy & Townsend, 2012). These academic words tend to be morphologically complex with more than one morpheme. Often, these words have either Latin or Greek origins in addition to a prefix and/or suffix, as in *indisposition* and

Morphological awareness is related to vocabulary acquisition. Nagy and Anderson (1984) estimated that for every word learned by a child, an additional one to three related words should also be understandable by the child; however, the exact number depends highly on the child’s skills to use morphological analysis and contextual analysis to induce word meanings. More than half of the new words students encountered in reading texts are morphologically analyzable so that children can figure out the meanings of those words using morphological analysis. Teaching words together as a family helps bridge the most-frequent and already-known words to new words, and learning the new words also reinforce the learning of morphemes. Anglin (1993) studied the growth of children’s lexical knowledge. For first graders, about 4,000 words out of 10,000 were potentially knowable through morphological analysis. The number of derived words known by students increased by about 4,000 between first and third grade (from 2000 to 6000), and between third and fifth grade, the growth increased by about 10,000. Quadratic growth was also observed for inflected words and root words. Anglin noted children’s vocabulary growth was associated with an increasingly powerful skill to analyze the morphological structure of complex words. Bowers and Kirby (2010) examined the effects of a 20-session morphological intervention on vocabulary knowledge for fourth and fifth graders. After controlling for pre-intervention word knowledge, significant instructional effects were found on morphological analysis, knowledge of words taught directly, and novel words built on roots taught in the context of other derivations, but not on words with untaught roots. The authors suggested explicit
instruction of morphological structure is potential for developing students’ interest in and understanding of base words.

Morphological awareness also contributes to reading comprehension and other literacy achievement. For example, two meta-analyses by Goodwin and Ahn (2010, 2013) examined the effects of morphological interventions on literacy achievement for English language learners. Significant effects were noted for phonological awareness, morphological awareness, vocabulary, spelling, and reading comprehension, suggesting morphological intervention can effectively facilitate the development of literacy for English language learners. Carlisle (2010) conducted an integrative review of sixteen studies on the effect of morphological awareness on literacy development and results indicated that morphological awareness potentially contributes to children’s understanding of morphemic structure, spelling, and meaning of written words.

Recent empirical research also suggests the critical role of morphological awareness for the development of literacy skills of young English language learners with or without reading difficulties. Lesaux, Kieffer, Kelley, and Harris (2014) conducted a randomized field trial to examine the effect of an academic vocabulary intervention that focused on morphological awareness on the development of language and literacy skills for sixth-grade English language learners. The 20-week classroom-based intervention significantly improved students’ vocabulary knowledge, morphological awareness, standardized writing, and reading comprehension of expository texts. Kieffer (2013) examined the relation between derivational morphological awareness and reading difficulties for sixth-grade Spanish-speaking English language learners and English-only students. Results indicated morphological awareness differentiated skilled readers from
students with reading difficulties. English language learners with reading difficulties were particularly likely to show lower morphological knowledge, suggesting that morphological awareness is a particularly important skill to develop for English language learners with reading difficulties.

Morphological awareness is especially useful for English language learners whose first language share cognates with English, such as native-Spanish English language learners (Carlo, August, Snow 2005). Cognates refer to words in English and Spanish that share etymological roots, forms, and/or meanings. English and Spanish share many derivational affixes of Latin and Greek origin (Barber, 2000). Over one-third of the words in academic contexts are English-Spanish cognates (Nash, 1997). Lubliner and Hiebert (2008) suggested that morphologically transparent English-Spanish cognates consist of about 70% of the words from the Academic Word List (Coxhead, 2000). Instruction on cогnate strategy provides powerful literacy tools to Spanish-speaking students (Lubliner & Grisham, 2012). Students with morphological awareness can effectively transfer their knowledge of L1 morphemes to English learning. Specifically, Spanish-speaking ELLs can use their Spanish language knowledge to infer the meanings of unknown English words that are English-Spanish cognates. Nagy et al. (1993) studied reading comprehension of Hispanic bilingual students and found students with a better ability to recognize cognates performed better in English reading comprehension, despite that these students’ knowledge and use of cognates were far from reaching ceiling. Nagy et al. (1993) suggested the potential of cognate strategy instruction helping Hispanic bilingual students overcome some of the difficulties with English reading vocabulary. More recent empirical research (Carlo, August, & Snow, 2005; Calderon, 2007) supports
the potential of cognate strategy instruction. For example, Calderon (2007) reported that English-Spanish cognate strategy instruction had a positive effect on academic vocabulary both in English and Spanish among monolingual and bilingual (English-Spanish) elementary children.

Overall, morphological awareness is critical for English language learners at upper elementary grade levels and above to learn new words and comprehend reading texts in various content areas. English language learners well-equipped with morphological awareness can maximize their vocabulary acquisition by increasing the depth and breadth of vocabulary knowledge. The depth of word knowledge can be increased as English language learners skillfully manipulate meaningful morphemes of new words. The breadth of vocabulary knowledge can be enhanced at a faster pace because English language learners are likely to learn a family of words sharing a word root that they know. Morphological knowledge also helps English language learners meet the demand of academic texts with an increasing number of complex words with Latin and Greek origins (Goodwin, 2011; Kieffer, 2013; Kieffer & Lesaux, 2008; Tong et al., 2011). This is because with the knowledge of these academic words, English language learners will have less difficulty comprehending the concepts of content areas.

**Contextual Analysis**

Students use context clues to understand word meanings by scrutinizing surrounding text, including preceding or succeeding phrases and sentences that might provide syntactic and semantic cues (Baumann & Kame'enui, 2004). Students can be taught to look at the sentences around the unknown word for synonyms, antonyms, definitions, appositive definitions, examples, and punctuations for clues to the word
meaning (Baumann, Font, Edwards, & Boland, 2005). Contextual analysis is a means for students of all ages to learn word meanings from context, and the chance of word learning increases as the encounters with the words accumulate (Graves, 2006). “Most vocabulary is learned from context” (Sternberg, 1987, p.89); in fact, no other explanation can better explain the huge amount of words students learn (Graves, 2006).

Some researchers (Nagy et al., 1987; Nagy & Scott, 2000; Schatz & Baldwin, 1986) pointed out that it is rare to learn a low-frequency word from a single encounter in a natural occurring context. For instance, Schatz and Baldwin (1986) conducted three studies to examine the extent to which context helps students infer the meanings of unknown words, and they found context did not help readers to identify the meanings of low-frequency words in naturally occurring prose. In another study, Anderson Nagy and his colleagues (1985, 1987) found that probability for students to learn a word in natural passages well enough to answer a multiple-choice question was only between .05 to .15. A meta-analysis of 20 studies suggested that students can learn new words in natural context by using contextual analysis with a probability of .15 (Swanborn & de Glopper, 1999). It is important to recognize contextual analysis is not necessarily always effective in natural reading context in the short run. Nevertheless, given the large volume of reading, students learn a lot of new words from reading context (Graves, 2006). The use of context clues has been shown to substantially improve vocabulary learning efficiency (e.g., Bauman, Edwards, et al., 2003; Baumann et al., 2002; Baumann & Kame'enui, 2004).

A number of studies with English native speakers have shown the effect of contextual analysis on vocabulary learning. Baumann, et al. (2002) conducted a mixed
method study to examine the effects of instruction in contextual analysis and morphemic analysis with four classes of fifth-grade students assigned to a control group, a morphemic-only group, a context-only group, and a combined morphemic-context group. The context-only group outperformed other students without contextual analysis instruction. Immediate effect, but not delayed effect, was observed for contextual analysis for both lesson words and transfer words. The combined morphemic-context group’s skill to infer word meanings using context clues was similar to the skill of the context-only group. Baumann, et al. (2003) applied a quasi-experimental design to compare the effect of a combined morphemic-context instruction with a traditional textbook vocabulary instruction imbedded into social studies textbook lessons among eight fifth-grade classrooms. Results suggested students in the experimental group were more successful inferring meanings of contextually decipherable words on a delayed text but not on an immediate test. Baumann et al. (2011) conducted a formative experiment on vocabulary instruction focusing on providing rich and varied language experiences, teaching individual words and word-learning strategies of morphological analysis and contextual analysis. Quantitative results showed growth for all children’s receptive word knowledge using Peabody Picture Vocabulary Test (PPVT), and children initially below average in vocabulary knowledge benefited more than children initially above average in vocabulary knowledge. Qualitative results revealed that students used more complicated words, increased interest and attitudes toward vocabulary learning, and engaged more in using word-learning strategies independently, such as context clues. A meta-analysis of 21 intervention studies focusing on contextual analysis (Fukkink & de Glopper, 1998)
indicated a positive effect of teaching contextual analysis on students’ skill to derive word meaning from context.

The limited research with English language learners suggests a positive effect of instruction focusing on contextual analysis alone or in combination with morphological analysis. For instance, Carlo et al. (2004) concluded that instruction of contextual analysis and morphological analysis positively impacted fifth-grade ELL children’s word knowledge and reading comprehension. Montelongo et al. (2011) suggested the effectiveness of teaching six context clues on word knowledge and reading comprehension for fourth-grade Latino ELL children, including synonyms, antonyms, definition, examples, appositive word or phrases, and punctuation.

**Self-regulated Learning and Vocabulary Acquisition**

Considerable evidence exists from the past half century that teaching self-regulated strategies enhances student learning in various academic domains (August & Shanahan, 2010; Zimmerman & Bandura, 1994; Zimmerman & Schunk, 2013). A group of scholars have emphasized the importance of assisting ELLs to become self-regulated learners (Echevarria, Vogt, & Short, 2012; Snow, Griffin, & Burns, 2005). Although in general self-regulated learning is considered a critical component of academic learning, empirical studies supporting this notion are rare in the field of vocabulary acquisition. To my knowledge, only two intervention studies have explicitly addressed the contribution of self-regulatory processes to vocabulary acquisition.

In a multiple-probe study, Kim and Linan-Thompson (2013) examined the effects of self-regulation on the acquisition of science vocabulary among four 3rd-grade ELLs with learning difficulties. Results showed vocabulary instruction with the incorporation
of self-regulation (self-goal setting and self-monitoring) led to significant enhancement in
ELLs’ word learning as well as their interest in using self-regulated strategies. Direct
vocabulary instruction in their study, however, did not facilitate word learning, contrary
to previous work showing the effect of direct vocabulary instruction among ELLs with
limited English proficiency (Carlo et al., 2004). The authors suggested the characteristics
of the sample (i.e., the beginning stage of English language development with learning
disabilities with poor learning skills) might explain for low improvement of word
learning with direct vocabulary instruction. Although this study contributed to the
research on the effect of self-regulated learning on the vocabulary acquisition for ELLs
with learning difficulties, it is not yet known whether ELLs with typical learning ability
will benefit from instruction with goal-setting and self-monitoring. In addition, their
intervention did not involve teaching of any task-specific cognitive strategies, such as
morphological analysis and contextual analysis (Anglin, 1993; Baumann et al, 2003;
Graves, 2009, 2015; Kieffer, 2008). These are task-specific cognitive strategies highly
recommended by vocabulary research scholars for ELLs to become independent learners.
These strategies might not be appropriate for ELLs with low English proficiency level,
but might facilitate tremendously the word learning for those ELLs with intermediate and
above proficiency level who begin to have awareness of word structures and context
clues.

In another study, Lubliner and Smetana (2005) examined the effects of a
metacognitive vocabulary intervention on the vocabulary learning and reading
comprehension of fifth-grade students from one of California’s lowest performing Title I
schools. This study focused on the development of students’ metacognitive skills (i.e.,
self-appraisal of cognition and management of thinking) in order to help students monitor their word-learning processes and word-learning strategy use. The study revealed promising findings that the achievement gap narrowed between Title I students and those from an above-average school. However, the question remains regarding whether the students are more engaged and motivated to learn words. The most effective interventions incorporate not only cognitive and metacognitive, but also motivational aspects of self-regulated learning, in line with suggestions by previous work (Boekaerts & Corno, 2005). A meta-analysis of 30 articles on enhancing self-regulated learning for elementary level students (Dignath, et al., 2008) suggested self-regulated learning training programs have a positive effect on academic learning outcomes, cognitive and metacognitive strategy use, as well as motivation with an weighted average effect size of .69. The current study included the three components of self-regulated learning: cognitive strategies, metacognitive strategies, and motivational control (Bruning, Schraw, & Norby, 2010; Boekaerts, Maes, & Karoly, 2005; Zimmerman & Schunk, 2011).

**Cognitive Strategies**

Cognitive strategies can be identified as general, domain-specific, or task specific (Alexander, Graham, & Harris, 1998). Some, such as organization, rehearsal, and elaboration of information, are applicable to a variety of academic domains whereas others are domain or task-specific, such as learning new words by scrutinizing surrounding text when reading a book. In the current study, the cognitive strategies for learning vocabulary refer to two task-specific word-learning strategies: morphological analysis and contextual analysis. These two strategies have received sound research
support for both English-only speakers and ELLs (Baumann et al., 2003; Graves, 2009; Nagy & Scott, 2000; NICHD, 2000).

**Metacognitive Strategies**

This study focused on two types of metacognitive knowledge: self-goal setting and self-monitoring. The purpose was to help children learn the skills of setting goals, monitoring and reflecting word learning processes, and strategically using specific word learning strategies to enhance their depth and width of academic vocabulary knowledge from reading texts.

*Goal-setting*. Social cognitive theorists emphasize *goal-setting* as a key motivational process (Bandura, 1997; Locke & Latham, 2002, 2006; Schunk & Pajares, 2009; Zimmerman, 2008). Goal-setting theory is based on the premise that conscious goals affect behavior (Locke & Latham, 1990, 2002, 2006). Goal-setting theory was formulated inductively based on research conducted over nearly five decades by Edwin A. Locke, Gary P. Latham and their associates. Goals are defined as “something that the person wants to achieve” (Locke & Latham, 1990, p. 2).

Goal-setting theory is generally accepted as a valid and useful theory that explains differences in performance in terms of different goal attributes in the fields of education, industrial-organizational behavior, and human-computer interaction (David, Song, Hayes, & Fredin, 2007; Locke & Latham, 2006; Zimmerman, 2008). In a meta-analysis, Locke and Latham (1990) showed a positive relationship between goal level and performance with effect sizes (Cohen’s $d$) ranging from .5 to .8. Goals will guide learners’ engagement in activities that lead to goal attainment. Specifically, goals affect performance through four mechanisms (Locke & Latham, 2002): (1) goals serve a directive function because
they direct individual attention, action, and effort toward activities relevant to assigned
goals; (2) goals serve an energizing function as high goals lead to greater effort than low
goals; (3) goals affect persistence; (4) goals affect action indirectly by leading to the
arousal, discovery, and use of task-relevant knowledge and strategies. Goal-setting theory
emphasizes specificity, proximity, and difficulty (Locke & Latham, 2002). Goals that are
specific, moderately difficult, and proximal (close at hand) optimally affect student
motivation.

Locke and Latham (2002) emphasized the importance of goal specificity in
achieving high performance when performance is fully controllable. Goal specificity in
itself does not necessarily lead to high performance because specific goals vary in the
level of difficulty, but goal specificity reduce variation in performance by reducing the
ambiguity. Specific goals are more likely to activate self-evaluations and self-reflection
than general goals (e.g., “try your best”). Specific goals provide greater specification on
the amount of effort needed for success. When the learning process is specific and
obtainable, specific goals facilitate the development of self-efficacy because of mastery
experience.

Goal proximity, the temporal proximity of goals, is vital in promoting self-
regulation, motivation, and self-regulated learning in educational research (Schunk,
2008). Proximal goals result in greater motivation because it is easier to observe progress
than distant goals (Bandura, 1986). For instance, Bandura and Schunk (1981) conducted
a study on goal proximity in which proximal-goal children were asked to complete a
portion of material during each session whereas distant-goal children were asked to
complete all of the material by the end of the last session. Bandura and Schunk (1981)
found that proximal goal children outperformed distant goal children in terms of enhanced motivation, self-efficacy, and overall performance on the material.

*Goal difficulty* impacts learners’ effort and self-efficacy. Assuming requisite skills, as complexity increases, learners show greater effort and persistence that lead to higher performance (Locke & Latham, 2002). Locke (1996) reviewed past empirical studies and concluded that the more difficult the goal is, the greater the achievement is; goals that are specific and difficult lead to highest performance. Learners might show doubt initially against difficulty tasks, but working toward them builds self-efficacy (Schunk, 1990). Goals for ELLs must be reasonably challenging in terms of cognitive ability level, background knowledge, and English language proficiency level. Different from native speakers, each English learner might have a unique background (e.g., age, L1 and English language proficiency, personality, schooling experience, parent education, and immigration reasons). Students need the rationale of goal-setting and how to set realistic short- and long-term goals. If self-set goals are not appropriate, students need to self-reflect, analyze, and refine their goals (Gregory & Burkman, 2011).

Locke and Latham (2002) emphasized self-set goals because they motivate people better than assigned goals that might be far above learners’ skill levels. When students have opportunities to set their own goals, students gain self-efficacy, make substantial goal commitment, and performance better (Schunk, 1985). Teachers should provide opportunities for ELLs to have choice and control over some of their learning tasks. Though goals might be too easy sometimes, it is important for learners to be aware of their capabilities to attain goals with reasonable efforts and persistence.
Self-monitoring. The definition of self-monitoring varies depending on the combination of self-regulatory components, such as self-assessment, self-observation, self-recording. In general, self-monitoring refers to a person’s tracking of specific aspects of their own performance, the conditions that surround it, and the effects that it produces (Schunk, Meece, & Pintrich, 2014). Sharpino, Durnan, Post, and Levinson (2002) introduced two types, self-monitoring of performance and self-monitoring of attention. Self-monitoring of performance refers to assessing and recording academic performance whereas self-monitoring of attention emphasizes students’ assessing and recording of on-task behaviors (Harris et al., 1994). Self-monitoring of academic performance was found more helpful than self-monitoring of attention in improving academic productivity and accuracy of tasks (Maag, Reid, & DiGangi, 1993). In the current study, self-monitoring of performance was introduced.

The effectiveness of self-monitoring is influenced by temporal proximity (Bandura, 1986). Delayed self-monitoring precludes a person from taking corrective action in a timely manner, such as monitoring how well the goal was met after the completion of the independent practice in the present study. The informativeness of performance is another feature that influences the quality of self-monitoring (Bandura, 1986; Ericsson & Lehman, 1996; Zimmerman, 2000). Practicing a skill in a structured setting can improve this feature. For instance, practicing contextual analysis and morphological analysis in authentic rich reading texts allows students to observe how well these strategies improve their vocabulary knowledge and reading comprehension. As for accuracy, for instance, students who misunderstand contextual analysis cannot accurately monitor their performance. The feature of valence of behavior refers to the
concept that observation of negative aspects of one’s behaviors can decrease one’s motivation to monitor or self-regulate these behaviors. If a child observes inability to use cognitive strategies, he or she might be less motivated to do so. Positive feedback or focusing on positive accomplishments can positively influence the effectiveness of self-monitoring (Zimmerman, 2000).

Motivational Control

Motivation is an important component of self-regulated word learning. The knowledge of word-learning strategies and how to use these strategies is not enough if students are not interested to use them or cannot maintain their motivation during learning tasks (Nagy, Diakidoy, & Anderson, 1993; Scott & Nagy, 2009). Pintrich (2000, 2004) argued that motivation as a key factor is integrated in all phases of self-regulated learning. Motivational processes influence self-regulated learning through interacting with cognitive, behavioral, and contextual factors (Pintrich, Marx, & Boyle, 1993). Two motivational beliefs of interest in the current study are self-efficacy beliefs (i.e., judgments of one’s capabilities to perform a certain task) and task values (i.e., beliefs about the importance of, interest in, value of the task) (Bandura, 1986; Pintrich, 1999).

In vocabulary acquisition research, the concept of word consciousness emphasizes the role of student motivation in word learning. Word consciousness has been defined in multiple ways. For example, Anderson and Nagy (1992) defined it as “a sense of curiosity about word meanings, appreciation of nuances of meaning, and independence in word analysis” (p. 1). Graves and Watts-Taffe (2002) referred it to the “awareness of and interest in words and their meanings” (p. 144). Scott and Nagy (2004) suggested word consciousness is best conceptualized as a variety of knowledge and skills. Word
consciousness specifically involves interest in word meanings, motivation to learn new words, appreciation of nuances of word meanings, awareness of how words work, recognition of difference between conversational and academic words, awareness of the difference between spoken and written English, and the ability to use words well in such different contexts as writing and speech (Nagy, Diakidoy, & Anderson, 1993; Baumann et al., 2011; Blachowicz & Fisher, 2014; Graves, 2006, 2009; Graves & Watts-Taffe, 2002). Word consciousness is a complex and multifaceted construct that influences vocabulary development in multiple ways. Students with word consciousness can use effective strategies to learn new words, are motivated to learn new words, appreciate the communicative power of words, know how to choose the right word in context, and understand why certain words are used rather than others in the context of spoken and written language (Graves, 2009; Nagy & Scott, 2000). Scott and her colleagues have documented the impact of word consciousness instruction on students’ interest in word learning as well as spontaneous use of new and complex words in their writing (Flinspach, Scott, & Vevea, 2010; Scott, Vevea, & Flinspach, 2010). In this study, I emphasized the motivational perspective of word consciousness and specifically focused on ELL children’s self-efficacy and task values for word learning.

**Self-efficacy beliefs**

Self-efficacy refers to “people’s judgments of their capabilities to organize and execute the courses of academic action required to accomplish academic tasks” (Bandura, 1986, p. 391). Self-efficacy is important for self-regulated learning because it strongly influences the choice students make, the effort they exert, and the engagement and perseverance they display in face of challenging tasks (Pajares, 1997; Schunk & Pajares,
2009; Schunk & Zimmerman, 2007). In the context of academic learning, students with a strong feeling of self-efficacy willingly undertake challenging tasks, show higher motivation, have lower levels of anxiety, demonstrate increased persistence in the face of adversity, and self-regulate better than less efficacious counterparts (Bandura, 1986; Liem, Lau, & Nie, 2008; Pajares, 1997; Schunk et al., 2014). In contrast, students with less sense of efficacy tend to avoid challenging academic tasks. They prefer relatively easy academic tasks to which they are more likely to apply minimal effort with limited to no persistence. Consequently, students with high efficacy are likely to obtain higher levels of academic achievement whereas students with low self-efficacy tend to underperform in academic tasks (Bandura, 1997; Schunk & Pajares, 2009).

Regarding the development of self-efficacy, Bandura (1986, 1997) proposed four sources of self-efficacy beliefs: mastery experience, vicarious experience, verbal persuasions, and physiological states. *Mastery experiences* are the most influential source of self-efficacy because students’ interpretation of the effects of their performance helps shape their efficacy beliefs (Bandura, 1986; Pajares, 1997; Usher & Pajares, 2008). Outcomes or experiences interpreted as successful help raise the sense of efficacy; experiences interpreted as failure lower self-efficacy. *Vicarious experiences* are the effects of actions of others. Vicarious experiences play a role when students have limited prior experiences or are uncertain about their own abilities. Students with limited prior experiences might refer to social comparisons with other students or a significant model that helps instill self-beliefs that will influence their academic performance. The third source of self-efficacy, *verbal persuasions*, involves receiving verbal affirmation from others. Verbal affirmation is effective when the envisioned success is attainable. It is not
effective if the praise is empty and artificial without tangible goals. *Physiological states* are achievement emotions such as anxiety, stress, or boredom. Physiological states influence self-efficacy because student emotional reactions to an academic task usually provide physiological cues about anticipated success or failure. If students are extremely anxious about or stressed by schoolwork, these negative emotions can lower their perceptions of capabilities of succeeding in academic tasks.

**Task value beliefs**

Task values refer to the extent to which students find a learning task important, and interesting (Eccles & Wigfield, 2002). Task value beliefs are related to students’ learning and performance. Students with higher interest in a task or perceiving the task as important or interesting tend to use more self-regulatory strategies to obtain the outcome (Schunk, 2001). Eccles and her colleagues have shown that task values beliefs are significantly related to and predict academic performance in the areas of mathematics, English, and career choices (Eccles & Wigfield, 2002). Students with higher task values are more likely to form the intention to learn and thus implement strategic knowledge to achieve a certain goal (Garcia, McCann, Turner, & Roska, 1998).

**Principles of Academic Vocabulary Intervention**

Traditional technique of instruction usually involves presenting new words in the classroom and requiring students to memorize lists of vocabulary items (DiCerbo, Anstrom, Baker, & Rivera, 2014; NICHD, 2000). Recent techniques of vocabulary instruction are much more comprehensive. One of the most comprehensive review of experimental studies on vocabulary instruction for English-only speakers is the report by National Reading Panel (NICHD, 2000), the purpose of which was to assess the
effectiveness of various approaches to teaching children to read and to indicate the extent to which these approaches were ready for application in classroom settings. The report yield several specific findings and implications for vocabulary instruction, including 1) vocabulary instruction improves reading comprehension when it is appropriate for the age and cognitive ability; 2) technology integration (e.g., use of computer) is more effective than traditional methods; 3) direct instruction techniques such as word task reconstructing facilitate vocabulary knowledge development; 4) vocabulary should be taught both directly and indirectly; 5) words should be presented in rich contexts; 6) learning environment for incidental learning should be provided; 7) multiple vocabulary instructional methods should be applied to engage students and promote optimal learning; and, 8) it is important to include repetition and multiple exposure to word items in various contexts. While NRP report shows us the importance of vocabulary instruction in reading comprehension, it also noted the lack of research on the best methods or the combinations of methods of vocabulary instruction and the measurement of vocabulary growth and its relation to instruction methods. However, NRP excluded research reports that dealt exclusively with learning disabled or other special populations (e.g., English language learners). Thus, one of the next steps for vocabulary research, according to NRP report, is to extend student populations from mainstream students to those low-achieving or learning-disabled students to examine whether they benefit from instructional techniques.

In addition to the report by National Reading Panel, Michael Graves and his research team developed an influential vocabulary instruction program (1984, 1992, 2004, 2009). The instructional framework includes four components: (1) providing rich
and varied language experiences, (2) teaching individual words, (3) teaching word-learning strategies, and (4) fostering word consciousness. According to Graves (2009), in kindergarten and primary grades, listening and speaking are important for vocabulary learning because most children enter school with a bigger oral vocabulary than reading vocabulary. Teachers should explicitly teach some individual words with definition and contextual information to promote intentional vocabulary learning. In middle and secondary school, speaking and listening are still important; at the same time, reading gradually becomes the primary activity for incidental vocabulary learning. We should do everything we can to encourage students to read as much as possible to build up their vocabulary size. We should also teach word-learning strategies (e.g., contextual clues and word-part analysis) in order for students to independently and intentionally learn vocabulary through exposure to rich language experience.

Since the report of National Reading Panel, a few other reviews and meta-analyses of vocabulary instruction were published to date with both ELLs and English-only speakers (Elleman, Lindo, Morphy, & Compton, 2009; Hairrell, Rupley, & Simmons, 2011; Harmon, Hedrick, & Wood, 2005; Kuhn & Stahl, 1998; Read, 2004; Nagy & Scott, 2000; Nagy & Townsend, 2012; Swanborn & de Glopper, 1999). For example, Nagy and Townsend (2012) synthesized the recent literature on academic vocabulary instruction and provided a set of recommendations on how to continue inquiry in this area. They adopted “words as tools” as a metaphor to indicate the importance of the purposes for which academic words are used in academic language. This metaphor also indicates that students must have enough opportunities to use these words to serve various purposes (e.g., academic communication, daily oral
conversations). Nagy and Townsend (2012) defined academic language as “the specialized language, both oral and written, of academic settings that facilitates communication and thinking about disciplinary content (p.92)” Academic language are characterized with words of Latin and Greek origin, morphologically complex words, more adjectives and prepositions than spoken language, grammatical metaphor including nominalization, dense information, and abstractness.

Hairrell et al. (2011) reviewed 24 empirical studies examining vocabulary instructional strategies and their impact on vocabulary development among English-only speakers from 2nd to 8th grade. Nine strategies were previously identified by NRP: contextual analysis, morphological analysis, semantic strategies, mnemonics strategies, explicit instruction, incidental word learning, multiple exposures, multiple strategies, and graphic organizers. Hairrell et al. (2011) also identified several other effective strategies including the use of video presentations, the integration of visual cues, the instruction of metacognitive strategies, the provision of revised definitions of target words, and the inclusion of group activities.

Although the majority of vocabulary interventions have been conducted with monolingual English speakers, fortunately, most of what we know about vocabulary acquisition and appropriate instructions for English-only students may also benefit English language learners (August et al., 2005; Calderón et al., 2005; Goldenberg, 2008; Graves, August, & Mancilla-Martinez, 2012; Shanahan & Beck, 2006). The existing experimental work indicates that vocabulary interventions with ELLs can make a difference at elementary level. For example, Taboada and Rutherford (2011) conducted a formative experiment among 4th grade English language learners to compare the
influences of two instructional frameworks (i.e., contextualized vocabulary instruction vs. intensified vocabulary instruction) on the outcome of reading comprehension, vocabulary acquisition, perceptions of autonomy supports, and reading engagements. These two frameworks varied in the explicitness of academic vocabulary instruction, comprehension strategy instruction, and supports for student autonomy. Contextualized vocabulary instruction included four reading comprehension strategies integrated with two autonomy-supportive practices and implicit academic vocabulary instruction, whereas intensified vocabulary instruction emphasized explicit academic vocabulary instruction without explicit reading strategy instruction or autonomy supports. Findings indicated contextualized vocabulary instruction benefit reading engagement better, but intensified vocabulary instruction increased more academic vocabulary knowledge. The intensified vocabulary instructional framework was based on explicit instruction of contextual clue and word-part analysis to develop word consciousness, and it had shed light on the cognitive strategy use aspect of self-regulated learning among English language learners. It is not known how the metacognitive and motivational aspects of self-regulated learning play a role in vocabulary learning for English language learners.

Townsend and Collins (2009) carried out an experimental intervention to examine the effectiveness of rich vocabulary instruction (McKeown & Beck, 2004) on general and academic vocabulary development for adolescent English language learners with their English proficiency ranging from beginning to advanced level. Findings indicated that vocabulary intervention principles previously determined to be effective for younger and native English speakers were also effective for adolescent English language learners, especially those with intermediate to advanced English proficiency. These principles
include direct instruction of target words, multiple exposures in different contexts, many opportunities to use and personalize word meanings.

Calderon et al. (2005) implemented an experimental intervention to develop the breadth and depth of vocabulary knowledge with 293 3rd grade Spanish-speaking English language learners from eight elementary schools. Students had Spanish classes since kindergarten and then were identified as ready to transit into English classroom. Results suggested vocabulary should be explicitly taught to English language learners as part of a comprehensive literacy program. Additionally, explicit vocabulary instruction should include morphological awareness.

Carlo et al. (2004) developed, implemented, and evaluated a vocabulary instructional intervention designed to enhance academic vocabulary for a total of 254 bilingual and monolingual children from nine fifth-grade classrooms in four schools in three states. The intervention was guided by four principles that (1) new words should be encountered in meaningful text, (2) native Spanish speakers should have access to the meaning through Spanish, (3) word should be repeatedly encountered in different contexts, and (4) word knowledge involves spelling, pronunciation, morphology, and syntax as well as depth of meaning. The meanings of academic words were taught by using various strategies such as contextual clue, morphological analysis, cognates, and prior knowledge of word multiple meanings. Though no treatment gains was found on the PPVT, the findings showed greater growth than the comparison group on target word knowledge, depth of word knowledge, multiple meanings, and reading comprehension for both English language learners and English-only students, with English language learners scoring lower on all pre- and posttest measures.
These studies suggest how the instruction of word-learning strategies can be effective for both English-only students and English language learners. Some useful vocabulary strategies taught to English-only students might also foster English language learners’ word awareness and learning interest, such as context analysis, word parts analysis, dictionary use, or deliberate learning from word cards.

Based on the previous discussion, seven principles of vocabulary instruction were identified for the design of the present study: (1) provide authentic language context; (2) explicitly instruct the two word-learning strategies of morphological analysis and contextual analysis; (3) foster student interest and motivation in word learning, (4) provide repeated exposures; (5) explicitly teach word meanings; (6) teach metacognitive strategies; (7) provide appropriate modeling and feedback. These principles guide the intervention design concerning which words to teach, what word-learning strategies to teach, what metacognitive strategies to teach, what materials are used, how often the words are repeated, and what instructional activities to include.

Research Questions

The purpose of this study was to examine the effectiveness of self-regulated word-learning intervention on word knowledge, reading comprehension, and self-regulated word learning. This intervention approach attempted to tackle the challenge of word learning for ELLs and prepare them to be proactive, effective, and motivated lifelong word learners. To address the issue, the research questions included:

1. Did the instruction improve ELL children’s word knowledge? If so, how?
2. Did the instruction improve ELL children’s reading comprehension? If so, how?
3. Did the instruction enhance ELL children’s cognitive strategy use? If so, how?
4. Did the instruction enhance ELL children’s metacognitive strategy use? If so, how?

5. Did the instruction increase ELL children’s motivational beliefs for word learning? If so, how?
Chapter III. Methodology

This chapter describes the research design, research setting, participants, research procedures, and data analysis procedure that are applied to address the five research questions. The purpose of the study was to conduct an experimental intervention to examine the effects of self-regulated word learning instruction among upper elementary ELL children. The dependent variables included children’s performance on word knowledge, reading comprehension, cognitive strategy use, metacognitive strategy use, and motivational beliefs.

Research Design

This study used a single-subject design with multiple baselines across subjects (Kazdin, 2011) to determine the effectiveness of self-regulated word learning intervention. The rationale for a multiple-baseline design is described by Baer, Wolf, and Risley (1968) in their seminal article: “In the multiple-baseline technique, a number of responses are identified and measured over time to provide baselines, against which changes can be evaluated. With these baselines established, the experimenter then applies an experimental variable to one of the behaviors, produces a change in it, and perhaps notes little or no change in the other baselines” (p.94). In other words, the design begins with a baseline phase that continues until the target behavior demonstrates stability (or absence of variability), followed by the introduction of experimental intervention. Each combination of a baseline and an intervention can be conceptualized as one A-B design, with each design varying in terms of behaviors, participants, and settings (Kazdin, 2011). The features of multiple-baseline designs include (1) a single subject or a group of subjects as the unit of intervention and data analysis, (2) this unit provides its own control
group for comparison, and (3) repeated measurement of outcome variables within and across procedures (baseline, intervention, and maintenance phase) (Kratochwill et al., 2010).

A multiple-baseline design is powerful in determining a causal relation between the introduction of a new intervention and a typical state, as it demonstrates “change occurs when, and only when, the intervention is directed at the behavior, setting, or subject in question” (Barlow et al., 2009, p.202). In the current study, the strength of the multiple-baseline design across subjects is to ensure that the changes, if any, in word knowledge, reading comprehension, and self-regulated word learning, are the outcome of the self-regulated vocabulary intervention rather than any other random extraneous events.

In the present study, students received 16 sessions of instruction, 3 sessions per week, and about 30 minutes per session. I delivered all procedures. Experimental procedures included (1) baseline phase, (2) intervention phase, and (3) maintenance phase (Table 1). Children in Group A children received 3 sessions in the baseline phase, 10 sessions in the intervention phase, and 3 sessions in the maintenance phase. Group B children received 6 sessions in the baseline, 7 sessions in the intervention, and 3 sessions in the maintenance phase. Group C children received 9 sessions in the baseline, 4 sessions in the intervention, and 3 sessions in the maintenance phase.

The stability for the baseline phase in Group A was established with three data points; therefore, the intervention was introduced at the fourth session (Table 1). The criteria for stability establishment was first determined by two qualities (Byiers et al., 2012; Hayes, Strosahl, & Wilson, 1999) of children’s performance on vocabulary
knowledge: (1) the lack of a clear trend of improvement, and (2) the dependent variable vocabulary knowledge displaying limited variability within a range of 30% (i.e., a range of 3 points with a maximum score of 10). Results indicated a lack of positive trend of improvement and the variability was less than 10% for all three children in Group A, with the standard deviations for the children being .90, .35, and .20, respectively. Additionally, the stability establishment for dependent variables requires a minimum of three data points at the baseline phase (Kazdin, 2010). A 3-data points baseline with some instability is sufficient when the effect of the intervention is expected to be large with a data pattern far exceeding the baseline variance (Kratochwill et al., 2010). In the present study, the effect was relatively large for word knowledge, because the measurement focused on ten target words and six of which were taught in the instruction. The increased score was 5.20, 2.70, and 4.10 for the three children respectively with the full score being ten.

Table 1. Multiple Baseline Design (A-B-A) in this Study

<table>
<thead>
<tr>
<th>Group</th>
<th>Baseline</th>
<th>Intervention</th>
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<tbody>
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<tr>
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*Note.* Three data points were included for the baseline when the designated criteria were met.

**Baseline phase**

For each session, I met with each group and administered the self-regulated word-learning measure, as well as word knowledge and reading comprehension protocol. The collection of baseline data continued for three, six, and nine sessions for group A, group B, and group C, respectively.
**Intervention phase**

Intervention began for group A once the baseline reached stability. Intervention was staggered for each group (Edmonds, & Kennedy, 2012). When intervention began for group A, groups B and C continued to respond to baseline probes until group A reached the criterion performance, which is defined as the ability to independently to perform correctly 50% of taught target-words on the vocabulary knowledge measurement for at least three sessions. Once group A reaches the criterion performance, they continued to receive intervention. These procedures were repeated for other groups of children. Group C received 5 intervention sessions (Table 1).

**Maintenance Phase**

To determine maintained effects for the intervention, the baseline phase procedure was repeated for all groups after group C received 4 sessions and reached criterion performance in the intervention phase.

**Research Setting**

The study was conducted in a large Public School District in the Midwest. The six children in Group A and B were from a Title I elementary school. At the time of the study, the school had a population of 546 students (55% Female; 75 third, 88 fourth, and 77 fifth grade students, respectively). The school had a mobility rate of 21%, a poverty percentage of 88%, and an eligibility rate of 91% for free or reduced lunch. The minority enrollment was 63%, of which 25% were Black, 22% Hispanic, 6% Asian, 1% American Indian, and 9% identified with two or more races. The percentage was 26% for English language learners. On the Iowa Test of Basic Skills for Reading in Grade 3, ELLs scored 37 and non-ELLs scored 49 in participating school, compared to the state average of 58.
On the Nebraska State Accountability Reading Assessment, at third grade level 76% of ELLs met or exceeded standards, compared to 72% of school students and 82% of state students; at fourth grade 53% of ELLs met or exceeded standards, compared to 71% for school students and 81% for state students; and at fifth grade only 46% of ELLs met or exceed standards, compared to 56% for school students and 84% for state students.

The three children in Group C were from a non-Title I elementary school. At the time of the study, the school had a population of 580 students (52% Female; 86 third, 96 fourth, and 94 fifth grade students, respectively). The school had a mobility rate of 10%, and an eligibility rate of 22% for free or reduced lunch. The minority enrollment was 18%, of which 5% Asian, 5% Hispanic, 2% were Black, and 6% identified with two or more races. The percentage of English language learners was 3%. The average school performance was higher than state average. On the Iowa Test of Basic Skills for Reading in Grade 3, the school average reading score was 72, higher than the state average of 58. On the Nebraska State Accountability Reading Assessment, at third, fourth, and fifth grade level, 98%, 92%, and 90% of school students met or exceeded standards, respectively, compared to 82%, 81%, and 84% of state students.

I was the sole researcher responsible for all the intervention procedures. I obtained the child oral consent from all children during the first session. I conducted all procedures for all 16 sessions, with each lasting about 30 minutes. The meeting time with Group A was between 3:00-3:30pm, with Group B between 3:30 to 4:00pm, and with Group C between 4:30 to 5:00pm. I met with the children on Monday, Wednesday, and Friday for a total of six weeks. All sessions happened in a quite room.
Recruitment

Once I received IRB approval at the University of Nebraska-Lincoln, I applied for the permission to conduct research in two local Public School Districts. I received the approval from one School District and rejection from the other. Thus with the recommendation of relevant district personnel from the first district, I contacted principals, and/or ELL teachers from six local elementary schools. Five elementary schools expressed their interest of having me recruit and work with their ELLs who were at 3rd, 4th, or 5th grade level with an English proficiency level of 3, 4, or 5. The English proficiency level standards are on a 5-point scale (ELP Standards, 2014). ELL teachers from these schools decided on the number of qualified potential participants for the present study; then they sent home a package with one recruitment letter and two parental consent forms. Thirty-two copies of parental consent forms were received from these schools. I began with two participating schools due to the possibility for the intervention procedures to happen: (1) the period of time available after school, (2) three days available per week for six weeks (i.e., Monday, Wednesday, and Friday), and (3) the number of participants available.

I received seven signed parental consent forms in the Title I school mentioned above. One male student did not participate because his general classroom teacher believed he needed to be in the classroom to receive individualized instruction on reading comprehension during the time of intervention. As a result, I worked with six students from the Title I school, and three students from the non-Title I school mentioned above. As a result, the sample for the present study included nine upper-elementary ELL children with an English language proficiency level of 3, 4, or 5.
Participants

The participants included 9 upper elementary-level ELL children (2 female and 7 male). I used a purposive sampling with three criteria. These criteria were based on the instructional goal of the intervention, that is, to improve ELL children’s word knowledge, and reading comprehension, and self-regulated word learning. The criteria included (1) not receiving special education services, (2) upper elementary grade level (3rd, 4th, and 5th), and (3) level three or above on the State English Language Proficiency Standards (ELP Standards, 2014). The information for the nine participants is presented in Table 1.

Students in special education were excluded because the present study focused on ELL children with no additional need in special education. I included upper elementary students because reading texts at these grade levels present an increasingly number of morphologically complex words, and the development of morphological awareness is critical for both vocabulary acquisition and reading comprehension (Anglin, 1993).

English proficiency was at least level 3, because ELL children at level 3 have an emerging awareness of morphology and they begin to use “an increasing number of general academic and content-specific words, phrases, and expressions” (ELP Standards, 2014, p. 25). General academic words and phrases refer to words “common to written texts but not commonly a part of speech” (ELP Standards, 2014, p. 60). The concept of general academic words is similar to Beck, McKeown and Kucan’s (2002) Tier 2 words and phrases. Beck et al. (2002) proposed a three-tier model of vocabulary words. Tier one words are most basic that rarely require instruction in school (e.g., floor, baby, happy). Tier two words are those of high frequency for mature language users and are shared across a variety of subject domains, characterized in written text but not so common in
everyday language (e.g., proportion, consequence, approach). Tier three words are those of low frequency and are limited to certain subject domains (e.g., estuary, isotope, photosynthesis).

Content-specific words and phrases refer to those “appropriate to the topic or specific to a particular field of study” (ELP Standards, 2014, p. 60), analogous to Tier three words and phrases of Beck et al. (2002). ELL children at these levels typically have sufficient oral English vocabulary for everyday social communication, but they are likely to lack in-depth knowledge of academic words in textbooks (Egbert & Ernst-Slavist, 2011). In addition, these students have begun to develop the skills to use context, visual aids, reference materials to “determine the meaning of words and phrases in oral presentations and literary and informational text” (ELP Standards, 2014, p. 25). Thus, the instruction of contextual analysis can provide them effective skills to enhance their academic word knowledge, as is suggested by previous work (Baumann, Edwards, Boland, Olejnik, & Kame’enui, 2003; Helman, Templeton, Invernizzi, Bear, & Johnston, 2011; Taboada & Rutherford, 2011).

The nine children were randomly assigned into one of the three groups. Group A included Akram, Anna, and Bow; Group B included Ahmed, Kevin, and Randy; and Group C included Zhang, Ming, and Wei (all pseudonyms). Table 2 presents the descriptive statistics for the participants.

Akram. Akram was a fourth grade male student with an English Language Proficiency level of 4 (identified right before the present study). He did not receive regular formal schooling before he entered the United States with an English Language Proficiency level of 1. He entered the United States as a refugee from a Middle East
country. His English language proficiency level moved fast from level 1 to level 4 in two years. He was identified at level 4 during the present study. Kurdish was first language, also the language spoken at home. During the study, his performance on English Language Development Assessment (ELDA) was at Advanced level for Speaking and Writing (level 4), at Intermediate level for Listening and Composite (level 3), and Beginning level for Reading and comprehension (level 2).

Table 2. Descriptive Statistics of the Background Information for all Participants

| Name (pseudo) | Age | Grade | ELP1 | ELDA2 | | | | | | |
|---------------|-----|-------|------|-------|---|---|---|---|---|
|               |     |       |      | Speaking | Comprehension | Writing | Listening | Reading | Composite |
| Akram         | 11  | 4     | 4    | 4      | 2            | 4       | 3         | 2       | 3         |
| Anna          | 10  | 4     | 3    | 4      | 2            | 1       | 1         | 1       | 1         |
| Bow           | 10  | 4     | 3    | 4      | 2            | 2       | 2         | 2       | 2         |
| Ahmed         | 11  | 5     | 4    | 5      | 3            | 4       | 3         | 3       | 3         |
| Kevin         | 10  | 4     | 3    | 3      | 2            | 3       | 3         | 2       | 2         |
| Randy         | 10  | 4     | 3    | 4      | 2            | 2       | 2         | 2       | 2         |
| Zhang         | 8   | 3     | 5    | 5      | 5            | 4       | 5         | 5       | 3         |
| Ming          | 9   | 4     | 3    | -      | -            | -       | -         | -       | -         |
| Wei           | 10  | 5     | 5    | 5      | 5            | 4       | 4         | 5       | 4         |

Note. 1English Language Proficiency. 2English Language Development Assessment. 3Withdrew after 8 sessions. 4Withdrew after 7 sessions. 5Withdrew after 9 sessions.

Anna. Anna was a fourth grade female student with an English language proficiency level of 3 (identified not long before the intervention). She entered the United State as an immigrant from a country in Central America with an English language proficiency level of 1. According to her ELL teacher, she was usually very quiet in the classroom and she struggled with English speech, comprehension, and writing. It took her three years to improve her English proficiency from level 1 to level 3. Her first language was Spanish, the main language spoken at home. Her performance on English Language Development Assessment was at Advanced level for Speaking (level 4), and Beginning
level for Comprehension (level 2), and close to Beginning level for Writing, Listening, Composite, and Reading (level 1).

Bow. Bow was a fourth grade female student with an English language proficiency level of 3 (already identified for one year and half before the present study). She entered the United State as a refugee from a country in Southeast Asia with an English proficiency level of 1. Her performance on the Developmental Reading Assessment increased in third grade within a year from a transitional reader to an extending reader. Her English language proficiency level improved from level 1 to level 3 in two years. Her home language was Filipino. Her performance on English Language Development Assessment was at Advanced level for Speaking (level 4), and at Beginning level for Writing, Listening, Composite, Reading, and comprehension (level 2).

Ahmed. Ahmed was a fifth grade male student with an English proficiency level of 4 (been at this level for one year). He entered the United State as a refugee from a country in the Middle East. His first language was Kurdish. His performance on English Language Development Assessment was at Fully English Proficient level for Speaking (level 5), at Advanced level for writing (level 4), and intermediate level for Listening, Composite, Reading, and comprehension (level 3).

Kevin. Kevin was a fourth grade male student with an English proficiency level of 3 (been at this level for over one year). His ELL teacher believed he was at the late stage of level 3. He was born in the United States. Arabic was the primary language spoken at home although his parents spoke some English. His performance on English Language Development Assessment was at Intermediate level for Speaking, Listening, and Writing (level 3), and at Beginning level for Composite, Reading, and comprehension (level 2).
**Randy.** Randy was a fourth grade male student with an English language proficiency level of 3 (recently identified). He was born in the United States with Kurdish being the primary language spoken at home. He spent his first and second grades in the current elementary school, but he stayed in Iraq for one year at third grade level before coming back to the same school as a fourth grader. His writing was characterized with emergent writing with words missing vowels or letters. His actual English Language Development Assessment scores were not available due to missing files. His ELL teacher estimated that his performance was at Advanced level for Speaking (level 4), Beginning level for Listening, Composite, Reading, Writing, and Comprehension (level 2).

**Zhang.** Zhang was a third grade male student with an English language proficiency level of 5 (at the beginning of the intervention), and he graduated ELL program at the end of the intervention. He was born in the United State with Mandarin being the primary home language. He attended private elementary school in China for one year as a second grader. His performance on English Language Development Assessment was at Fully English Proficient level for Speaking, Listening, Reading, and Comprehension (level 5), at Advanced level for Writing (level 4), and at Intermediate level for Composite (level 3).

**Ming.** Ming was a fourth grade male student with an English language proficiency level of 3. He was born in China and entered the United State as a non-immigrant. Home language was Mandarin. His performance on ELDA was not available. His parent withdrew after nine sessions in the baseline phase.

**Wei.** Wei was a fifth grade male student with an English language proficiency level of 5 (at the beginning of the intervention). He entered the United State as an
immigrant from China. His performance on English Language Development Assessment was Fully English Proficient level for Speaking, Reading, and Comprehension (level 5), and at Advanced level for Listening, Composite, and Writing (level 4).

**Fidelity of Implementation**

Fidelity of implementation (O’Donnell, 2008) was assessed and ensured in two ways. First, detailed lesson plans were prepared and followed for each session. I filled out a checklist (see Appendix C) immediately after each session to check if sessions were administered as planned. Second, approximately 20% (e.g., nine sessions) were randomly selected and rated by a graduate student in literacy education not affiliated with the study. The raters used the same checklist to determine whether the procedures were implemented as outlined in lesson plans. The inter-rater reliability used overall percentage agreement, which was set to 80% (Dumas, Lynch, Laughlin, Smith, & Prinz, 2001). Results indicated full implementation using the checklist and the inter-rater reliability was 100%.

**Materials**

**Reading materials**

The instructional reading materials were adapted from the QuickReads program developed by Elfrieda Hiebert (2005). The QuickReads program consists of short text passages designed to develop children’s reading fluency, comprehension, and background knowledge in the subject areas of science and social studies. The QuickReads program includes six grade levels (from A to F). Each level has nine topics on science and nine topics on social studies, with each topic consisting of five connected short texts. In QuickReads, 98% of the words are a combination of high-frequency words
and grade-appropriate words. The rest 2% are content-specific words in social studies and science.

The current study used QuickReads social-studies texts at Level D (4th grade reading level). Four topics were included: (1) American Pathfinders, (2) Becoming an American Citizen, (3) Geography and How We Live, and (4) Natural Resources and the Economy. These topics are critical in the domains of social studies. Each topic features five passages. Each passage has about 120 to 130 words. Words in social-studies texts are likely to represent low frequency, unfamiliar Tier 2 words (Baumann et al., 2003). Most of these Tier 2 words contain word roots (Beck & Kucan, 2002). These academic words are good candidates to teach morphological analysis. Social-studies content with authentic and rich context clues is appropriate for teaching contextual analysis (Baumann et al., 2005).

**Target Words**

This intervention mainly focused on (1) general-purpose academic words that are likely to be encountered by students frequently in literacy and content areas and (2) content-specific academic words critical for reading comprehension in social studies, as is recommended by first language vocabulary scholars (Beck et al., 1987; Hiebert, 2005; Graves, 2000) as well as second language vocabulary scholars (Cummins, 2003; Nation, 2001). In the present study, frequently used academic words that are part of semantic families with numerous members were preferred for teaching the strategy of morphological analysis, instead of those with few clear semantic connections (Carlo et al., 2005; Graves, 2006; Hiebert, 2005; McKeown & Beck, 2004). Teaching morphological analysis with carefully selected words was found to support vocabulary
learning for ELLs (e.g., Carlo et al., 2005; Lesaux et al., 2014). For instance, *predict, provide,* and *challenge* can be good candidates as general academic words at upper elementary grade levels using Marzano and Marzano’s (1988) categorization. Frequently used academic words that are useful and critical for reading comprehension in social studies were preferred for teaching the strategy of contextual clue (McKeown & Beck, 2004). For example, *climate* and *temperature* are good candidates for unit lessons focusing on different geographic climate zones. Words were not candidates if they were either too infrequent or likely to be known by the majority of students (Hiebert, 2005). I referred to a list of words in social studies by grade level (Marzano et al., 2005) and a list of word families (Marzano, 2004), as well as the New Academic Word List (NAWL, Coxhead, 2000). This is to ensure that the target words were grade-appropriate, target words for morphological analysis were general academic words used across subject areas, and target words for contextual analysis were critical for comprehending the subject content knowledge.

I created a total of 200 target words for twenty sessions. Each session included 10 target words in the assessment (Table 3), with five words focusing on morphological analysis and five on contextual analysis. During the intervention phase, I taught six words with three focusing on morphological analysis and other three on contextual analysis. The remaining four words were not taught but included in the independent practice to assess students’ skills to transfer morphological analysis and contextual analysis. Appendix D includes the list of target words for the topic of *Immigration to America* (Hiebert, 2005, QuickReads, Level D, Book 1).
Three morphologically related target words were included in the instruction of morphological analysis in each intervention session. One word was selected from the reading passage, which shared the same word root with the other two words from the same word family, but the other two words did not guarantee being selected from the reading passage. Each session included the instruction of one word root shared by three target words and three word parts (prefix or suffix) that might influence the meaning or function of target words.

Table 3. Number of Target Words Involved in Each Session

<table>
<thead>
<tr>
<th></th>
<th>Morphological Analysis</th>
<th>Contextual Analysis</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target words taught</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Transfer words not taught</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

Note. * The number of words measured in each session.

Three contextual analysis words were included to teach the strategy of contextual analysis in each intervention session. All three words were selected from the reading passage that provided the authentic word-learning context.

**Instructional Model**

The intervention procedure followed the instructional model of the gradual release of responsibility (Pearson & Gallagher, 1983). This model allows a release of responsibility for strategy use from the instructor to students through five stages: explicit instruction, modeling, collaborative practice, guided practice, and independent practice (Duke & Pearson, 2002; Duke, Pearson, Strachan, & Billman, 2011). In the present study, all sessions followed a three-step format: (1) an introduction that included an overview of the target strategies; (2) an instructional step that included an explicit description of the strategies and when and how it should be used, modeling of the strategies in action, and a guided practice using the strategies; and (3) independent
practice of using the strategies. An example of intervention lesson plan illustrates the instructional procedure (Appendix E).

**Pilot Study**

The intervention activities were piloted with three participants (one female and two males) at upper elementary grade level. The female student was in fifth grade with an English proficiency level of three. One male student was in third grade with an English proficiency level of four. The other male student was in fifth grade with an English proficiency level of five. I met with the students three times a week for approximately 30 minutes per session and administered the baseline phase for one week and the intervention phase for two weeks. The baseline phase included reading fluency instruction and direct instruction of target word meanings. The intervention phase included self-regulated word-learning instruction. Based on the pilot procedures and results, I modified both lesson plans and assessments. The changes included

1. Shortening the number of target words taught from 10 to 6;
2. Providing specific learning goals and specific monitoring contents (refer to Appendix G) instead of asking children to write down unspecified goals and reflect their learning with open-ended questions;
3. Using QuickReads at Level D instead of Level C, because children in pilot study showed relatively high scores in vocabulary knowledge measure (about 75% correctness) and reading comprehension measure (about 75% correctness) of Level C passages without intervention; and
4. Dropping QuickReads Instructional Routine and adding target words direct instruction in order to minimize the effect of QuickReads Instructional Routine on children’s reading comprehension.

**Intervention Procedure**

**Baseline phase**

The purpose of this phase was to collect data of dependent variables before the presence of intervention. The sessions included these steps: (1) measure of self-regulated word-learning skills (about 3 minutes), (2) independent practice (about 4 minutes), (3) direct instruction for target words (about 15 minutes), and (4) reading fluency (about 5 minutes).

Each session began with the measure of self-regulated word learning. I informed ELL children that there were no right or wrong answers, and their responses would not influence their grades or their relationship with others, and only I would see their responses. Children read a passage silently and circled the words that were new or challenging to them. Children kept these words in mind as I read them 10 survey items about what they thought about these words. If some children knew all words in the passage, I asked them to think about new words they faced when they read textbooks or stories. The 10 items involved two items for cognitive strategy use (i.e., item 1 for morphological analysis and item 2 for contextual analysis), two items for metacognitive strategy use (i.e., item 3 for goal-setting, item 4 for self-monitoring), as well as 6 items for motivational beliefs (item 5, 6, 7 for task values and item 8, 9, 10 for self-efficacy) (see Appendix F).
The first four items focused on the frequency of using various strategies by students on a 4-point Likert scale ranging from 1 (Never) to 4 (All the time). The other six items focused on the degree of students’ task values and self-efficacy on a Likert scale ranging from 1 (Definitely Not Agree) to 4 (Definitely Agree). The scale was adapted from the Self-Efficacy Subscale of the Early Literacy Motivation Scale (ELMS; Wilson & Trainin, 2007). The ELMS was designed specifically for children from first to fourth grade level. The responses included pictures of the cartoon character, Garfield, with emotions ranging from 1 (very upset) to 4 (very happy). For example, the second item concerned the frequency of using contextual analysis, “When you read, how often do you look the words or sentences around a new word to understand it?” The four response options ranged from “Never” (very upset Garfield) to “All the time” (very happy Garfield). The fifth item focused on children’s task values, “I think word-learning strategies are useful.” The four response options ranged from “Definitely Not Agree (very upset Garfield) to “Definitely Agree” (very happy Garfield). The eighth item was about self-efficacy, “I can learn a lot of new words.” Item scores were individually calculated. All calculated item scores ranged from 1 to 4, with higher score indicating higher self-regulated word learning.

Children read the passage again and finished the independent practice, including the measures of word knowledge with ten words and reading comprehension (see Appendix I). Among the ten words, six were from the passage, with 3 words being related to morphological analysis and 3 to contextual analysis; the remaining four words were not from the passage. Reading comprehension was composed of one main-idea
comprehension question in multiple-choice format and one open-ended question about the topic details.

Following the independent practice, I administered the direct instruction (Carnine et al., 1997) to teach children the ten target words. The routine included: (1) activate prior knowledge, (2) provide word definition, (3) explain word meaning with examples and pictures, and (4) ask children to create sentences using the target words. I only taught the meanings of target words, involving no word-learning strategies or self-regulated word learning.

The reading fluency instruction was adapted from Quickreads Instructional Routine (Hiebert, 2005). I said to children “Your goal is to read as much of the passage as you can in one minute”. I asked students to read silently as I timed them for one minute. Students circled the last word they read when I asked them to stop. To end the session, I asked them to count and write the number of words they have read at the bottom of the page.

**Intervention phase**

The purpose of the intervention phase was to examine the effects of self-regulated word learning intervention imbedded within social studies content on ELL children’s academic vocabulary knowledge, reading comprehension, and self-regulated word learning. Each session began with the measure for self-regulated word learning, identical to that in the baseline phase (see Appendix F). The measure was followed by self-regulated word learning instruction. The instruction included six steps: (1) introduction (about 2 minutes), (2) self-goal setting (about 1 minute), (3) word learning strategies
(about 20 minutes), (4) independent practice (about 4 minutes), (5) self-monitoring (about 1 minute), and (6) review and feedback (about 1 minute).

Introduction

The first session began with an explanation of the importance of being an independent word learner and using effective strategies to enhance independent learning. I presented a card with “3+ ? =10” and explained the answer was seven. I continued to explain that on average their peers learn about 10 words per day and teachers teach about 3 words per day, and that they learn the other 7 words independently. I informed the children that they could learn words independently by applying effective and useful strategies. For the first session, I ended the introduction by informing students that, over the next five weeks, they were going to learn two useful word-learning strategies to figure out the meanings of unknown words they came across during reading, as I presented on a card the two strategies. I also told children that they were going to learn the skills to set and monitor goals. For the following sessions, I focused more on the introduction of the learning objectives (e.g., the type of context clue) and the topic of the passage as I presented them a picture corresponding to the passage.

Goal setting

This study adapted the procedures of two previous self-goal setting models (Schunk, 1985; Stoeger, Sontag, & Ziegler, 2014). Children set specific learning goals by filling out a learning journal (Appendix G). This learning journal required children to decide the number of words they wanted to learn during the session, the word-learning strategies they planned to apply, and the comprehension they planned to accomplish for the passage. Children were encouraged to set challenging but achievable goals. When
students finished filling the learning journal, I continued to teach word-learning strategies. Before the children decided on their goals, I provided the following instruction:

When you read, it helps to keep in mind what you are trying to do. For example, you could try to learn some words today, you could try to use word-learning strategies to help learn the words, and you could try to learn some ideas about the topic of the passage. Now, why don’t you decide how many words you think you can learn today? Choose and circle a number out of the seven options (as I point to the paper sheet). Decide what strategies you want to use to learn these words, and circle one out of the four options. Decide how many ideas you want to learn more about the topic in the passages, and circle a number out of the five options. Remember, set a goal to challenge yourself, but not too high that you cannot achieve it.

**Word-learning Strategies**

For the first session, I presented and introduced the Vocabulary Rule chart (refer to Appendix H) (adapted from Baumann et al., 2002, 2003, 2005; Diamond & Gutlohn, 2006). I explained the steps and modeled the first two steps of using context clues and word-part clues.

**Vocabulary Rule Chart**

When you see a word, and you don't know the meaning, use

1. **Context clues.** Read the sentences around the word to see if there are clues to its meaning.
2. **Word-part clues.** See if you can break down the word into a word root, prefix, or suffix to understand its meaning.

3. **Dictionary use.** Look up the word in a dictionary to learn its meaning and history.

**Contextual analysis.** I introduced context clues by directly explaining that students could sometimes use context clues to figure out the meanings of new words, as I presented a card with the definition of context clues (i.e., words, phrases, sentences around a new word that can give clues to its meaning). Then I distributed the chart of the Types of Helpful Context Clues (refer to Appendix H) and briefly explained the types of context clues and modeled the use of them. For the first session, I modeled the first type of context clue, *definition*, by using one target word *native* from the passage of *A Land of Immigration* from Hiebert’s (2004) QuickReads, Level D, Book 1 (p.11). The other types of context clues were modeled in the following sessions (refer to Appendix D for detailed lesson plan).

*Types of Helpful Context Clues Chart*

1. **Definition.** The author gives a direct definition of a word in the sentence (signal words: is, are, include, means,).

2. **Synonym.** The author uses another word or sentence that has similar meaning to the word you want to understand.

3. **Antonym.** The author uses another word or sentence that means about the opposite of the word you want to understand.

4. **Example.** The author gives you several words or ideas that are examples of a new word.
5. General. The author gives you general clues to the meanings of a word, often spread over several sentences.

In session one, I began contextual analysis instruction by reading a sentence from the passage that included the target word *native*: “The first or original people who lived in North America before the arrival of white settlers are called Native Americans.” The modeling process included five think-aloud steps: (1) identify and underline the difficult word in red as I say “I am going look for context clues to help me understand this word”; (2) identify and underline any signal words or punctuation in blue (e.g., is, are, means, refer to, is defined as); (3) identify and underline the definition context clues in green; (4) guess the meaning of the word; and (5) use a dictionary if necessary.

For guided practice, the two target words were *country* and *immigrant* from the same passage. Take the word *country* for example, I will ask children to follow the modeled procedure and think aloud as he or she was engaged in the process. I pointed to the sentence: “Immigrants are people who leave their home country to live in a new country.” I said, “Let’s figure out the meaning of the word “immigrant”, what types of context clue might we look for?” I confirmed it was definition type of context clue. Then I said, “Can you tell me what is the signal word in the sentence?” I confirmed it is the word “are” as I underlined the signal word in blue. Then I said, “What is the clue?” as I confirmed and underlined it in green. Last I said, “Let’s guess the meaning of the word *immigrant*” and make sure children knew its meaning.

*Morphological analysis.* For word-part clue strategy, I directly explained to children that they could sometimes use word-part clues to figure out the meanings of new words as I presented the Word-Part Clue Chart (refer to Appendix H). I went through the
chart to introduce the word-part clue strategy and the definition of a word root, prefix, and suffix. As I explained that word roots were word parts that could sometimes stand alone as words in English (e.g., phone), but not other times (e.g., tele-, migr-), I introduced the concept of word family/word tree by presenting a word-tree picture with words sharing the same root, migr-.

Word-part clues Chart

1. Look for the **ROOT WORD**, which is a single word that cannot be broken down into smaller words or word parts. See if you know what the root word means.

2. Look for a **PREFIX**, which is a word part added to the beginning of a word or word root. The prefix changes the meaning of the word or word root. See if you know what the prefix means.

3. Look for a **SUFFIX**, which is a word part added to the end of a word or word root. The suffix changes the meaning of the word or word root. See if you know what the suffix means.

4. Put the meanings of the **ROOT WORD** and any **PREFIX** or **SUFFIX** together. See if you can build the meaning of the word.

I modeled the use of word-part clues by teaching the word *immigrate*. The modeling included (1) point to and underline the word *immigrated* in the sentence from the passage “Children whose families have lived in the United States for hundreds of years may not have heard about their family members who immigrated,” and print the word *immigrate* on a small white board and read it aloud; (2) ask the student if he or she knows what it is, confirm and provide the definition of the word: to come to a country of
which one is not a native; (3) say that “I am going to try to break the word down into smaller meaningful parts and explain that the word is made up of three word parts: im + migr + ate, while presenting a card with the mathematical equation and read it aloud im + migr + ate = immigrate; (4) explain the prefix of Latin origin im- means “in or into”. Latin root migr- means “to move from one place to another”. The suffix of -ate is a verbal suffix. I will remind the student a suffix is a word part added to the end of a root word that changes the meaning; (5) put the meanings of the word parts together to get the meaning of the whole word. The word immigrate literally means “to move into another place”; and (6) ask and explain “can you tell me how this literal meaning of the word immigrate relates to its real-life meaning?

Guided practice included two target words: immigration and emigrate. The guided practice includes (1) present a card with these words as a family immigrant, immigrate, immigration, immigrated, emigrate, emigration, emigrated, and migrate, and tell the student he or she is going to use the word-part clue strategy to help learn the meaning of the word “immigration”; (2) point to the sentence in the passage “Many countries have immigration restriction that allows a person entering the country with a valid visa”, and underline the word “immigration”; (3) say that “I am going to try to break it down into smaller meaningful parts to understand it”. Ask: Can you break down the words into smaller part? Can you tell me the root word, the prefix and suffix? What is the meaning of the word root? Children knew the word begins with im- and ends with -ed, in between migr-ate; (4) confirm the student knows the prefix im- means “into”, migrate means “to move from one country into another”, and -ion means “state or condition”. The word immigration means the state of immigrating; (5) ask “Can you tell
me the meanings of the word parts after you combine the word parts?” The student guessed the meaning and put the meaning in the sentence and see if it makes sense; (6) write the word migrate on board, and ask the student to think of other words sharing the root. After guided practice, I briefly reviewed the steps of the Vocabulary Rule Chart and the two strategies. Detailed lesson plan sample is included in Appendix E.

**Independent Practice.** I asked students to read the passage and answer a few questions about the reading on a separate worksheet. The worksheet (Appendix I) included three parts: (1) two reading comprehension questions (one for main idea, and one open-ended question for details); (2) word knowledge questions; and (3) cognitive strategy use of word-part clue and context clue. The procedure of the independent practice was identical to the procedure in the baseline phase.

**Self-monitoring.** When children finished the independent practice, they immediately evaluated their learning and performance by filling a self-monitoring worksheet as a part of the learning journal (Appendix G): (1) the number of words they learned, (2) the strategies they used, and (3) the performance on reading comprehension. As I presented the worksheet, I asked children to highlight the words they learned. Children first counted the number of words they learned and circled the corresponding number of words on the worksheet; they monitored what strategies they used, and then reflected what they learned about the related topic.

**Review and feedback.** Each session ended with lesson review and performance feedback to their independent practice by providing positive and corrective feedback. For example, I might encourage the children by telling them that they did a fantastic job.
learning more than six new words or they had set realistic goals. If children set goals that were too low or too high, I advised them to set realistic goals next time.

For the following sessions after the first one in the intervention phase, the procedures were generally the same. Although the first session emphasized on the introduction of the context-clue strategy and the first type of context-clue (i.e., definition), the following sessions continued to teach ELL children the skills to recognize and apply different types of context clues: definition, synonym, antonym, example, appositive, and general (Baumann, et al., 2002, 2003, 2005). For word-part clues, first session in the intervention phase focused on the introduction of morphological analysis, the types of word parts, the definition type of context clue, and word family that shares a word root; the following sessions continued to enhance ELL children’s morphological analysis by teaching specific word parts and word roots.

**Measures**

Outcome variables in the present study included global reading vocabulary knowledge, experimental word knowledge, and reading comprehension, self-regulated word learning.

**Self-regulated Word Learning Measure**

The three categories included to measure self-regulated word learning were cognitive strategies, metacognitive strategies, and motivational beliefs. Cognitive strategies included two researcher-developed items that measured the frequency of using morphological analysis and contextual analysis when reading. The item on morphological analysis was “When you read, how often do you break a new word down into smaller meaningful parts to understand it?” The item regarding contextual analysis was “When
you read, how often do you look the words or sentences around a new word to understand it?” For metacognitive strategies and motivational beliefs, I developed questions based on Motivated Strategies for Learning Questionnaire (MSLQ) by Pintrich and De Groot (1990). This questionnaire was originally developed to measure middle school students’ motivation, cognitive strategy use, and self-regulation (i.e., metacognitive strategy use and effort management strategies) in science and English. It demonstrated good validity and reliability with alpha value larger than .80. It has been used with both upper elementary and middle school students (Metallidou et al., 2007). I developed two items to measure ELL children’s metacognitive strategy use of goal setting and self-monitoring: “When you read, how often do you plan or set goals for word learning?” “When you read, how often do you look back and see if you met your plan or goal of word learning?” To measure ELL children’s task values, I created three items: (1) “I think word-learning strategies are useful.” (2) “I like learning new words.” and (3) “I will be able to use word learning strategies in all classes (e.g. math).” Last, the three items were used to measure self-efficacy (1) “I can learn a lot of new words.” (2) “I an learn many more words than my classmates.” and (3) I can use very useful strategies to learn new words.”

Vocabulary Knowledge Measure

Global Vocabulary Knowledge

The Gates-Macginitie Reading Vocabulary Test (fourth grade version; MacGinitie, MacGinitie, Maria, & Dreyer, 2000) was administered as pre- and posttest to measure ELL children’s global reading vocabulary knowledge. The pretest was administered before the baseline phase whereas posttest was administered immediately after the maintenance phase. The Gates-Macginitie Reading Test is a widely used
standardized and norm-referenced measurement. Students are asked to identify the synonym for a given word in a sentence. The publisher provides evidence of adequate validity and reliability (Kuder-Richardson Formula 20 reliability = .86).

**Experimental Vocabulary Knowledge**

*Pre-/post-test on word knowledge.* A pre-/post-test was administered before and after the intervention. Each test included twenty target words randomly generated from the vocabulary pool created before the intervention.

*Word knowledge.* Each session included a word knowledge measure containing 10 target words. It included six words taught during the intervention phase (3 for word-part clues and 3 for context clues) and four words not taught during the intervention phase.

**Reading Comprehension**

Students’ reading comprehension is measured through one multiple-choice question and one open-ended question about comprehending the passages. This measure was adapted from the reading comprehension questions available in the QuickReads for the text passages (Hiebert, 2005). The first two questions in Appendix D is an example of reading comprehension measure (Appendix D).

**Data analysis procedure**

The techniques for data analyses included visual analysis and Cohen’s d calculation of effect sizes.

**Visual analyses**

Visual data analyses were administrated for all dependent variables for individual participant and across participants. A good visual analysis involves systematic
examination of graphed data. Visual analysis considers the interpretation of the level, trend, and variability of performance for each phase (baseline, intervention, and maintenance). I plotted a number of graphs using Excel, in which the y-axis represented dependent variable and the x-axis represented the unit of time (session). I referred to What Works Clearinghouse (WWC) technical manual for single-case design to conduct visual analyses and determine intervention effect (Kratochwill et al., 2010). This manual includes four steps of visual analyses: (1) documentation of a stable baseline pattern, (2) examination of within-phase pattern(s), (3) comparison of data from each phase with the data in the adjacent phase (e.g., baseline and intervention) to examine the effect, and (4) integration of the information from all phases to determine whether there are at least three demonstrations of an effect at different points in time.

Within each step, six features were used to assess the effect within and between phases (1) level, (2) trend, (3) variability, (4) immediacy of effect, (5) overlap/non-overlap, and (6) consistency of data patterns across phases. These six features were examined both at individual and collective levels to determine a causal relationship. Level refers to the mean performance during an individual phase. Trend involves the best-fitting straight line for the dependent variable within a phase (i.e., slope). Variability refers to the degree of fluctuation for the performance around a mean or slop (standard deviation) within a phase. The immediacy of effect(s), either following the onset or the withdrawal of an intervention, refers to the change in mean performance between the last three data points within a phase and the first three data points of the next phase.

The Shewart procedure (see Krishef, 1991) was applied to detect a change in level. The mean and standard deviation of the baseline data was calculated. Two
horizontal reference lines (one standard deviation above and below the mean) were drawn across the baseline period and throughout the intervention period. Two successive data points in the intervention period falling out of the reference line indicates significant change (Robey, Schultz, Crawford, & Sinner, 1999).

Overlap signifies the proportion of overlapping data points from one phase that overlaps with data from the previous phase, for example, between the intervention phase and the baseline phase. This method is known as the percentage of nonoverlapping data (PND, Campbell, 2013), which has been widely used to calculate effect size in single-case design meta-analyses literature in the past two decades (Maggin, O’Keeffe, & Johnson, 2011). The smaller the proportion of overlapping data points, the more convincing the demonstration of an effect (Gast & Spriggs, 2010). According to Scruggs and Mastropieri (1998), PND score of over 90 indicates high effectiveness, that is, 90% of treatment observations exceed the highest baseline observation. Scores between 70 and 90 are considered moderately effective. Scores between 50 and 70 are minimally effective and questionable. Scores below 50% are ineffective.

Consistency of data across similar phases refers to looking at data from all phases within the same phase (e.g., all the baseline phases; all the maintenance phases) to examine the extent to which the data patterns within the same phase show consistency. The reliability (or consistency) of the effects was decided by scrutinizing the graph (Long & Hollin, 1995). This approach works best when the intervention effects are large. The greater the consistency, the more likely for the data patterns to reflect a causal relationship.
Effect sizes

Cohen’s d statistic (Cohen, 1977) was used to calculate effect sizes if the data is free from serial dependency (Kazdin, 2011). Weighted means were calculated for each series of data points. Effect sizes were interpreted as the treatment effects for each individual and each dependent variable. The general guidelines for the cut-offs introduced by Cohen (1977) were used to interpret the intervention effect, including small (.20), medium (.50), and large (.80) sizes.
Chapter IV. Results

This study was designed to examine the effectiveness of a self-regulated word learning intervention on nine elementary ELL children’s word knowledge, reading comprehension, and self-regulated word learning (i.e., cognitive strategies, metacognitive strategies, and motivational beliefs). Children’s word knowledge was measured using ten words, with three taught target words sharing a word root (morphologically-related words), two untaught words on morphological awareness (morphological transfer), three taught target words focusing on contextual clues (words from context), and two untaught words on contextual awareness (context transfer). Children’s self-regulated word learning was measured using ten items, with two items on cognitive strategies (contextual analysis and morphological analysis), two items on metacognitive strategies (goal setting and monitoring), six items on motivational beliefs (3 items for task values, and 3 items on self-efficacy). Group A (Akram, Anna, and Bow) received three baseline sessions, ten intervention sessions, and three maintenance sessions; group B (Kevin, Randy, and Ahmed) received six baseline sessions, seven intervention sessions, and three maintenance sessions; group C (Wei, Zhang, and Ming) received nine baseline sessions, four intervention sessions, and three maintenance sessions.

In this chapter, results of this study are discussed in three sections. Section one presents the pre-/post-test of global reading vocabulary and experimental vocabulary. Section two presents the results and discussion of individual child’s growth in terms of word knowledge, reading comprehension, and self-regulated word learning. Section three presents the analysis and discussion of the intervention effect on word knowledge, reading comprehension, and self-regulated word learning (cognitive strategies,
metacognitive strategies, and motivational beliefs), respectively, in correspondence to the five research questions.

**Pre-Post Test on Vocabulary Knowledge**

Table 4 presents the results for global vocabulary knowledge using the Gates-Macgrinitie Reading Vocabulary Test at fourth grade level with a total of 45 multiple-choice word questions. The results showed that Akram improved his performance substantially, a small increase for Bow, Anna, and Zhang, but no improvement for Kevin and Wei. Table 4 also presents the results for experimental vocabulary test. A significant improvement was observed for Akram, Bow, Anna, and Wei, and a small increase was observed for Kevin and Zhang.

<table>
<thead>
<tr>
<th>Name</th>
<th>Group</th>
<th>1Global reading vocabulary</th>
<th>2Experimental vocabulary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akram</td>
<td>1</td>
<td>16</td>
<td>11</td>
</tr>
<tr>
<td>Bow</td>
<td>1</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Anna</td>
<td>1</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Randy</td>
<td>2</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Ahmed</td>
<td>2</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>Kevin</td>
<td>2</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>Ming</td>
<td>3</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Wei</td>
<td>3</td>
<td>41</td>
<td>14</td>
</tr>
<tr>
<td>Zhang</td>
<td>3</td>
<td>27</td>
<td>15</td>
</tr>
</tbody>
</table>

Note. ¹With a maximum score of 45. ²With a maximum score of 20.

**Individual child’s Growth**

**Akram**

*Anecdotal notes*

Akram was a fourth grade male ELL with an English Language Proficiency level of 4, identified right before the intervention. His home language was Kurdish. His performance on English Language Development Assessment was at advanced level for
speaking and writing, intermediate for listening, and beginning for reading and comprehension. His teacher described him as a faster learner with his English language proficiency level progressing from level 1 to 4 in two years, despite the fact he did not receive regular formal schooling before entering the United States.

Akram joined the intervention as an enthusiastic and attentive learner. He would always actively finish both the independent practice and the self-regulated learning measure. Once intervention began, he was very excited about the concepts of word tree, prefixes, word roots, and suffixes. Sometimes, he would bring words and asked whether they had prefixes or suffixes. In general, he was eager to participate and always raised his hand to answer questions. He was almost always the first one to arrive at the intervention room and ready for the lesson. He carefully read the passage and finished the independent practice. At the early stages of intervention, he would ask if he could keep the materials especially when he believed that he had not learned them well enough. He began to read more carefully the tasks on morphological transfer and context transfer, which he would skip in the baseline phase. One session covered the topic of the American president Franklin Roosevelt, he was very excited and raised his hand to share that he knew most of the American presidents. I encouraged him to learn more about who he did not know yet, and he came back during the next few sessions sharing the information of all presidents and the fact that some of the unknown reading vocabulary had word roots or contextual clues.

At the end of intervention phase, he had significantly improved his morphological awareness and contextual awareness, which continued to affect his performance and interest during maintenance phase. For many times, immediately after he finished the
independent practice, he would ask the meanings of some untaught words. Akram’s
teacher mentioned that it was with great pleasure to work with him and Akram was
always demonstrating great interest and curiosity. After the posttest of general word
knowledge, a game on word roots grabbed his interest that persisted through all levels.

**Visual analyses**

Analysis results for Akram are presented in Table 5 and Figure 1. Akram received
three baseline sessions, 10 intervention sessions, and 3 maintenance sessions. Table 5
shows the level, trend, immediacy, percentage of non-overlapping data (PND), and effect
sizes across phases. Figure 1 shows Akram’s performance on word knowledge (i.e.,
morphologically-related words, morphological transfer, words from context, context
transfer), reading comprehension, and self-regulated word learning (i.e., cognitive
strategies, metacognitive strategies, self-efficacy, and task values).

**Level.** Visual analyses revealed that Akram’s performance on all dependent
variables increased in the intervention phase. The increase either continued or stabilized
in the maintenance phase for all variables but one, the variable of reading comprehension,
which decreased slightly. The level (or mean) of morphologically-related words showed
great improvement from the baseline phase ($M = 1.27$) to the intervention phase ($M =
2.62$), and stabilized in the maintenance phase ($M = 2.43$). The scale for morphologically-
related words ranged from 0 to 3. The level of morphological transfer increased from .83
to 1.25 in the intervention phase, and continued to increase in the maintenance phase ($M
= 1.67$). The scale for morphological transfer ranged from 0 to 2.
<table>
<thead>
<tr>
<th>Variable (Maximum score)</th>
<th>Level</th>
<th>Trend</th>
<th>Immediacy</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>aBL</td>
<td>bINT</td>
<td>cMTN</td>
<td>dPND</td>
</tr>
<tr>
<td>1Morph words (3)</td>
<td>1.27</td>
<td>2.62</td>
<td>2.43</td>
<td>.10</td>
</tr>
<tr>
<td>2Morph transfer (2)</td>
<td>.83</td>
<td>1.25</td>
<td>1.67</td>
<td>.25</td>
</tr>
<tr>
<td>Words from context (3)</td>
<td>2.67</td>
<td>3.00</td>
<td>3.00</td>
<td>-.50</td>
</tr>
<tr>
<td>Context transfer (2)</td>
<td>.67</td>
<td>1.90</td>
<td>2.00</td>
<td>.00</td>
</tr>
<tr>
<td>Reading (3)</td>
<td>1.33</td>
<td>2.10</td>
<td>1.67</td>
<td>.50</td>
</tr>
<tr>
<td>Task values (4)</td>
<td>3.33</td>
<td>3.91</td>
<td>4.00</td>
<td>-.33</td>
</tr>
<tr>
<td>Self-efficacy (4)</td>
<td>3.06</td>
<td>3.73</td>
<td>4.00</td>
<td>-.25</td>
</tr>
<tr>
<td>Metacognitive (4)</td>
<td>1.83</td>
<td>3.05</td>
<td>4.00</td>
<td>-.75</td>
</tr>
<tr>
<td>Cognitive (4)</td>
<td>3.00</td>
<td>3.50</td>
<td>4.00</td>
<td>-.50</td>
</tr>
</tbody>
</table>

Note. aBL = baseline. bINT = intervention. cMTN = maintenance. dPND = percentage of non-overlapping data. eINT = Intervention effect. fMaintenance effect (mean difference between the maintenance and the intervention). 1Morph words = Morphologically-related words; 2Morph transfer = morphological transfer.
Figure 1. Performance of Akram across Nine Variables and Three Phases

Baseline | Intervention | Maintenance

Morphologically-related words

Morphological Transfer

Contextual Words

Contextual Transfer

Reading

Task Value

Self-efficacy

Meta-cognitive

Cognitive

Session
Akram showed high scores for the variable of words from context in the baseline phase ($M = 2.67$) on a 0-3 scale, and the level increased in the intervention phase ($M = 3.00$), and stabilized in the maintenance phase ($M = 3.00$). Although Akram’s level of context transfer was relatively low during the baseline phase ($M = .67$) on a scale from 0 to 2, he showed great growth with the score being increased from .67 to 1.90 in the intervention phase, which reached ceiling ($M = 2.00$) in the maintenance phase.

Compared to the level of reading comprehension in the baseline phase ($M = 1.33$), Akram’s performance increased greatly in the intervention phase ($M = 2.10$), but the improvement reduced slightly in the maintenance phase ($M = 1.67$). The scale for reading comprehension was from 0 to 3. The levels for all four variables on self-regulated word learning in the intervention phase enhanced compared to the levels in the baseline phase.

All four variables on self-regulated word learning were on a 4-point Likert scale. The biggest level increase happened for metacognitive strategies, followed by cognitive strategies, self-efficacy, and task values. The increase continued in the maintenance phase for metacognitive strategies and cognitive strategies until the levels reached ceiling.

*Trend.* Visual analyses revealed a relatively stable baseline with flat trend for three variables (i.e., morphologically-related words, morphological transfer, and context transfer), a positive trend for reading comprehension, and a negative trend for Words from context and all four variables of self-regulated word learning (i.e., cognitive strategies, metacognitive strategies, self-efficacy, task-value). In the intervention phase, a flat trend was observed for all four variables of word knowledge (i.e., morphologically-related words, morphological transfer, Words from context, and context transfer) and reading comprehension. Although a negative trend was observed in the baseline phase for
all four variables of self-regulated word learning, a positive trend was unanimously revealed for all four variables during the intervention phase. During maintenance phase a flat trend was demonstrated for most variables (.00), except for a light downward trend for morphologically-related words (-.20), and a slight upward line for morphological transfer (.25).

Variability. Variability refers to the difference or divergence of scores within a phase. Range lines were first drawn to conduct visual analysis for variability, and standard deviations were also calculated examine the stability. The variability in the baseline phase was relatively low for all variables, although some variables had more variation due to one data point being much higher or lower than the other data, for instance, the variable of morphologically-related words ($SD = .64$) and metacognitive strategies ($SD = .76$). The variability was low for morphological transfer ($SD = .29$), Words from context ($SD = .58$), context transfer ($SD = .58$), and reading ($SD = .29$), task values ($SD = .33$), self-efficacy ($SD = .25$), and cognitive strategies ($SD = .55$). Because the baseline data pattern was stable with low variability for all variables, intervention was subsequently implemented (Wolery & Harris, 1982) and the observed scores can be used to refer to Akram’s real performance (Kratochwill et al., 2010). In the intervention phase, the variability was low with standard deviation close to zero for most variables, however, three variables with higher variability were reading comprehension ($SD = 1.03$), cognitive strategies ($SD = .55$), and metacognitive strategies ($SD = 1.17$). The variability for reading comprehension was mainly due to three data points either higher or lower than average score, where the variability for cognitive strategies and metacognitive strategies was due to the low scores for the first few sessions in the intervention phase.
and high scores for the ending few sessions in the intervention phase. In the maintenance phase, the variability was zero for most variables with standard deviation being zero, except three variables with low variability that included morphologically-related words ($SD = .21$), morphological transfer ($SD = .29$), and reading comprehension ($SD = .58$).

**Immediacy.** An immediate intervention effect was observed for word knowledge variables (i.e., morphologically-related words, morphological transfer, words from context, context transfer) and reading comprehension, as well as task values. No immediate intervention effect was found for the variables of cognitive strategies and self-efficacy, and negative intervention immediate effect was found for metacognitive strategies. The results indicated that once the intervention began, Akram reported an unchanged frequency of using cognitive strategies (morphological analysis and contextual analysis) and a decreased frequency of using metacognitive strategies (goal setting and monitoring word learning), despite his increase performance on actual performance on both morphological transfer and context transfer tasks. Little immediate intervention effect existed for self-efficacy, but a higher immediate intervention effect for task values, suggesting that immediately after intervention Akram reported an increased task values of vocabulary learning, but his self-efficacy for vocabulary learning initially did not change. However, as the intervention continued, Akram steadily increased his scores on task values, self-efficacy, cognitive strategies, and metacognitive strategies, which continued through maintenance phase, indicating a delayed intervention effect. Once maintenance phase began, there was no immediate decrease for most variables, except for a slightly decreased score for morphological transfer with a mean difference of -.30.
**Effect size**

To examine the effect size of the intervention, average scores across phases were compared for each variable using Cohen’s d statistic (Cohen, 1988). The percentage of nonoverlapping data (PND) was also used to quantify the intervention effect (Scruggs, Mastropieri, & Casto, 1987). Results are presented in Table 5. In addition, Cohen’s d statistic was used to examine whether the effect continues into maintenance phase.

PND results suggested the intervention was highly effective to enhance Akram’s performance on morphologically-related words (100%) and context transfer (100%); moderately effective for reading comprehension (80%), and task values (70%), self-efficacy (70%), and metacognitive strategies (70%); minimally effective for cognitive strategies (60%) and morphological transfer (50%); and not effective for words from context (0%).

Effect size calculation using Cohen’s d also suggested large intervention effect for morphologically-related words \(d = 2.12\), context transfer \(d = 1.94\), reading comprehension \(d = 1.67\), self-efficacy \(d = .92\), metacognitive strategies \(d = 4.68\), and cognitive strategies \(d = 1.05\); medium intervention effect for morphological transfer \(d = .59\) and task values \(d = .57\); and small intervention effect for words from context \(d = .38\). The effect for morphological transfer was not high using PND (50%), mainly due to the highest score (1.00) in the baseline line overlaps four data points in the intervention phase. However, the effect size score suggested an intermediate effect size for intervention \(d = .58\), and Akram’s performance on morphological transfer continue to increase significantly during the maintenance scores \(d = .59\), suggesting a continuous improvement in Akram’s skills to use morphological analysis to understand unknown
words. For the variable of words from context, a clear intervention effect was likely despite the fact that all intervention data points overlap the highest baseline data points, which results in 0% for PND. According to Scruggs et al. (1987), PND may not be an appropriate measure when graphed data demonstrate floor or ceiling effects, in which instance a calculation of completely overlapping data will be more representative of potential intervention effect (Scruggs et al., 1987). With Cohen’s d statistics, a small intervention effect \((d = .38)\) was revealed. Akram’s performance continued to show a ceiling effect in the maintenance phase.

**Summary**

Akram’s performance on all variables increased substantially in the intervention phase, and the intervention effect either continued or stabilized in the maintenance phase for most variables except for one variable with a slight decrease (i.e., reading comprehension). Overall intervention effects were particularly large for morphologically-related words, context transfer, and reading comprehension, as well as cognitive strategies and metacognitive strategies. Immediate intervention effects were observed for all five variables on word knowledge and reading comprehension, as well as the variable of task values, with the largest immediate effects for morphological transfer and context transfer. Delayed large intervention effects were shown for all other three variables on self-regulated word learning (self-efficacy, metacognitive strategies, and cognitive strategies). Trends were stable for all five variables on word knowledge and reading comprehension, but the trends for the four variables on self-regulated word learning demonstrated a negative trend in the baseline phase and a positive trend in the intervention phase. The variability for all variables was relatively low.
Anna

Anecdotal notes

Anna was a fourth grade female ELL with a recently identified English Language Proficiency level of 3. She struggled with English speech and writing. It took her three years to move from level 1 to 3. Her performance on English Language Development Assessment was at advanced level for speaking, at beginning for comprehension, and close to beginning for reading, listening, and writing. According to her ELL teacher, she was usually very quiet in the classroom, but talkative at home with Spanish being the home language.

In the baseline phase, she struggled with reading some words in the passage. She had little morphological awareness and her understanding of meaningful word parts equated to phonological parts. She skipped all practice on context transfer. In the intervention phase, she gained some interests and showed more effort in learning new words when she received direct instructions on word parts and word meanings, as well as positive feedback on morphological analysis and new vocabulary acquisition. Later on in the treatment phase, she became even more actively engaged in reading passages, participating in activities in word parts, asking questions regarding word meanings.

One critical moment that made her more interested, comfortable, and confident with English word learning was when I pointed out the link between English word parts and Spanish word parts. In the maintenance phase, she still struggled with word reading, but she was more comfortable with the independent practice, especially with morphological transfer and context transfer. Immediately after the independent practice, she would ask me for the correct answers to the questions she was not sure about.
Positive feedback and encouragement had played critical role to engage Anna and to ensure that she could do well learning new words.

**Visual analyses**

Analysis results for Anna are presented in Table 6 and Figure 2. Anna received three baseline sessions, 10 intervention sessions, and 3 maintenance sessions. Table 6 presents the baseline and intervention level, trend, immediacy, percentage of non-overlapping data (PND), and effect size using Cohen’s $d$. Figure 2 shows the performance of Anna on variables for word knowledge (i.e., morphological word, morphological transfer, contextual word, context transfer), reading comprehension, and variables for self-regulated word learning (i.e., cognitive strategies, metacognitive strategies, task-value, and self-efficacy).

**Level.** Visual analyses (see Figure 2 and Table 6) indicated that Anna’s performance increased in the intervention phase for three variables (i.e., morphologically-related words, words from context, context transfer), but not for morphological transfer, reading comprehension, and all four variables of self-regulated word learning. The increase stabilized in the maintenance phase for morphologically-related words and context transfer, but decreased for words from context. The level for morphologically-related words increased greatly from .60 in the baseline phase to 1.72 in the intervention phase, and stabilized to 1.73 in the maintenance phase. The level for words from context increased substantially from 1.00 to 2.40, but decreased to 1.67 in the maintenance phase. Context transfer score increased from .00 to .40, and stabilized to .33 in the maintenance phase. Anna’s performance did not increase significantly for morphological transfer from baseline ($M = .50$) to intervention ($M = .70$), or for reading comprehension from baseline
Table 6. The Level, Trend, Immediacy, PND, and Effect Size for the performance of Anna on all variables

<table>
<thead>
<tr>
<th>Variable (Maximum score)</th>
<th>Level</th>
<th></th>
<th>Trend</th>
<th></th>
<th>Immediacy</th>
<th></th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>aBL</td>
<td>bINT</td>
<td>cMTN</td>
<td>BL</td>
<td>INT</td>
<td>MTN</td>
<td>dPND</td>
</tr>
<tr>
<td>1. Morph words (3)</td>
<td>.60</td>
<td>1.72</td>
<td>1.73</td>
<td>.30</td>
<td>.01</td>
<td>.40</td>
<td>90%</td>
</tr>
<tr>
<td>2. Morph transfer (2)</td>
<td>.50</td>
<td>.70</td>
<td>.67</td>
<td>.25</td>
<td>.01</td>
<td>.25</td>
<td>0%</td>
</tr>
<tr>
<td>Words from context (3)</td>
<td>1.00</td>
<td>2.40</td>
<td>1.67</td>
<td>-1.00</td>
<td>.02</td>
<td>1.00</td>
<td>50%</td>
</tr>
<tr>
<td>Context transfer (2)</td>
<td>.00</td>
<td>.40</td>
<td>.33</td>
<td>.00</td>
<td>.00</td>
<td>.50</td>
<td>50%</td>
</tr>
<tr>
<td>Reading (3)</td>
<td>.33</td>
<td>.45</td>
<td>.83</td>
<td>.00</td>
<td>-.02</td>
<td>.25</td>
<td>10%</td>
</tr>
<tr>
<td>Task values (4)</td>
<td>3.67</td>
<td>3.93</td>
<td>4.00</td>
<td>-.17</td>
<td>.01</td>
<td>.00</td>
<td>0%</td>
</tr>
<tr>
<td>Self-efficacy (4)</td>
<td>4.00</td>
<td>3.97</td>
<td>4.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>0%</td>
</tr>
<tr>
<td>Metacognitive (4)</td>
<td>3.33</td>
<td>3.00</td>
<td>3.83</td>
<td>.25</td>
<td>-.03</td>
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</tr>
<tr>
<td>Cognitive (4)</td>
<td>3.50</td>
<td>3.05</td>
<td>3.83</td>
<td>-.25</td>
<td>.01</td>
<td>.25</td>
<td>0%</td>
</tr>
</tbody>
</table>

Note. aBL = baseline. bINT = intervention. cMTN = maintenance. dPND = percentage of non-overlapping data. eIntervention effect. fMaintenance effect (mean difference between the maintenance and the intervention). 1 Morph words = Morphologically-related words; 2 Morph transfer = Morphological transfer.
Figure 2. Performance of Anna across phases and variables

Baseline                      Intervention                      Maintenance

Morphological words

Morphological transfer

Words from context

Context transfer

Reading

Task Value

Self-efficacy

Meta-cognitive

Cognitive

Session
to intervention ($M = .45$). Anna’s performance on four variables for self-regulated word learning did not change for task values and self-efficacy mainly due to ceiling effect, but decreased for cognitive strategies and metacognitive strategies.

**Trend.** Visual analyses demonstrated a relatively stable baseline with a flat trend for eight variables, and a negative trend for words from context. In the intervention phase, a flat trend was observed for all nine variables with the largest absolute slope being .03 for metacognitive strategies. During the maintenance phase, a positive trend was revealed for morphologically-related words (.40), morphological transfer (.25), words from context (1.00), context transfer (.50), and reading comprehension (.25), as well as metacognitive strategies (.25) and cognitive strategies (.25), with the rest variables having a flat trend (.00).

**Variability.** In the baseline, the variability was relatively low for most variables. The variability was high for words from context ($SD = 1.00$), and relatively low for morphologically-related words ($SD = .35$), morphological transfer ($SD = .50$), reading comprehension ($SD = .58$), task values ($SD = .33$), metacognitive strategies ($SD = .29$), and cognitive strategies ($SD = .50$). The variability was zero for context transfer and self-efficacy. In the intervention phase, variability was low for all variables, including morphological transfer ($SD = .43$), morphological transfer ($SD = .35$), words from context ($SD = .70$), context transfer ($SD = .46$), reading comprehension ($SD = .46$), task values ($SD = .21$), self-efficacy ($SD = .11$), metacognitive strategies ($SD = .24$), and cognitive strategies $SD = .28$). In the maintenance phase, variability was lower than .30 for most variables, except for morphologically-related words ($SD = .61$), words from context ($SD = 1.15$), context transfer ($SD = .58$), and reading comprehension ($SD = .76$).
**Immediacy.** A substantial immediate intervention effect was observed for morphologically-related words, words from context, and context transfer, but not for morphological transfer and reading comprehension. The results suggest that, immediately after the intervention began, Anna increased her performance on target words in terms of morphologically-related words and words from context, which stabilized in the maintenance phase. She also increased her skills to use contextual analysis to understand new words (i.e., context transfer), but her score decreased slightly in the maintenance phase. No immediate intervention effect was shown for task values or self-efficacy, indicating no immediate effect on Anna’s perception of her motivational beliefs on word learning. Her motivational beliefs were high in the baseline phase, and continued to be very high in the maintenance phase. A slight negative immediate effect was shown for metacognitive strategies and cognitive strategies, indicating a decrease in Anna’s perception of her frequency of using these two strategies once the intervention began. However, her perception of using these two strategies significantly increased as she proceeded from intervention phase to maintenance phase, indicating the possibility for a delayed effect for these two variables.

**Effect size**

Both percentage of nonoverlapping data (PND) and Cohen’s $d$ statistic were used to examine the intervention effect sizes for Anna (Table 6). Cohen’s $d$ statistic was also used to examine whether intervention effect, if any, continued into the maintenance phase. PND results indicated the intervention was highly effective to improve Anna’s performance on morphologically-related words (90%), minimally effective for words from context (50%) and context transfer (50%), but not effective for morphological
transfer (0%), reading comprehension (10%), or the four variables on self-regulated word learning.

Cohen’s $d$ statistic suggested a large intervention effect size for morphologically-related words ($d = 1.75$) and words from context ($d = 4.76$); a small effect size for morphological transfer ($d = .34$) and context transfer ($d = .37$). Both methods consistently suggested intervention effect for morphologically-related words, words from context, and context transfer. The effect on morphologically-related words continued ($d = .03$) and context transfer ($d = -.14$) in the maintenance phase, but the effect on words from context ($d = -2.72$) seemed to fade away. A small intervention effect was observed for task values ($d = .29$), which stabilized in the maintenance phase. No intervention effect was found for self-efficacy ($d = -.01$). Visual analyses showed that Anna reported high score on self-efficacy both in baseline and maintenance phase. Negative intervention effect was observed for cognitive strategies ($d = -.35$) and metacognitive strategies ($d = -.71$); however, positive effect was detected in the maintenance phase with effect sizes being .89 and 90, indicating Anna’s reported frequency of using these two strategies significantly increased in the maintenance phase. This confirmed the speculation of a delayed intervention effect, rather than an immediate effect on Anna’s skills to use cognitive and metacognitive strategies.

**Summary**

Ann’s performance increased substantially for the variables of for morphologically-related words, morphological transfer, words from context, and context transfer in the intervention phase, and the intervention effect stabilized in the maintenance phase for morphologically-related words, morphological transfer, and
context transfer, but decreased for words from context. A delayed intervention effect was observed for reading comprehension, cognitive strategies, and metacognitive strategies. Overall intervention effect was especially large for morphologically-related words, words from context, cognitive strategies, and metacognitive strategies. Immediate effect was observed for all four variables of word knowledge and reading comprehension, but not for the four variables of self-regulated word learning.

**Bow**

**Anecdotal notes**

Bow was a fourth grade female student with an English Language Proficiency level of 3 (identified for one year and half upon the present study). Her English Language Proficiency level improved from level 1 to level 3 in two years. Her home language was Spanish. Her performance on English Language Development Assessment was at Advanced level for Speaking (level 4), and at Beginning level for Writing, Listening, Composite, Reading, and Comprehension (level 2). She was engaged in most sessions. When she paid attention to the reading passage and the instruction, she usually can provide answers to questions afterward regarding the gist of reading. For the rest of the time, even if she tried, she read much slower than her peers and she expressed her resentment for the reading passages two times. She liked the Garfield questionnaire because she could color the Garfield afterward. She was more engaged in word-part activities with visual supports. She does not ask questions although there were usually at least five new words for her in each passage. For some sessions (for example, session 8 and 11), she would give up, move her chair away, and avoid listening to the instruction. She would either draw on the materials or color the activity sheets.
**Visual Analyses**

Results for Bow are presented in Table 7 and Figure 3. Bow received 3 baseline sessions, 10 intervention sessions, and 3 maintenance sessions. Table 7 presents the level, trend, immediacy, percentage of non-overlapping data (PND), and effect size using Cohen’s *d*. Figure 3 shows the performance of Anna on all variables in word knowledge, reading comprehension, and self-regulated word learning.

*Level.* Visual analyses suggested increased performance in the intervention phase for all variables of word knowledge, reading comprehension, task values, and cognitive strategies, but not for self-efficacy and metacognitive strategies. The increased performance seemed to stabilized in the maintenance phase. The greatest increase happened for morphologically-related words (from .80 to 1.88), morphological transfer (from .50 to 1.15), and words from context (from 0 to 1.80), and the effect continued in the maintenance phase. There was relatively smaller increase for context transfers (from .00 to .45) and reading comprehension (from .00 to .40); while effect for reading comprehension continued to increase in the maintenance phase, the effect for context transfer decreased slightly. Bow’s scores in the baseline phase was zero for words from context, context transfer, and reading comprehension. Bow’s score on task values increased from 3.44 to 3.93, and her score on cognitive strategies increased from 2.67 to 3.05, with both stabilized in the maintenance phase. Bow’s score on metacognitive strategies did not change in the intervention phase but increased in the maintenance phase (*M* = 3.83). Her self-efficacy did not change due to ceiling effect in both baseline and intervention phase.
<table>
<thead>
<tr>
<th>Variable (maximum score)</th>
<th>aBL</th>
<th>bINT</th>
<th>cMTN</th>
<th>aBL</th>
<th>bINT</th>
<th>cMTN</th>
<th>dPND</th>
<th>eINT</th>
<th>fMTN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morph words (3)</td>
<td>.80</td>
<td>1.88</td>
<td>2.00</td>
<td>.30</td>
<td>-.04</td>
<td>.20</td>
<td>100%</td>
<td>.120</td>
<td>.33</td>
</tr>
<tr>
<td>Morph transfer (2)</td>
<td>.50</td>
<td>1.15</td>
<td>1.33</td>
<td>.25</td>
<td>.08</td>
<td>.00</td>
<td>30%</td>
<td>.05</td>
<td>.00</td>
</tr>
<tr>
<td>Words from context (3)</td>
<td>.00</td>
<td>1.80</td>
<td>2.33</td>
<td>.00</td>
<td>.07</td>
<td>1.00</td>
<td>90%</td>
<td>2.00</td>
<td>-.33</td>
</tr>
<tr>
<td>Context transfer (2)</td>
<td>0.00</td>
<td>.45</td>
<td>0.17</td>
<td>0.00</td>
<td>-.09</td>
<td>.25</td>
<td>50%</td>
<td>1.00</td>
<td>.00</td>
</tr>
<tr>
<td>Reading (3)</td>
<td>0.00</td>
<td>.40</td>
<td>.67</td>
<td>0.00</td>
<td>-.11</td>
<td>.50</td>
<td>30%</td>
<td>1.00</td>
<td>.67</td>
</tr>
<tr>
<td>Task values (4)</td>
<td>3.44</td>
<td>3.93</td>
<td>4.00</td>
<td>-.17</td>
<td>-.03</td>
<td>.00</td>
<td>0%</td>
<td>.00</td>
<td>.46</td>
</tr>
<tr>
<td>Self-efficacy (4)</td>
<td>3.89</td>
<td>3.97</td>
<td>4.00</td>
<td>.00</td>
<td>.02</td>
<td>.00</td>
<td>0%</td>
<td>-.11</td>
<td>.13</td>
</tr>
<tr>
<td>Metacognitive (4)</td>
<td>3.00</td>
<td>3.00</td>
<td>3.83</td>
<td>.25</td>
<td>-.01</td>
<td>.25</td>
<td>0%</td>
<td>.05</td>
<td>.83</td>
</tr>
<tr>
<td>Cognitive (4)</td>
<td>2.67</td>
<td>3.05</td>
<td>3.83</td>
<td>-.25</td>
<td>.08</td>
<td>.25</td>
<td>20%</td>
<td>-.34</td>
<td>.65</td>
</tr>
</tbody>
</table>

Note. *BL = baseline. bINT = intervention. cMTN = maintenance. dPND = percentage of non-overlapping data. eINT = Intervention effect. fMTN = Maintenance effect (mean difference between the maintenance and the intervention). 1 Morph words = morphologically-related words; 2 Morph Transfer = Morphological transfer.
Figure 3. Performance of Bow across phases and variables

Baseline | Intervention | Maintenance

Morphologically-related words

Morphological transfer

Context words

Context transfer

Reading

Task Value

Self-efficacy

Meta-cognitive

Cognitive

Session
**Trend.** Visual analyses also suggested a stable baseline with a flat trend for all variables with the slopes ranging from -.25 to .30. The trends were even flatter for all variables in the intervention phase with the largest absolute slope being .11. In the maintenance phase, most variables were flat; however, the variable of words from context revealed a positive trend with the slope of 1.00.

**Variability.** The variability in the baseline phase was relatively low for all variables, including morphological word (SD = .35), morphological word (SD = .50), context word (SD = .00), context transfer (SD = .00), reading comprehension (SD = .00), task values (SD = .51), self-efficacy ((SD = .19), metacognitive strategies (SD = .50), and cognitive strategies ((SD = .29). In the intervention phase, variability was relatively low for most variables. The variability was high for context word (SD = 1.03); medium for reading comprehension (SD = .70), context transfer (SD = .64), and metacognitive strategies (SD = .63); and relatively low for morphologically-related words (SD = .23), task values (SD = .39), self-efficacy (SD = .17), and cognitive strategies (SD = .46). In the maintenance phase, variability was relatively low for most variables with standard deviations raging from .20 to .58, except for the variable of words from context (SD = 1.15). Although the variability for the words from context was very high for intervention and maintenance phase, visual analysis revealed the variability was mainly due to a low score at the 5th data point in intervention phase and 14th data point in the maintenance phase, not due to high variability across the board. Therefore, the results for words from context were still used to refer to the true score of Bow’s words from context.

**Immediacy.** A big immediate intervention effect was present for morphological word, words from context, context transfer, and reading comprehension, but not for
morphological transfer. The results suggested that immediately after the intervention began, Bow’s performance on word knowledge increased significantly in terms of target words sharing word root, taught target words from the passage, and untaught words using contextual analysis. Bow’s reading comprehension improved immediately after the intervention began. Once the maintenance phase began, Bow’s performance immediately increased slight for morphologically-related words and reading comprehension, stayed the same for morphological transfer and context transfer, and decreased slightly for words from context. For the four variables of self-regulated word learning, Bow’s performance did not show immediate intervention effect once the intervention began. On the contrary, her performance immediately decreased slightly for self-efficacy and cognitive strategies. When the maintenance phase began, Bow’s performance on the four variables for self-regulated word learning increased, suggesting the possibility of a delayed intervention effect.

**Effect sizes**

PND and Cohen’s d were used to calculate the intervention effect for Bow. Cohen’s d statistic was also used to examine whether intervention effect, if any, continued into maintenance phase. PND results indicated the intervention was highly effective to enhance Bow’s performance on morphologically-related words (100%) and words from context (90%), minimally effective for context transfer (50%), but not effective for morphological transfer (30%), reading comprehension (30%), or all variables on self-regulated word learning. Cohen’s d statistics suggested a large intervention effect size for morphologically-related words ($d = 1.26$), morphological transfer ($d = 1.34$), and words from context ($d = 3.74$); a medium effect size for and
context transfer ($d = .58$) and reading comprehension ($d = .56$). Both methods unanimously suggested intervention effect for morphologically-related words, words from context, and morphological transfer. The intervention effect continued in the maintenance phase for words from context ($d = 2.33$) and stabilized for morphologically-related words ($d = .10$), but the effect for context transfer ($d = -.56$) seemed to slightly fade away. For all variables of self-regulated word learning, effect sizes ranged from .00 to .81 during the intervention phase, and ranged from .02 to 1.94 during maintenance phase. Intervention was especially effective for cognitive strategies ($d = .81$), which continued to grow in the maintenance phase compared to the intervention phase ($d = .86$). There was medium intervention effect for task values ($d = .48$) and the effect stabilized in the maintenance phase. For metacognitive strategies, although no intervention effect was observed during intervention phase ($d = .00$), the difference between maintenance phase and intervention phase was substantial ($d = 1.94$). The results confirmed the speculation of delayed effect for metacognitive strategies.

**Summary**

Bow’s scores in the baseline phase was very low for all four variables of word knowledge (i.e., morphologically-related words, morphological transfer, words from context, context transfer) and reading comprehension, relatively low for cognitive strategies and metacognitive strategies, but high for task-value and self-efficacy. Bow’s performance in the intervention phase significantly improved for all variables for word knowledge and reading comprehension, as well as task values and cognitive strategies. A delayed intervention effect was found for metacognitive strategies. Overall, the effect was large for morphologically-related words, morphological transfer, and words from
context. Immediate effect was found for all four variables for word knowledge and reading comprehension, but not for the four variables of self-regulated word learning.

Kevin

Anecdotal notes

Kevin was a fourth grade male student with an English Language Proficiency level of 4 (at this level for one year) upon the intervention. His ELL teacher believed he was at the late stage of level 4. He was born in the United States and English was the primary language spoken at home. His performance on English Language Development Assessment was at Intermediate level for Speaking, Listening, and Writing (level 3), and at Beginning level for Composite, Reading, and comprehension (level 2).

Kevin began the intervention with less struggling compared to Bow and Anna. He believed he knew the content that he did not need to learn it. He expressed that he did not like learning new words in the baseline phases. However, he did listen when new words were taught using the direct instruction method. As the intervention phase began, he showed interest in the word parts but not the words from context, once in a while he would skip reading the words from context section of the independent practice, or chose answers for words from context without reading the questions. He was more engaged in morphologically-related words and morphological transfer. For most of the time he was attentive to instruction and he even asked questions about word parts. Once in a while he became inattentive, especially after arguing with Randy on content in the reading passage.

Visual analyses

Results for Kevin are presented in Table 8 and Figure 4. Kevin received 6 baseline sessions, 7 intervention sessions, and 3 maintenance sessions. Table 8 presents
the baseline and intervention level, trend, immediacy, percentage of non-overlapping data (PND), and effect size using Cohen’s $d$. Figure 4 shows Kevin’s performance on all four variables of word knowledge (i.e., morphologically-related words, morphological transfer, contextual words, contextual transfer), and reading comprehension, and four variables of self-regulated word learning (cognitive strategies, metacognitive strategies, task-value, and self-efficacy).

*Level.* Visual analyses indicated Kevin’s performance on all four variables word knowledge and reading comprehension increased in the intervention phase. The increases either continued or stabilized in the maintenance phase. For instance, the level of morphologically-related words increased from 1.47 in the baseline phase to 2.06 in the intervention phase, and stabilized to 2.20 in the maintenance phase. The level of morphological transfer increased from 1.00 in the baseline phase to 1.57 in the intervention phase, and decreased slightly to 1.33 in the maintenance phase. The level of words from context increased from 1.17 in the baseline phase to 1.43 in the intervention phase, and continued to increase to 1.67 in the maintenance phase. The levels for the four variables of self-regulated word learning decreased at the beginning of the intervention phase, but increased significantly at the end of the intervention phase, and the change stabilized in the maintenance phase. For example, Kevin’s reported frequency to use cognitive strategies decreased from 3.42 in the baseline phase to 2.91 in the intervention phase, and increased to 4.00 in the maintenance phase. The same pattern happened to the other three variables of self-regulated word learning.
Table 8. Baseline and Intervention Level, Trend, Immediacy, PND, and Effect Size for Kevin on all variables

<table>
<thead>
<tr>
<th>Variable (maximum score)</th>
<th>Level</th>
<th>Trend</th>
<th>Immediacy</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>aBL</td>
<td>bINT</td>
<td>cMTN</td>
<td>dPND</td>
</tr>
<tr>
<td>1Morph words (3)</td>
<td>1.47</td>
<td>2.06</td>
<td>2.20</td>
<td>-01</td>
</tr>
<tr>
<td>1Morph transfer (2)</td>
<td>1.00</td>
<td>1.57</td>
<td>1.33</td>
<td>.00</td>
</tr>
<tr>
<td>Words from context (3)</td>
<td>1.17</td>
<td>1.43</td>
<td>1.67</td>
<td>-.31</td>
</tr>
<tr>
<td>Context transfer (2)</td>
<td>.25</td>
<td>.64</td>
<td>.33</td>
<td>-.04</td>
</tr>
<tr>
<td>Reading (3)</td>
<td>.83</td>
<td>.79</td>
<td>.33</td>
<td>.06</td>
</tr>
<tr>
<td>Task values (4)</td>
<td>3.67</td>
<td>3.17</td>
<td>4.00</td>
<td>-.17</td>
</tr>
<tr>
<td>Self-efficacy (4)</td>
<td>3.62</td>
<td>3.21</td>
<td>4.00</td>
<td>-.22</td>
</tr>
<tr>
<td>Metacognitive (4)</td>
<td>3.58</td>
<td>3.19</td>
<td>4.00</td>
<td>-.27</td>
</tr>
<tr>
<td>Cognitive (4)</td>
<td>3.42</td>
<td>2.91</td>
<td>4.00</td>
<td>-.21</td>
</tr>
</tbody>
</table>

Note. aBL = baseline. bINT = intervention. cMTN = maintenance. dPND = percentage of non-overlapping data. eIntervention effect. fMaintenance effect (mean difference between the maintenance and the intervention).
Figure 4. Performance of Kevin across variables and phases

Baseline | Intervention | Maintenance

Morphologically-related words

Morphological transfer

Words from context

Context transfer

Reading

Task value

Self-efficacy

Meta-cognitive

Cognitive
Trend. Visual analyses indicated a relatively stable trend for all variables in the baseline phase. A flat trend was observed for morphological word, morphological transfer, context transfer, and reading comprehension. A slightly negative trend was observed for all other variables. In the intervention phase, a flat trend was observed for morphologically-related words, morphological transfer. A positive trend was observed for words from context, context transfer, and reading comprehension, as well as all four variables for self-regulated word learning. In the maintenance phase, a flat trend was observed for all variables.

Variability. In the baseline phase, the variability ranged from .00 (morphological transfer) to .98 (words from context). The variability was low for morphological word ($SD = .24$), morphological transfer ($SD = .00$), and context transfer ($SD = .42$), but slightly high for words from context ($SD = .98$) and reading comprehension ($SD = .68$). The variability for variables of self-regulated word learning ranged from .42 to .66. In the intervention phase, the variability was relatively low for morphologically-related words ($SD = .41$), morphological transfer ($SD = .53$), words from context ($SD = .53$), context transfer ($SD = .75$), and reading comprehension ($SD = .57$). The variability for variables of self-regulated word learning was relatively large ranging form .94 for self-efficacy to 1.18 for cognitive strategies, due to a large positive trend for these variables in the treatment phase. In the maintenance phase, variability was low for all variables ranging from .00 to .58.

Immediacy. No immediate intervention effect was observed for all four variables on word knowledge (i.e., morphologically-related words, morphological transfer, words from context, context transfer) and reading comprehension, indicating Kevin’s
performance did not immediately improve once the intervention began. A negative intervention effect was revealed for the variables for self-regulated word learning (i.e., task values, self-efficacy, metacognitive strategies, and cognitive strategies), indicating Kevin’s reported scores on these variables decreased once the intervention began. When intervention ended and the maintenance phase began, Kevin’s performance decreased for context transfer and reading comprehension, but did not change for all other variables.

*Effect sizes*

Both percentage of nonoverlapping data (PND) and Cohen’s $d$ statistic were used to examine the effect size of the intervention for Kevin. Cohen’s $d$ statistic was also used to examine whether intervention effect, if any, continue into maintenance phase. PND results indicated the intervention was highly effective for improving Kevin’s performance on morphologically-related words (100%) and words from context (90%), minimally effective for context transfer (50%), but not effective for morphological transfer (30%), reading comprehension (30%), or all variables on self-regulated word learning. Cohen’s $d$ statistic suggested medium intervention effect for morphologically-related words (Cohen’s $d = .77$), words from context (Cohen’s $d = .79$), morphological transfer (Cohen’s $d = .61$) and context transfer (Cohen’s $d = .92$), but no effect for reading comprehension (Cohen’s $d = -.12$). Negative intervention effect was found for all self-regulated learning strategies variables. Both methods consistently suggested certain intervention effect for morphologically-related words, words from context, and context transfer. The effect on morphologically-related words continued in the maintenance phase (Cohen’s $d = .17$) and words from context (Cohen’s $d = .53$), but the effect on morphological transfer (words from context (Cohen’s $d = -.53$) and context transfer
(Cohen’s $d = -.82$) seemed to fade away. Positive large effect was observed for all self-regulated word learning variables during the maintenance phase, with Cohen’s $d$ ranging from 1.49 to 3.21.

**Summary.** Kevin’s performance in the intervention phase substantially improved for all four variables of word learning, but not for reading comprehension. The effect for morphologically-related words and words from context continued in the maintenance phase, but the effect for context transfer and reading comprehension decreased slightly in the maintenance phase, indicating little effect on his contextual analysis skills. His performance on the variables of self-regulated word learning decreased significantly in the intervention phase; however, delayed increases for all variables happened and his performance in the maintenance phase was higher than that in intervention phase.

**Zhang**

**Anecdotal notes**

Zhang was a third grade male student with an English Language Proficiency level of 5 at the beginning of the intervention, and he graduated from the ELL program at the end of the intervention. He was born in the United State with Mandarin being the primary home language. He attended school in China for one year as a second grader. During the period in China, he attended afterschool program that specially focused on English language learning. He was always attentive to the instruction. His favorite subject was reading and he read in English extensively. His English Language Development Assessment was at Fully English Proficient level for Speaking, Listening, Reading, and Comprehension (level 5), at Advanced level for Writing (level 4), and at Intermediate level for Composite (level 3).
Visual analyses

Results for Zhang are presented in Table 9 and Figure 5. Zhang received nine baseline sessions, four intervention sessions, and three maintenance sessions. Table 9 presents the level, trend, immediacy, percentage of non-overlapping data (PND), and effect size using Cohen’s $d$ across phases. Figure 5 shows Zhang’s performance on word knowledge (i.e., morphologically-related words, morphological transfer, words from context, context transfer), reading comprehension, and self-regulated word learning (i.e., cognitive strategies, metacognitive strategies, task-value, and self-efficacy).

Level. Visual analyses indicated that Zhang’s performance on most dependent variables increased in the intervention phase, including morphologically-related words, morphological transfer, context transfer, and the self-regulated learning variables of task value, self-efficacy, and cognitive strategies. The increased scores either continued or stabilized in the maintenance phase for these variables. For instance, the level of morphologically-related words improved from 1.60 in the baseline phase to 2.45 in the intervention phase, and continued to increase to 2.73 in the maintenance phase. The level of self-efficacy improved greatly from the baseline phase ($M = 3.70$) to the intervention phase ($M = 4.00$), and stabilized in the maintenance phase ($M = 4.00$). Zhang showed a ceiling effect in the baseline phase for the variable of words from context ($M = 4.00$), reading comprehension ($M = 2$), and metacognitive strategies ($M = 4.00$).

Trend. Visual analyses suggested a relatively stable baseline with a flat trend for all variables. The intervention phase showed a stable baseline for most variables (i.e., morphologically-related words, morphological transfer, words from context, task values, self-efficacy, metacognitive strategies, and cognitive strategies), a positive trend for
Table 9. Baseline and Intervention Level, Trend, Immediacy, PND, and Effect Size for Zhang

<table>
<thead>
<tr>
<th>Variable (maximal score)</th>
<th>( ^aBL )</th>
<th>( ^bINT )</th>
<th>( ^cMTN )</th>
<th>Trend</th>
<th>( ^dPND )</th>
<th>Immediacy</th>
<th>Cohen’s ( d )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BL</td>
<td>INT</td>
<td>MTN</td>
<td>PND</td>
<td>INT</td>
<td>MTN</td>
<td>INT</td>
</tr>
<tr>
<td>Morph words (3)</td>
<td>1.60</td>
<td>2.45</td>
<td>2.73</td>
<td>-.01</td>
<td>.02</td>
<td>.10</td>
<td>0%</td>
</tr>
<tr>
<td>Morph transfer (2)</td>
<td>.83</td>
<td>1.25</td>
<td>1.67</td>
<td>-.03</td>
<td>.10</td>
<td>.50</td>
<td>25%</td>
</tr>
<tr>
<td>Words from context (3)</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>0%</td>
</tr>
<tr>
<td>Context transfer (2)</td>
<td>1.00</td>
<td>1.38</td>
<td>1.50</td>
<td>-.08</td>
<td>.35</td>
<td>.25</td>
<td>0%</td>
</tr>
<tr>
<td>Reading (3)</td>
<td>2.00</td>
<td>1.75</td>
<td>2.00</td>
<td>-.15</td>
<td>-.30</td>
<td>.00</td>
<td>0%</td>
</tr>
<tr>
<td>Task values (4)</td>
<td>3.78</td>
<td>4.00</td>
<td>4.00</td>
<td>.09</td>
<td>.00</td>
<td>.00</td>
<td>0%</td>
</tr>
<tr>
<td>Self-efficacy (4)</td>
<td>3.70</td>
<td>4.00</td>
<td>4.00</td>
<td>.10</td>
<td>.00</td>
<td>.00</td>
<td>0%</td>
</tr>
<tr>
<td>Metacognitive (4)</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>0%</td>
</tr>
<tr>
<td>Cognitive (4)</td>
<td>3.33</td>
<td>3.90</td>
<td>4.00</td>
<td>.01</td>
<td>.10</td>
<td>.00</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Note.** \( ^aBL \) = baseline. \( ^bINT \) = intervention. \( ^cMTN \) = maintenance. \( ^dPND \) = percentage of non-overlapping data. \( ^e \)Intervention effect. \( ^f \)Maintenance effect (mean difference between the maintenance and the intervention).
Figure 5. Performance of Zhang across phases and variables.
context transfer (.35), and a negative trend for reading comprehension (-.30). In the maintenance phase, a positive trend was shown for morphologically-related words (.01), morphological transfer (.50), and context transfer (.25); a flat trend was shown for the remaining variables.

**Variability.** The variability in the baseline phase was relatively small for the variables of morphologically-related words (SD = .49), morphological transfer (SD = .50), words from context (SD = .00), context transfer (SD = .71), and reading comprehension (SD = .71). The variability in the baseline is low for all self-regulated word learning variables, including task values (SD = .29), self-efficacy (SD = .35), cognitive strategies (SD = .00), and metacognitive strategies (SD = .43). In the intervention phase, the variability was low for morphologically-related words (SD = .19), morphological transfer (SD = .50), words from context (SD = .00), context transfer (SD = .75), and reading comprehension (SD = .50). In the maintenance phase, the variability was relatively low for morphologically-related words (SD = .00), morphological transfer (SD = .50), words from context (SD = .00), context transfer (SD = .42), and reading comprehension (SD = .20). The variability was zero for all variables of self-regulated learning in both intervention phase and maintenance phase.

**Immediacy.** An immediate effect was observed for morphologically-related words, morphological transfer, context transfer, and reading comprehension. A small immediate effect was observed for cognitive strategies. No immediate effect of treatment existed for self-efficacy, task values or metacognitive strategies. As the intervention continued, Zhang steadily increased his scores on cognitive strategies, which continued through the maintenance phase.
**Effect sizes**

To examine the intervention effect sizes, the scores in all phases were compared for each variable using both the percentage of nonoverlapping data (PND) and Cohen’s d statistic (Table 5). Cohen’s d statistic was used to examine whether the effect continues into the maintenance phase. PND results suggested that the intervention was ineffective for all nine variables, because Zhang’s highest scores in the baseline phase reach ceiling effect for all variables. However, effect size calculations using Cohen’s d also suggested a large intervention effect for morphologically-related words ($d = 1.16$), morphological transfer ($d = .89$), and context transfer ($d = 1.09$), and a medium intervention effect for cognitive strategies ($d = .74$). Zhang’s score on morphological transfer continued to increase in the maintenance scores ($d = .90$), suggesting a continuous improvement in Zhang’s skills to use morphological analysis to understand unknown words.

**Wei**

**Anecdotal notes**

Wei was a fifth grade male student with an English Language Proficiency level of 5 during the intervention. He graduated ELL program in the middle of the intervention. He entered the United State as an immigrant from China. His performance on English Language Development Assessment was Fully English Proficient level for Speaking, Reading, and Comprehension (level 5), and at Advanced level for Listening, Composite, and Writing (level 4). Wei performed well in the baseline phase without intervention. He shared that he knew all the words in the reading passages for almost all reading passages. It is not surprising that he did well in reading comprehension and words from the reading context. However, his knowledge on parts of speech was very low in the baseline phase.
He showed great interest in morphological knowledge in the intervention phase and his performance on the morphologically-related words had increased substantially. He was always attentive and quiet in the intervention phase.

**Visual analyses**

Results for Wei are presented in Table 10 and Figure 6. Wei received nine baseline sessions, four intervention sessions, and three maintenance sessions. Table 10 presents the level, trend, immediacy, percentage of non-overlapping data (PND), and effect sizes using Cohen’s $d$ across all phases. Figure 6 presents Wei’s performance on all nine variables.

**Level.** Visual analyses suggested Wei’s performance on most variables increased in the intervention phase (i.e., morphologically-related words, morphological transfer, context transfer, reading comprehension, task value, self-efficacy, metacognitive strategies, and cognitive strategies), except for one variable, words from context, which did not improve due to ceiling effect across all phases ($M = 3.00$). The increase either continued or stabilized in the maintenance phase for all variables. For instance, Wei’s performance on morphologically-related words increased from the baseline phase ($M = 1.50$) to the intervention phase ($M = 2.15$), and continued to increase in the maintenance phase ($M = 2.53$).
<table>
<thead>
<tr>
<th>Variable (maximal score)</th>
<th>Level</th>
<th>Trend</th>
<th>Immediacy</th>
<th>Effect Size for Wei $^d$</th>
<th>Cohen’s $^d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morph words (3)</td>
<td>1.50</td>
<td>2.15</td>
<td>2.33</td>
<td>1.83</td>
<td>.47</td>
</tr>
<tr>
<td>Morph transfer (2)</td>
<td>1.11</td>
<td>1.38</td>
<td>2.00</td>
<td>-.10</td>
<td>-.30</td>
</tr>
<tr>
<td>Words from context (3)</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>-.07</td>
<td>-.30</td>
</tr>
<tr>
<td>Context transfer (2)</td>
<td>.83</td>
<td>2.00</td>
<td>1.67</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Reading (3)</td>
<td>1.83</td>
<td>2.00</td>
<td>2.33</td>
<td>-06</td>
<td>-0.50</td>
</tr>
<tr>
<td>Task values (4)</td>
<td>3.58</td>
<td>3.94</td>
<td>4.00</td>
<td>.05</td>
<td>.06</td>
</tr>
<tr>
<td>Self-efficacy (4)</td>
<td>3.68</td>
<td>3.82</td>
<td>4.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Metacognitive (4)</td>
<td>2.33</td>
<td>2.90</td>
<td>4.00</td>
<td>.08</td>
<td>.10</td>
</tr>
<tr>
<td>Cognitive (4)</td>
<td>2.61</td>
<td>3.20</td>
<td>4.00</td>
<td>.10</td>
<td>.00</td>
</tr>
</tbody>
</table>

Note. $^a$BL = baseline. $^b$INT = intervention. $^c$MTN = maintenance. $^d$PND = percentage of non-overlapping data. Intervention effect. Maintenance effect (mean difference between the maintenance and the intervention).
Figure 6. Performance of Wei across all variables and all phases

Baseline       Intervention       Maintenance

- Morphologically-related words

- Morphological transfer

- Words from context

- Context transfer

- Reading

- Task value

- Self-efficacy

- Metacognitive

- Cognitive

Session
Trend. A stable or flat trend was achieved for all variables with the trends ranging from \(-0.05\) to \(0.10\). In the intervention phase, a positive trend was observed for the self-regulated learning variables and a stable trend was observed for other variables. In the maintenance phase, a positive trend was revealed for reading comprehension (\(0.50\)); a negative trend was shown for morphologically-related words (\(-0.30\)) and context transfer (\(-0.05\)); the remaining variables had flat trend.

Variability. The variability in the baseline is relatively small for morphological word (\(SD = 0.33\)), morphological transfer (\(SD = 0.55\)), words from context (\(SD = 0.00\)), context transfer (\(SD = 0.25\)), and reading comprehension (\(SD = 0.35\)). The variability in the baseline is low for all self-regulated word learning variables, including task values (\(SD = 0.29\)), self-efficacy (\(SD = 0.35\)), cognitive strategies (\(SD = 0.00\)), and metacognitive strategies (\(SD = 0.43\)).

Immediacy. A large immediate intervention effect was observed for the variables of morphologically-related words, morphological transfer, and context transfer. A small immediate effect was found for reading comprehension and cognitive strategies. The results indicated that once the intervention began, Wei reported a higher frequency of using cognitive strategies (morphological analysis and contextual analysis), consistent with his increased scores on actual performance on both morphological transfer and context transfer tasks. No immediate effect was observed for metacognitive strategies, self-efficacy, and task values. As the intervention continued, Wei increased his scores on task values, self-efficacy, and metacognitive strategies and stabilized in the maintenance phase.
Effect sizes

To examine the intervention effect sizes, both percentage of nonoverlapping data (PND) and Cohen’s d statistic were used to examine the intervention effect sizes. Cohen’s d statistic was also used to examine whether the effect continued into the maintenance phase. PND results suggested the intervention was highly effective to enhance Wei’s scores in context transfer (100%), but not effective for all other variables. Effect size calculations using Cohen’s d suggested a medium intervention effect for morphologically-related words ($d = .68$), morphological transfer ($d = .54$), context transfer ($d = .58$), and cognitive strategies ($d = .74$). The effect using PND for cognitive strategies, morphologically-related words, and morphological transfer was not significant, mainly due to the existence of ceiling score in the baseline phase. However, the effect size score suggested an intermediate effect size for treatment, and Wei’s scores continued to increase during the maintenance scores for morphologically-related words ($d = .47$) and morphological transfer ($d = .60$), suggesting a continuous improvement in Wei’s skills to use morphological analysis to understand unknown words. Wei’s score for reading comprehension also continued to improve in the maintenance phase ($d = .38$). Wei’s score stabilized for the variables of words from context, task values, self-efficacy, metacognitive strategies, and cognitive strategies. Wei’s score was slightly decreased for context transfer ($d = -.33$) in the maintenance phase.

Ming, Randy, and Ahmed

Ming

Ming was a fourth-grade boy with an English Language Proficiency level of 3. Ming was originally from China and he had stayed in the United States for one year when
the current study was conducted. He was assigned to Group C, which included 9 baseline sessions, 4 intervention sessions, and 3 maintenance sessions. He participated in the first nine sessions before his parent withdrew without any reasons. During the measure of self-regulated word-learning strategies, he often had about five to ten unknown words in the short reading passages (with an average of 120 to 130 words). His performance was consistently very low on all variables including morphologically-related words ($M = .36$, $SD = .38$), words from context ($M = .44$, $SD = .73$), context transfer ($M = .22$, $SD = .44$), reading comprehension ($M = .33$, $SD = .50$), and relatively higher for morphological transfer ($M = .78$, $SD = .26$). Ming performed better in morphological awareness than his performance on other variables, which is different from all other students whose performance on morphological transfer was lower than other variables. Ming reported relatively high score on task-value ($M = 3.55$, $SD = .25$) and self-efficacy ($M = 3.22$, $SD = .33$), but lower score on cognitive strategies ($M = 2.34$, $SD = .60$) and metacognitive strategies ($M = 2.44$, $SD = .46$).

**Randy**

Randy was a fourth grade male student with an English Language Proficiency level of 3. He was born in the United States with English being the primary language spoken at home. He had an advanced level of speaking (level 4 on English Language Development Assessment) but low level for composite, reading, writing, and comprehension (level 1). For example, his writing was characterized with words with missing vowels or letters (emergent level). When he was asked to read the passages and finish the independent practice, he was the first to finish the assignment but with the lowest correct rate. For instance, he often claimed to be done reading immediately after
the passage was handed to him, but when asked about what he had learned from the passage, he could not provide any answers. He would then return to the passage and read more carefully. The passages were cognitively challenging enough that he usually gave up after reading two or three sentences. When he was asked to answer a question related to the passage, he usually provided irrelevant answers. Although the answers were not relevant, he tended to continue to talk nonstop, which might reflect his advanced level of speaking skills on English Language Development Assessment. His non-stop talk was usually disruptive to other students in the same group, if I did not interrupt.

He was assigned to Group B, which included six baseline sessions, seven intervention sessions, and three maintenance sessions. He participated in seven sessions and withdrew afterward explaining that he was tired of the sessions. His performance was consistently low for morphologically-related words (\( M = .51, SD = .40 \)), morphological transfer (\( M = .36, SD = .38 \)), words from context (\( M = .29, SD = .49 \)), context transfer (\( M = .07, SD = .19 \)), and reading comprehension (\( M = .00, SD = .00 \)). His reported self-regulated word learning included cognitive strategies (\( M = 2.36, SD = .24 \)), metacognitive strategies (\( M = 2.79, SD = .48 \)), task values (\( M = 3.00, SD = .77 \)), and self-efficacy (\( M = 2.48, SD = .66 \)).

**Ahmed**

Ahmed was a fifth grade boy with an English Language Proficiency level of 4 with first language being Kurdish. During this study, his was at Fully English Proficient level for Speaking (level 5), at advanced level for writing (level 4), and intermediate level for reading, composite, and listening (level 3). He was assigned to Group B, same with Randy. He participated in eight sessions with six of which being baseline sessions. His
performance included morphologically-related words ($M = 1.00, SD = .73$), morphological transfer ($M = .92, SD = .49$), words from context ($M = 1.67, SD = 1.03$), context transfer ($M = .67, SD = .81$), and reading comprehension ($M = 1.25, SD = .42$). His reported self-regulated word learning included cognitive strategies ($M = 2.75, SD = .27$), metacognitive strategies ($M = 1.81, SD = .51$), task values ($M = 3.28, SD = .33$), and self-efficacy ($M = 2.28, SD = .25$).

**Research questions**

This section presents the discussion of the intervention effect and maintenance for word knowledge, reading comprehension, and self-regulated word learning strategies (cognitive strategies, metacognitive strategies, and motivational beliefs) across participants, phases, and groups.

**Word knowledge**

Figure 7 presents the scores of ELL children’s overall word knowledge (i.e., morphologically-related words, morphological transfer, words from context, and context transfer). Table 11 shows the level, trend, immediacy, the percentage of nonoverlapping data and effect size for word knowledge across participants. Group A received three baseline sessions, ten intervention sessions, and three maintenance sessions; Group B received six baseline sessions, seven intervention sessions, and three maintenance sessions; Group C received nine baseline sessions, four intervention sessions, and three maintenance sessions.

**Visual Analyses**

**Level.** Visual analyses suggested that all children increased their performance on word knowledge in the intervention phase. The level growth varied from 1.64 to 3.98
with an average of 2.64 (the maximum score being 10). Bow showed the greatest word knowledge growth from 1.30 in the baseline to 5.28 in the intervention. Zhang had the smallest word knowledge growth from 6.43 in the baseline to 8.08 in the intervention.

The growth in the intervention for most students (Akram, Bow, Zhang, and Wei) continued in the maintenance phase. For example, Zhang’s performance increased from 8.08 in the intervention to 8.90 in the maintenance phase. The growth of two students (Anna and Kevin) decreased slightly in the maintenance phase. For example, Anna’s score decreased slightly from 5.22 to 4.40 in the maintenance phase.

Table 11. The Level, Trend, Immediacy, PND, and Effect Sizes for the Variable of Word Knowledge

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Level</th>
<th>Trend</th>
<th>Immediacy</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>BL</td>
<td>INT</td>
<td>MTN</td>
<td>INT</td>
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<tr>
<td>Akram</td>
<td>1</td>
<td>5.43</td>
<td>8.77</td>
<td>9.10</td>
<td>-.15</td>
</tr>
<tr>
<td>Anna</td>
<td>1</td>
<td>2.10</td>
<td>5.22</td>
<td>4.40</td>
<td>-.87</td>
</tr>
<tr>
<td>Bow</td>
<td>1</td>
<td>1.30</td>
<td>5.28</td>
<td>5.83</td>
<td>-.16</td>
</tr>
<tr>
<td>Kevin</td>
<td>2</td>
<td>3.88</td>
<td>5.70</td>
<td>5.53</td>
<td>.09</td>
</tr>
<tr>
<td>Zhang</td>
<td>3</td>
<td>6.43</td>
<td>8.08</td>
<td>8.90</td>
<td>-.03</td>
</tr>
<tr>
<td>Wei</td>
<td>3</td>
<td>6.44</td>
<td>8.53</td>
<td>9.20</td>
<td>-.26</td>
</tr>
</tbody>
</table>

**Note.** aBL = baseline. bINT = intervention. cMTN = maintenance. dPND = percentage of non-overlapping data. eIntervention effect. fMaintenance effect (mean difference between the maintenance and the intervention).

**Trend.** Visual analysis for each child suggested that a relatively stable baseline was achieved for all children with some degree of variation. Three children (Kevin, Ming, and Zhang) showed flat baselines. Three children (Akram, Bow, and Wei) had slight downward trends. Three children (Anna, Randy, and Ahmed) had downward trends. In the intervention phase, three children (Akram, Anna, and Zhang) had flat trends; two children (Bow and Kevin) had upward trends; Wei showed a downward trend. In the maintenance phase, three children (Anna, Bow, and Zhang) showed upward trends; three children had flat trend (Akram, Kevin, and Wei).
Figure 7. Word knowledge performance across phases for all participants

Baseline | Intervention | Maintenance

Tom
Anna
Amanda
Randy
Kevin
David
Sam
Max
Jake
**Variability.** The variability for word knowledge in the baseline phase was relatively low for all ELL children. Two children, that is, Kevin (SD = 1.38) and Ahmed (SD = 1.18), showed slightly more variability in word knowledge than other children, including Akram (SD = .51), Anna (SD = .75), Bow (SD = .61), Randy (SD = .61), Ming (SD = .86), Zhang (SD = .70), and Wei (SD = .87). In the intervention phase, the variability for Bow (SD = 1.16) and Kevin (SD = 1.46) were slightly bigger than that for other children, including Akram (SD = .57), Anna (SD = .56), Ahmed (SD = .92), Zhang (SD = .81), and Wei (SD = .50). In the maintenance phase, the variability for Anna (SD = 2.61), Bow (SD = 1.77), and Zhang (SD = 1.15), was slightly higher than the variability for Akram (SD = .10), Kevin (SD = .42), and Wei (SD = .50).

**Immediacy.** A substantial immediate intervention effect was observed for all children with the increase ranging from 1.20 to 4.70 on word knowledge with an average immediate effect of 2.87. The smallest immediate effect happened for Kevin from 3.80 to 5.00. The largest immediate effect happened for Bow from 1.30 to 6.00. When the intervention was withdrawn, no immediate decrease was observed for four children (Akram, Bow, Zhang, and Wei); on the contrary, the performance of Zhang and Wei continue to increase. A slight immediate decrease was observed for Anna (-.87) and Kevin (-.30).

**Comparison across participants.** In multiple baseline designs, the intervention effect is verified by demonstrating that the introduction of intervention changes one participant’s behavior without influencing the performance of remaining participants who were still in the baseline phase (Cooper, Heron, & Heward, 1987). This verification is an inference because it is based on observation across participants instead of within a
participant (Carr, 2005). In the current study, Group A (Akram, Anna, and Bow) began the intervention phase at the fourth session; Group B (Randy, Kevin, and Ahmed) began at the seventh session; and Group C (Zhang, Wei, and Ming) began at the tenth session. As Group A began in the intervention phase at session four, five, and six, all three children in Group A showed a substantial immediate intervention effect, but group B and C did not show a similar effect. On the contrary, children’s performance in Group B and C revealed a slight downward stable trend. When Group B began intervention phase at session seven, eight, and nine, Group B demonstrated an obvious immediate intervention effect, especially for Keven and Ahmed; however, the three children in Group C did not show such change over these sessions. In addition, the stable baselines established the prediction of a baseline’s path into subsequent treatment phase, which allows the differentiation between the actual treatment path and the predicted path from baseline (Carr, 2005). The intervention effects were replicated across different participants in different groups (Carr, 2005). These results verified the intervention effect and supported a functional relation between the intervention and children’s increased performance on word knowledge. These results also demonstrate the control of two primary threats to internal validity, including historical events and participant maturation (Kazdin, 1982).

**Effect size**

Two methods were used to calculate the intervention effect sizes, including percentage of non-overlapping data (PND, Maggin & Chafouleas, 2013) and Cohen’s d (Kazin, 2013). Overall, PND indicated high effectiveness for most participants. PND was 100% for Akram, Anna, Bow and Ahmed; 75% for Zhang and Wei, and 57% for Kevin. Effect sizes indicated high intervention effect for all children with Cohen’s d ranging
from 4.94 to 14.05. In the maintenance phase Akram, Bow, Zhang, and Wei continued to improve their performance on word knowledge. The effect of intervention for Anna decreased significantly after proceeding into the maintenance phase, and the effect for Kevin decreased slightly in the maintenance phase.

**Reading comprehension**

The results and discussion are presented here regarding whether the intervention enhanced children’s reading comprehension. Figure 8 presents the scores across participants. Table 12 shows the levels, trend, immediacy, Percentage of Non-overlapping Data, and effect size. The data for Randy, Ahmed and Ming was not analyzed due to their withdrawal early in the intervention phase.

Table 12. The Level, Trend, Immediacy, PND, and Effect Sizes for the Variable of Reading Comprehension (score ranging from 0 to 3)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Level</th>
<th>Trend</th>
<th>Immediacy</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td>BL</td>
<td>INT</td>
<td>MTN</td>
<td>BL</td>
</tr>
<tr>
<td>Akram</td>
<td>1</td>
<td>1.33</td>
<td>2.00</td>
<td>2.67</td>
<td>.50</td>
</tr>
<tr>
<td>Anna</td>
<td>1</td>
<td>.33</td>
<td>.40</td>
<td>.67</td>
<td>.00</td>
</tr>
<tr>
<td>Bow</td>
<td>1</td>
<td>.00</td>
<td>.50</td>
<td>.67</td>
<td>.00</td>
</tr>
<tr>
<td>Kevin</td>
<td>2</td>
<td>.83</td>
<td>.93</td>
<td>1.17</td>
<td>.06</td>
</tr>
<tr>
<td>Zhang</td>
<td>3</td>
<td>1.89</td>
<td>2.25</td>
<td>2.67</td>
<td>-.08</td>
</tr>
<tr>
<td>Wei</td>
<td>3</td>
<td>1.83</td>
<td>2.50</td>
<td>3.00</td>
<td>-.06</td>
</tr>
</tbody>
</table>

*Note.* aBL = baseline. bINT=intervention. cMTN = maintenance. dPND = percentage of non-overlapping data. eIntervention effect. fMaintenance effect (mean difference between the maintenance and the intervention).

**Visual Analysis**

*Level.* Visual analyses suggested that all six children increased their performance on reading comprehension in the treatment phase (Akram, Anna, Bow, Kevin, Zhang, and Wei). Akram showed the greatest growth from 1.33 in the baseline to 2.00 in the intervention. Anna had the smallest growth from .33 in the baseline to .40 in the intervention. The growth in the intervention for all students continued in the maintenance
phase. For example, Akram’s performance increased from 2.00 in the intervention to 2.67 in the maintenance phase.

*_Trend._* Visual analysis for each child suggested that a relatively stable baseline was achieved for all six children with some degree of variation. Five children (Anna, Bow, Kevin, Ming, and Zhang) showed flat baselines. Akram had slight upward trends. In the intervention phase, most children had flat trends except for Wei who showed a slight upward trend. In the maintenance phase, three children (Anna, Bow, and Zhang) showed upward trends; three children had flat trend (Akram, Kevin, and Wei).

*_Variability._* The variability for reading comprehension in the baseline phase was relatively low for all children. Two children, that is, Kevin (SD = .68) and Zhang (SD = .60), showed slightly more variability than the other children, including Akram (SD = .58), Anna (SD = .58), Bow (SD = .00), and Wei (SD = .35). In the intervention phase, the variability for Bow (SD = .71) and Akram (SD = .67) was slightly bigger than the other students’, including Anna (SD = .52), Kevin (SD = .45), Zhang (SD = .50), and Wei (SD = .58). In the maintenance phase, the variability for Anna (SD = 1.15) was higher than the variability for Akram (SD = .58), Bow (SD = .58), Kevin (SD = .29), Zhang (SD = .58), and Wei (SD = .00).

*_Immediacy._* A substantial immediate intervention effect was observed for five children with the increase ranging from .33 to 1.00 with an average immediate effect of .67. No immediate effect happened to Kevin (.00). The largest immediate effect happened for Bow with score changing from .00 to .50. When the intervention was withdrawn, no immediate decrease was observed for all children; Kevin’s performance did not change; the performance of rest five children continued to increase.
Figure 8. Children’s performance on reading Comprehension and phases
Comparison across participants. Group A (Akram, Anna, and Bow) began the intervention phase at the fourth session; Group B (Randy, Kevin, and Ahmed) began at the seventh session; and Group C (Zhang, Wei, and Ming) began at the tenth session. As Group A began in the intervention phase at session four, five, and six, all three children in Group A showed a certain degree of immediate intervention effect ranging from .33 to 1.00, but Group B and C did not show a similar effect. On the contrary, children’s performance in Group B and C revealed a slight downward stable trend. When Group B began intervention phase at session seven, eight, and nine, Group B demonstrated no immediate intervention effect; the three children in Group C did not show such pattern over these sessions but a slight downward trend. These results verified the intervention effect and supported a functional relation between the intervention and children’s increased performance on reading comprehension.

Effect size

Overall, Percentage of Non-overlapping Data indicated low effectiveness for all participants in reading comprehension. The Percentage of Non-overlapping Data was below 50% for all participants. Effect sizes indicated high intervention effect for four children (Akram, Bow, Zhang, and Wei) with Cohen’s d ranging from .71 to 1.66. A small effect was observed for Anna and Kevin. The maintenance scores of participants showed that all students continued to improve their performance on reading comprehension with Cohen’s d ranging from .35 to 1.66.

Cognitive Strategies

Cognitive strategies in the present study included morphological analysis and contextual analysis. The score was calculated by averaging the two items measuring the
frequency of children’s use of morphological analysis and contextual analysis. Figure 9 presents the reported scores on cognitive strategies across participants. Table 12 shows the levels, trend, immediacy, Percentage of Non-overlapping Data, and effect size. The data for Randy, Ahmed and Ming was not analyzed due to their withdrawal early in the intervention phase.

*Visual Analysis*

*Level.* Visual analyses suggested growth in cognitive strategies for three children (Akram, Zhang, and Wei) in the treatment phase. Zhang showed the greatest growth from 3.44 in the baseline to 4.00 in the intervention phase. Wei had the smallest growth from 2.61 to 3.00 in the intervention phase. The growth in the intervention for these three students continued in the maintenance phase. Akram increased his score from 3.45 in the intervention phase to 4.00 in the maintenance phase, similar growth happened for Wei from 3.00 to 4.00. The other three students (Anna, Bow, and Kevin) showed decrease in the intervention phase, however, there was increase toward the end of the intervention and their score in the maintenance phase were higher than those in both baseline phase and intervention phase. For instance, Bow’s score decreased from 2.67 in the baseline to 2.50 in the intervention phase, but increased to 3.27 in the maintenance phase.
Figure 9. Cognitive strategies across participants

Baseline | Intervention | Maintenance

Tom

Anna

Amanda

Randy

Kevin

David

Sam

Max

Jake
Table 12. The Level, Trend, Immediacy, PND, and Effect Sizes for Cognitive Strategies

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Level</th>
<th>Trend</th>
<th>Immediacy</th>
<th>Cohen’s $d$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$^{a}$BL</td>
<td>$^{b}$INT</td>
<td>$^{c}$MTN</td>
<td>$^{d}$BL</td>
</tr>
<tr>
<td>Akram</td>
<td>1</td>
<td>3.00</td>
<td>3.45</td>
<td>4.00</td>
<td>-.50</td>
</tr>
<tr>
<td>Anna</td>
<td>1</td>
<td>3.50</td>
<td>3.05</td>
<td>3.83</td>
<td>-.25</td>
</tr>
<tr>
<td>Bow</td>
<td>1</td>
<td>2.67</td>
<td>2.50</td>
<td>3.27</td>
<td>.25</td>
</tr>
<tr>
<td>Kevin</td>
<td>2</td>
<td>3.42</td>
<td>2.83</td>
<td>3.83</td>
<td>-.21</td>
</tr>
<tr>
<td>Zhang</td>
<td>3</td>
<td>3.44</td>
<td>4.00</td>
<td>4.00</td>
<td>.07</td>
</tr>
<tr>
<td>Wei</td>
<td>3</td>
<td>2.61</td>
<td>3.00</td>
<td>4.00</td>
<td>.10</td>
</tr>
</tbody>
</table>

*Note. $^{a}$BL = baseline. $^{b}$INT = intervention. $^{c}$MTN = maintenance. $^{d}$PND = percentage of non-overlapping data. $^{e}$Intervention effect. $^{f}$Maintenance effect (mean difference between the maintenance and the intervention).*

**Trend.** Visual analysis for each child suggested that a flat stable baseline for Wei and Zhang, a light positive trend for Bow, and a light negative trend for Akram, Anna, and Kevin. In the intervention phase, a flat or slight positive trend was shown for five children (Akram, Bow, Anna, Wei, and Zhang) and a positive trend for one child (Kevin). In the maintenance phase, two children (Anna and Zhang) showed upward trends; three children had flat trend (Akram, Kevin, and Wei); and one child had a slight downward trend (Bow).

**Variability.** The variability for cognitive strategies in the baseline phase was low for all children ranging from .29 (Bow) to .58 (Kevin). In the intervention phase, the variability was highest for Kevin (SD = 1.19), lower for Akram (SD = .55), Anna (SD = .28), and Bow (SD = .62), and zero for Zhang and Wei. In the maintenance phase, the variability for all children was low, including Akram (SD = .00), Bow (SD = .25), Anna (SD = .29), Kevin (SD = .29), Zhang (SD = .00), and Wei (SD = .00).

**Immediacy.** A small immediate intervention effect was observed for Zhang and Wei. No immediate effect happened to Akram (.00). A negative immediate effect happened for Bow, Anna, and Kevin, indicating their reported frequency of using cognitive strategies decreased once the intervention began. However, as the intervention
continued, their reported frequency of using cognitive strategies increased with positive
trend. When the intervention was withdrawn, no immediate decrease was observed for all
children; on the contrary, continuing increase on their reported frequency was observed
for Anna, Bow, Kevin, and Wei, and the other two children (Akram and Zhang)
continued to report high frequency of using cognitive strategies with a ceiling effect.

*Comparison across participants.* As Group A began the intervention phase at
session four, five, and six, Akram in Group A showed a certain degree of positive
immediate intervention effect whereas Anna and Bow showed negative intervention
effect. On the contrary, children’s performance in Group B and C revealed a stable trend.
When Group B began intervention phase at session seven, eight, and nine, Group B
demonstrated no immediate negative intervention effect for Kevin; the three children in
Group C did not show such pattern over these sessions but a stable trend. These results
verified the intervention effect and supported a functional relation between the
intervention and children’s increased performance on reading comprehension.

*Effect size*

Overall, PND indicated low effectiveness for all children. Percentage of Non-
overlapping Data was below 50% for all six children. Effect sizes indicated high
intervention effect for Akram and medium intervention effect for Zhang and Wei. The
effect continued for all three in the maintenance phase. Negative intervention effect was
observed for the other three students (Anna, Bow, and Kevin), however, as intervention
continued, positive effect emerged and these three children’s reported frequency to use
cognitive strategies increased significantly in the maintenance phase with Cohen’s d
ranging from .90 to 2.96.
**Metacognitive Strategies**

Metacognitive strategies included two categories: goal setting and monitoring. The score was calculated by averaging the two items measuring the frequency of children’s use of goal setting and monitoring. Figure 10 presents the reported scores on metacognitive strategies across participants. Table 13 shows the levels, trend, immediacy, Percentage of Non-overlapping Data, and effect size. The data for Randy, Ahmed, and Ming was only analyzed for comparison across participants due to their withdrawal early in the intervention phase.

Table 13. The Level, Trend, Immediacy, PND, and Effect Sizes for the Variable of Metacognitive Strategies (ranging from 1 to 4)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Level</th>
<th>Trend</th>
<th>Immediacy</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>BL</td>
<td>INT</td>
<td>MTN</td>
<td>BL</td>
</tr>
<tr>
<td>Akram</td>
<td>1</td>
<td>1.83</td>
<td>2.95</td>
<td>4.00</td>
<td>-.75</td>
</tr>
<tr>
<td>Anna</td>
<td>1</td>
<td>3.00</td>
<td>3.15</td>
<td>3.00</td>
<td>-.50</td>
</tr>
<tr>
<td>Bow</td>
<td>1</td>
<td>3.33</td>
<td>3.00</td>
<td>3.83</td>
<td>.25</td>
</tr>
<tr>
<td>Kevin</td>
<td>2</td>
<td>3.58</td>
<td>3.07</td>
<td>4.00</td>
<td>-.27</td>
</tr>
<tr>
<td>Zhang</td>
<td>3</td>
<td>2.33</td>
<td>2.63</td>
<td>4.00</td>
<td>.08</td>
</tr>
<tr>
<td>Wei</td>
<td>3</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td>.00</td>
</tr>
</tbody>
</table>

*Note.* aBL = baseline. bINT = intervention. cMTN = maintenance. dPND = percentage of non-overlapping data. eIntervention effect. fMaintenance effect (mean difference between the maintenance and the intervention).

*Level.* Growth was observed for three children (Akram, Anna, and Zhang) in the treatment phase. Wei’s score had ceiling effect in the baseline phase (M = 4.00). The growth in the intervention for these three students continued in the maintenance phase.

The other two students (Bow and Kevin) showed decrease in the intervention phase, however, there was increase toward the end of the intervention and their score in the maintenance phase were higher than those in both baseline phase and intervention phase.

For instance, Bow’s score decreased from 3.33 in the baseline to 3.00 in the intervention phase, but increased to 3.83 in the maintenance phase.
Figure 10. Metacognitive strategies across participants

Baseline | Intervention | Maintenance
---|---|---
Tom
Anna
Amanda
Randy
Kevin
David
Sam
Max
Jake
Trend. Visual analysis for each child suggested that a flat stable baseline for three children (Bow, Wei, and Zhang), and a light negative trend for the other three children (Akram, Anna, and Kevin). In the intervention phase, a flat or slight positive trend was shown for all six children (Akram, Bow, Anna, Kevin, Wei, and Zhang). In the maintenance phase, five children had flat trend, and one child had a slight downward trend (Anna).

Variability. The variability in the baseline was relatively low for all children ranging from .00 (Wei) to .76 (Akram). In the intervention phase, the variability was highest for Kevin (SD = 1.17) and Akram (SD = 1.17), lower for Anna (SD = .63), Bow (SD = .24), and Zhang (SD = .25). In the maintenance phase, the variability for all children was low: Akram (SD = .00), Bow (SD = .50), Anna (SD = .29), Kevin (SD = .00), Zhang (SD = .00), and Wei (SD = .00).

Immediacy. A small immediate intervention effect was observed for Anna. No immediate effect happened to Zhang and Wei. A negative immediate effect happened for Akram, Bow, and Kevin. However, as the intervention continued, children’s reported frequency of using metacognitive strategies increased with positive trend. When the intervention was withdrawn, no immediate decrease was observed for five children, but a small decrease was observed for Anna.

Comparison across participants. As Group A began the intervention phase at session four, five, and six, Akram and Bow showed a certain degree of negative immediate intervention effect whereas Anna showed a positive intervention effect. Children in Group B and C revealed a stable trend except for one child Kevin. When Group B began intervention phase at session seven, eight, and nine, Group B
demonstrated immediate negative intervention effect for Kevin; the three children in Group C did not show such pattern over these sessions but a stable trend. These results verified the intervention effect for Group B and supported a functional relation between the intervention and children’s increased performance on reading comprehension.

**Effect size**

Overall, PND indicated effectiveness for Akram with a Percentage of Non-overlapping Data of 70%, and low effectiveness for all other five children. Effect sizes indicated high intervention effect for Akram ($d = 4.31$) and low intervention effect for Anna ($d = .34$) and Zhang ($d = .35$). The effect continued for all three in the maintenance phase for Akram ($d = 2.45$) and Zhang ($d = .69$). No effect was observed for Wei mainly because he reported high score ($M = 4$) throughout the intervention. Negative intervention effect was observed for the other two students (Bow, and Kevin), however, as intervention continued, positive effect emerged and their reported frequency to use cognitive strategies increased significantly in the maintenance phase with Cohen’s $d$ being $.87$ for Bow and $2.17$ for Kevin.

**Motivational Beliefs**

Motivational beliefs included self-efficacy and task values. The score was calculated by averaging the six items measuring reported scores on self-efficacy (3 items) and task values (3 items). Figure 11 presents the reported scores across participants. Table 14 shows the levels, trend, immediacy, Percentage of Non-overlapping Data, and effect size. The data for Randy, Ahmed, and Ming was only analyzed for comparison across participants due to their withdrawal early in the intervention phase.
Table 14. The Level, Trend, Immediacy, PND, and Effect Sizes for the Variable of Motivational Beliefs (ranging from 1 to 4)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Level</th>
<th>Trend</th>
<th>Immediacy</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$^a$BL</td>
<td>$^b$INT</td>
<td>$^c$MTN</td>
<td>$^d$BL</td>
</tr>
<tr>
<td>Akram</td>
<td>1</td>
<td>3.19</td>
<td>3.80</td>
<td>4.00</td>
<td>-.29</td>
</tr>
<tr>
<td>Anna</td>
<td>1</td>
<td>3.83</td>
<td>3.95</td>
<td>4.00</td>
<td>-.08</td>
</tr>
<tr>
<td>Bow</td>
<td>1</td>
<td>3.67</td>
<td>3.95</td>
<td>4.00</td>
<td>-.08</td>
</tr>
<tr>
<td>Kevin</td>
<td>2</td>
<td>3.72</td>
<td>3.13</td>
<td>4.00</td>
<td>-.19</td>
</tr>
<tr>
<td>Zhang</td>
<td>3</td>
<td>3.74</td>
<td>4.00</td>
<td>4.00</td>
<td>.10</td>
</tr>
<tr>
<td>Wei</td>
<td>3</td>
<td>3.62</td>
<td>3.85</td>
<td>4.00</td>
<td>.02</td>
</tr>
</tbody>
</table>

Note. $^a$BL=baseline. $^b$INT=intervention. $^c$MTN=maintenance. $^d$PND=percentage of non-overlapping data. $^e$Intervention effect. $^f$Maintenance effect (mean difference between the maintenance and the intervention). Motivational beliefs score was the averaged score of self-efficacy and task-value for word learning.

**Level.** Growth was observed for three children (Akram, Anna, and Zhang) in the treatment phase. Wei’s score had ceiling effect in the baseline phase ($M = 4.00$). The growth in the intervention for these three students continued in the maintenance phase. The other two students (Bow and Kevin) showed decrease in the intervention phase, however, there was increase toward the end of the intervention and their score in the maintenance phase were higher than those in both baseline phase and intervention phase. For instance Bow’s score decreased from 3.33 in the baseline to 3.00 in the intervention phase, but increased to 3.83 in the maintenance phase.

**Trend.** Visual analysis for each child suggested that a flat stable baseline for three children (Bow, Wei, and Zhang), and a light negative trend for the other three children (Akram, Anna, and Kevin). In the intervention phase, a flat or slight positive trend was shown for all six children (Akram, Bow, Anna, Kevin, Wei, and Zhang). In the maintenance phase, five children had flat trend, and one child had a slight downward trend (Anna).
Figure 11. Motivational beliefs across participants and phases

Baseline | Intervention | Maintenance

Tom
Anna
Amanda
Randy
Kevin
David
Sam
Max
Jake
**Variability.** The variability in the baseline phase was relatively low for all children ranging from .00 (Wei) to .76 (Akram). In the intervention phase, the variability was highest for Kevin (SD = 1.17) and Akram (SD = 1.17), lower for Anna (SD = .63), Bow (SD = .24), and Zhang (SD = .25). In the maintenance phase, the variability for all children was low, including Akram (SD = .00), Bow (SD = .50), Anna (SD = .29), Kevin (SD = .00), Zhang (SD = .00), and Wei (SD = .00).

**Immediacy.** A small immediate intervention effect was observed for Anna. No immediate effect happened to Zhang and Wei. A negative immediate effect happened for Akram, Bow, and Kevin. However, as the intervention continued, children’s reported frequency of using motivational strategies increased with positive trend. When the intervention was withdrawn, no immediate decrease was observed for five children, but a small decrease was observed for Anna.

**Comparison across participants.** As Group A began the intervention phase at session four, five, and six, Akram and Bow showed a certain degree of negative immediate intervention effect whereas Anna showed a positive intervention effect. Children in Group B and C revealed a stable trend except for one child Kevin. When Group B began intervention phase at session seven, eight, and nine, Group B demonstrated immediate negative intervention effect for Kevin; the three children in Group C did not show such pattern over these sessions but a stable trend. These results verified the intervention effect for Group B and supported a functional relation between the intervention and children’s increased performance on reading comprehension.
Effect size

Overall, PND indicated effectiveness for Akram with a PND of 70%, and for Wei with a PND of 100%, and low effectiveness for other four children. Effect sizes indicated high intervention effect for Akram ($d = 4.31$) and low intervention effect for Anna ($d = .34$) and Zhang ($d = .35$). The effect continued for all three in the maintenance phase for Akram ($d = 2.45$) and Zhang ($d = .69$). No effect was observed for Wei mainly because he reported high score ($M = 4$) throughout the intervention. Negative intervention effect was observed for the other two students (Bow and Kevin), however, as intervention continued, positive effect emerged and their reported frequency to use cognitive strategies increased significantly in the maintenance phase with Cohen’s $d$ being .87 for Bow and 2.17 for Kevin.

Summary

The functional intervention effect for reading comprehension was established for four children (Akram, Bow, Zhang, and Wei) with a large effect size regardless of their English proficiency levels. The intervention effect stabilized in the later sessions in the intervention phase, which continued to increase significantly in the maintenance phase for all four children. Kevin, who was more talkative and less engaged for most sessions, showed a small effect size on his reading comprehension. Anna who struggled with reading had a small effect size as well. However, as the intervention moved into maintenance phase, Kevin and Anna’s performance on reading comprehension stabilized and continued to increase substantially in the maintenance phase. The intervention effects for all children were supported by Cohen’s $d$ calculation, but not percentage of non-overlapping data, mainly due to one or two high-score data points in the baseline phase.
that exceeded the lowest data point in the intervention phase. The intervention effect was supported by visual analyses of level, trend, variability, immediacy, and comparison across participants.
Chapter V. Discussion

The goal of the study was to determine the effectiveness of a self-regulated vocabulary intervention with upper elementary English language learners with an English proficiency level of three, four, or five. This chapter presents the discussion of the findings in relation to the five research questions: whether and how the intervention instruction improved ELL children’s (1) word knowledge, (2) reading comprehension, (3) cognitive strategy use, (4) metacognitive strategy use, and (5) motivational beliefs. This is followed by a summary of the findings, the limitations and relevant suggestions for future research, and the implication of the findings.

Word knowledge

To answer the first research question, whether the intervention would improve ELL children’s word knowledge, two categories of results were referred to, including (1) the overall word knowledge performance across participants and (2) the individual performance of six children on the four individual variables that reflected children’s word knowledge (i.e., morphologically-related words, morphological transfer, words from context, and context transfer).

Results from the visual analyses and effect size calculations for the overall word knowledge performance suggested a causal relationship between the intervention and ELL children’s increased performance on overall word knowledge. The intervention effect was established for all six children who completed all sixteen instructional sessions in the study, regardless of their English language proficiency levels in terms of reading, speaking, writing, comprehension, composite, and listening. The effect sizes, ranging from 4.94 to 14.05, were very large using Cohen’s (1988) standards (from .20 to .30
being a small effect, around .50 a medium effect, .80 to infinity a large effect). The intervention effects were congruent with children’s performance on pre-post test on experimental vocabulary knowledge measure. The experimental vocabulary knowledge measure contained twenty target words randomly generated from the vocabulary pool created before the intervention began. The intervention effects were underpinned by the results from both percentage of non-overlapping data and effect size calculations for the six children. The intervention effects were also supported by visual analyses of level, trend, variability, immediacy, and comparison across participants. Moreover, in the maintenance phase where the intervention was withdrawn, children’s performance on word knowledge continued to improve instead of fading away. Specifically, the performance of four children with high levels of English proficiency improved consistently with a positive trend with medium to large effect sizes (Cohen’s $d$ from .44 to 3.24); for the other two children, despite of the slight but non-significant decrease in the maintenance phase, their performance was still substantially higher than that in the baseline phase.

The results suggest that all ELL children in the study enhanced their word knowledge from the intervention within a framework guided by (1) explicit instruction of context clue and word part analysis to foster word consciousness (Anglin, 1993; Baumann et al, 2003; Graves, 2006), (2) cognitive, metacognitive, and motivational skills (Graves & Watts, 2008; Taboada et al., 2011; Zimmerman, 1989, 2013; Zimmerman & Schunk, 2001), and (3) key principles of vocabulary instruction (i.e., authentic language context, modeling, repeated exposures, and positive feedback) (Hairrell et al., 2011; Graves, 2006, 2009). The findings are in alignment with previous research on the
effectiveness of rich vocabulary instruction on general and academic vocabulary
development for adolescent English language learners with a variety of English
proficiency levels (McKeown & Beck, 2012; Taboada & Rutherford, 2011; Townsend &
Collins, 2009). The overall effect conveys the promise of interventions intended to meet
the need of English language learners regarding the development of their vocabulary
knowledge, especially interventions that take into consideration the principles of direct
and explicit instruction of target words (Calderón et al., 2005), explicit instruction of
contextual clue and word-part analysis (Taboada & Rutherford, 2011), multiple
exposures (NICHD, 2000), rich and meaningful texts (Carlo et al., 2004; NICHD, 2000),
metalinguistic knowledge (Nagy & Scott, 2000), metacognitive strategies (Hairrell et al.,
2011).

Last, the overall effects on word knowledge for children with low to intermediate
English proficiency level (effect sizes ranging from 8.19 to 14.05) were much more
substantial than for children with intermediate to advanced English proficiency level
(effect sizes ranging from 4.94 to 7.24). The finding suggested that children with lower
English proficiency benefited more from the current intervention than children with
higher English proficiency. It is noted that, despite of the larger effect sizes for children
with lower English proficiency, they still scored lower on all variables compared with
children with higher English proficiency. This finding is congruent with Baumann et al.’s
(2011) formative experiment with fifth-grade children from a general classroom, in which
children initially below average in vocabulary benefited from their program more than
children initially above average in vocabulary. In the present study the relatively lower
overall effect for children with higher English proficiency might be due to their high
scores for the two variables of morphologically-related words and words from context in the baseline phase. For instance, these children showed a ceiling effect for the variable of words from context, which affected the intervention effect for overall word knowledge. Another potential explanation can be that children with lower English proficiency received on average more intervention sessions than ELL children with higher English proficiency.

**Individual child’s performance**

The second category of results was from visual analyses and effect size calculations for individual child’s performance on the four elements of word knowledge (e.g., morphologically-related words, morphological transfer, words from context, and context transfer). The results revealed that ELL children in the current study benefited differently. The differences included the growth of their depth and breadth of word knowledge (measured by morphologically-related words and words from context), as well as their skills to transfer contextual analysis and morphological analysis. The differences were partially dependent on their individual backgrounds.

**Children with high English proficiency**

Akram from group A was a 4th grade student with an English Language Proficiency level of four. He was a fast and attentive learner. The performance of Akram in the intervention phase increased considerably on all four variables (morphologically-related words, morphological transfer, words from context, and context transfer). In the maintenance phase the increased performance stabilized and reached a ceiling effect for three variables (morphologically-related words, words from context, and context transfer); the performance for morphological transfer continued to increase in the
maintenance phase notwithstanding the intervention being withdrawn. Akram’s performance in the baseline phase was relatively low for morphologically-related words, morphological transfer, and context transfer, but very high for words from context. Once the intervention began, immediate intervention effect was observed for all four variables. Trends were stable for all variables in all phases. Evidently, Akram benefited greatly from the intervention, especially with regards to transferring morphological analysis and context analysis to untaught target words.

Zhang from group C was a 3rd grade student with an English language proficiency level of five that was identified in the middle of the intervention. He was an attentive and fast learner. His performance improved substantially on morphologically-related words, morphological transfer, and context transfer, which preserved well in the maintenance phase with a slight increase for all three variables. Mirroring Akram’s performance, Zhang’s performance in the baseline phase was relatively low for morphologically-related words, morphological transfer, and context transfer, but his score on words from context reached a ceiling effect. Due the ceiling effect, no intervention effect existed for Zhang’s words from context.

Wei from group C was a 5th grade student with an English proficiency level of five. He was attentive and quiet in the intervention. He also improved his performance significantly in the intervention phase for morphologically-related words, morphological transfer, and context transfer, and the effects continued in the maintenance phase for morphologically-related words and morphological transfer. A slight decrease was observed for context transfer, but the score was still notably higher than that in the baseline phase. His performance on context transfer significantly improved and reached a
ceiling effect in the baseline phase, which stabilized in the maintenance phase. His score on words from context reached a ceiling effect in the baseline phase and did not change throughout the intervention, echoing the performance of Akram and Zhang.

Findings for Akram, Zhang, and Wei are in line with vocabulary researchers’ suggestions that vocabulary intervention principles previously determined to be effective for young native speakers are also effective for English language learners (Carlo et al., 2004). In the current study, ELL with intermediate to advanced English proficiency levels benefited greatly in word consciousness (Nagy et al., 1993; Graves, 2006; Blachowicz & Fisher, 2014), in terms of the skills to transferring word learning strategies to untaught complicated words and the appreciation of nuances of the meanings of morphologically complex words. Additionally, English language learners at intermediate to advanced levels seemed to have a good command of words from context before the intervention began but much less with context transfer. Their high performance on word from context could be attributed to either their previous knowledge of these words, or their use of contextual analysis that was learned from previous instruction in the classroom. ELL children at higher English proficiency levels might have begun to develop the skills to use context or reference materials to understand reading materials (ELP Standards, 2014). Interestingly, the intervention in this study significantly enhanced these children’s skills to transferring contextual analysis to unknown words, suggesting the merit of systematic instruction of different contextual clues (Baumann et al., 2003) with English language learners. In the baseline phase, children’s morphological awareness was weaker than their performance on words from context. Even for the words that they could define the meanings, they could not break the “known” words into meaningful word parts. These
children’s morphological transferring skill was significantly improved due to the intervention instruction on word parts. With the knowledge of taught word parts (e.g., in-, -spect-, -ion), they improved their skills to break the words into smaller meaningful word parts and to guess the meaning of the words (e.g., inspection). At the end of the intervention, these children significantly improved their depth of knowledge for morphologically-complex words, which was measured by morphologically-related words.

*Children with low English proficiency*

Anna from group A was a 4th grade student with an English language proficiency level of three. Anna struggled with speaking, reading, and writing. Her performance in the baseline phase was very low for all four variables, especially for morphological transfer and context transfer, which demonstrated a floor effect. In the intervention phase, Anna’s performance on all four variables increased substantially. There were large immediate effects for morphologically-related words, words from context, and context transfer, in addition to a small immediate effect for morphological transfer. It is interesting that Anna’s performance on morphologically-related words and morphological transfer stabilized in the maintenance phase, but her performance on words from context and context transfer decreased slightly upon the withdrawal of intervention, which reflected her struggle with reading comprehension (i.e., level two for comprehension on English Language Development Assessment). Although the intervention in the present study focused on explicit instructions on word-learning strategies only, Anna might benefit greatly from guided practice focusing on reading skills designed to build fluency and comprehension. For instance, the Quick Reads
passages level three or two (Hiebert, 2005) can be used to provide explicit talk about the benefits of using context to understand the author’s message. With limited vocabulary knowledge and reading skills, the introduction to morphological transfer and context transfer can easily lead to cognitive overload for Anna (Sweller, 2010). Despite the slight decrease in the maintenance phase, her performance was still significantly better than that in the baseline phase. As a result, the effects for morphologically-related words and words from context were significantly greater than the effect for morphological transfer, and followed by context transfer.

Bow from group A was also a female student with an English Language Proficiency level of three. She was usually attentive to the instruction but occasionally talkative and bored. She was more attentive when the tasks were visually appealing. Her levels on reading, writing, and comprehension (beginning level) were slightly higher than Anna’s, but much lower than that of Akram, Wei, and Zhang. The reading passages were challenging to her and she gave it up a few times. It was probable that the 4th grade reading level was too challenging for her that she occasionally demonstrate avoidance behaviors. Overall, Bow’s performance significantly improved for morphologically-related words, morphological transfer, words from context, but less for context transfer. In the baseline phase, Bow’s scores were low for all four variables, which improved significantly in the intervention phase with a large immediate intervention effect for all four variables. The effects stabilized in the maintenance phase for morphologically-related words, morphological transfer, and words from context, but faded away to a certain degree for context transfer. Echoing the performance of Anna, the effects for morphologically-related words and words from context for Bow were significantly
greater than the effect for morphological transfer, and followed by context transfer. Although explicit talk was given about using the context clue as a possible learning tool for unknown words, the reading contexts in the independent practice sometimes seemed to have more than one unknown words for her to even use the strategy. She might benefit more for words from context and context transfer if the reading passages both for the instruction and the independent practice were at a lower level, which was more in line with her reading level.

Kevin in Group B was a 4th grade student with an overall English Language Proficiency level of three, and he was at the beginning level in reading, comprehension, and composite. He had been at this English Language Proficiency level for over a year. In the current study, he improved significantly his performance in the intervention phase on all four variables. The intervention effect was stabilized in the maintenance phase for morphologically-related words and words from context, but faded away slightly for morphological transfer and context transfer, echoing the effects for Bow and Anna. Interestingly, no immediate effect, but a delayed effect, was observed for all of these four variables for Kevin. This might be partially due to Kevin’s inattentiveness to the instruction, and heavy involvement in arguing with Randy, who was disruptive and talkative in some sessions in the process of the intervention. This disruptiveness disappeared when Randy withdrew from the intervention. Kevin was more attentive to the instruction by raising his hands a number of times to provide answers to instructional questions (e.g., identifying a signal word for a context clue).

Findings for Anna, Bow, and Kevin suggested that all three children benefited significantly for all variables, with much larger effect sizes for taught target words.
(morphologically-related words and words from context) than those for transferring strategies to untaught words (morphological transfer and context transfer). It might be still cognitively demanding for these children to generalize the strategies of context clue and word part analysis to untaught words upon the end of the intervention. Anna’s English proficiency level was the lowest among all participants. However, Anna’s Spanish background seemed to help her tremendously understand the concept of word parts, especially after she was explicitly instructed about English-Spanish cognates. Indeed, language researchers suggest that English-Spanish cognates can provide a powerful tool for Spanish-speaking students to learn English words (Lubliner & Grisham, 2012).

Three children withdrew from the study. Randy was a 4th grade male student with an English Language Proficiency level of 3. He withdrew at the end of the baseline phase. He struggled with reading comprehension; he also expressed his dislike for word learning, partially reflecting his low performance on word knowledge in the baseline phase. Ahmed was a 5th grade male student with an English Language Proficiency level of 4. He withdrew at the beginning of the intervention phase. His withdrawal might be because of either the disruptiveness caused by the other two participants. In group C, Ming was a 4th grade male student with an English Language Proficiency level of 3 and his performance on all four variables was very low in the baseline phase. His parent withdrew at the end of the baseline phase. For Randy and Ahmed, more basic level of word awareness probably was still needed before the introduction of morphological parts, for example, phonology awareness. Randy’s word use in his writing was characterized with missing constants and vowels.
Summary of word knowledge

Overall, the intervention was effective on the breadth and depth of word knowledge for all the ELL children who completed the intervention, which was consistent with children improved performance on post-test on experimental vocabulary knowledge, regardless of the number of intervention sessions they received. The findings are in line with the idea that work knowledge is not an all-or-nothing matter (Beck, McKeown, & Omanson, 1987; Dale, 1965; Nagy & Scott, 2000); instead, word learning is an incremental process from an initial state of incomplete knowledge of a word or phrase, with more exposures and strategic learning over time, to a more complete and refined one (Frishkoff, et al., 2011). These children had improved their knowledge of word meaning, word parts, grammatical behaviors, and word function in authentic context because of the intervention instruction. This effect is consistent with Nagy and Scott’s (2000) dimensions of word knowledge: incrementality, multidimensionality, interrelatedness, polysemy, and heterogeneity. Overall, these children’s significant improvement in their skills to transfer morphological analysis and context analysis to untaught complicated words suggested that it is beneficial to teach word-learning strategies in order to improve children’s “generative word knowledge” (Scott & Nagy, 2009, p.106) that allows them to transfer the strategy use to the independent learning of the vast amount of new words that are not covered in the classroom by teachers.

The effects on morphologically-related words and words from context were larger for ELL children with low to intermediate English proficiency level and those with intermediate to high English proficiency level. A potential explanation could be the ceiling effects on these two variables for ELL children with higher English proficiency
level. However, the effects on morphological transfer and context transfer were more prevalent for ELL children with intermediate to advanced English proficiency level, despite that most of these children received only four intervention sessions, when compared to the ten intervention sessions received by ELL children with low to intermediate English proficiency level. The high-level reading materials for ELL children with lower English proficiency might have caused the lower improvement in their skills to transferring morphological and context analysis. It is also possible that these ELL children need not only explicit instruction on generative and content-specific academic words, but also direct instruction for some Tier 1 words (e.g., window, marble) in the reading materials (Beck et al., 2002) and everyday expressions and idioms (e.g., break a leg) (August et al., 2005). To further examine the impact of the intervention in the present study for ELL children with different English proficiency levels, it is necessary to conduct future research with instructional materials that correspond to ELL children English proficiency level. Future endeavor should also note a unique challenge in conducting vocabulary intervention for ELL children, that is, the difficulty of selecting appropriate target words in correspond to ELL children’s depth and breadth of vocabulary knowledge (Oller, Pearson, & Cobo-Lewis, 2007). Currently it seems research with English monolinguals is the major source available for predicting the words that children should know or learn (Biemiller & Slonim, 2001; Kuperman, Stadthagen-Gonzalez, & Brysbaert, 2012).

**Reading comprehension**

To answer the second research question, whether the intervention would enhance ELL children’s reading comprehension, the reading comprehension scores of the reading
passages were analyzed. Results from visual analyses and effect size calculations suggested a functional relationship between the intervention instruction and ELL children’s increased performance on reading comprehension. Although the intervention in the study did not involve direct instruction on reading comprehension strategies, ELL children improved their reading comprehension as a result of the intervention instruction that focused on the two word learning strategies of morphological analysis and context analysis. The finding is congruent with the previous research findings that morphological awareness contributes to reading comprehension for ELL students (Goodwin & Ahn, 2010, 2013) and the use of context clues is significantly related to reading comprehension (Baumann & Kame’enui, 2004; Nagy & Scott, 2000). Given that the major goal of reading is to understand the meanings from reading text, the finding in the present study is meaningful for the development of instructions to improve reading comprehension for young ELL children. Specifically, the instruction of morphological analysis and contextual analysis can improve ELL children’s sublexical knowledge, meanings of academic vocabulary, and/or contextual awareness, which helps ELL children better comprehend reading text. The finding in the present study concurred with previous research with middle school ELL student (Lesaux, Kieffer, Kelley, & Harris, 2014) in that an intervention focusing on morphological awareness can enhance ELL students’ reading comprehension of expository texts. This study is also agreement with Carlo et al. (2004) intervention study, which revealed the feasibility for ELL children to improve their scores on reading comprehension by teaching word analysis and vocabulary learning strategies such as word parts and context clues. The current study shared with Carlo et al. (2004) the instruction principles of meaningful context, repeated exposure,
and multidimensionality of word knowledge. Findings from the current study also support the sustainability of vocabulary intervention effect on reading comprehension.

Moreover, all ELL children with intermediate and advanced English proficiency levels (Akram, Zhang, and Wei) demonstrated substantial benefits regarding reading comprehension with a consistent large effect size. ELL children with lower English proficiency levels (Bow and Kevin), however, displayed with smaller effect sizes in the intervention phase. Interestingly, Anna, with low English proficiency level (i.e., low reading comprehension), increased substantially in her comprehension of the reading passages as demonstrated by a large effect size. Although the effect size was small for the two ELL children (Bow and Kevin) with lower English proficiency level, especially in their low reading comprehension level, their reading comprehension continued to improve in the maintenance phase to a degree that a large delayed effect size was observed. It is promising to observe a correlational relationship between teaching word learning strategies and improved performance on reading comprehension for ELL children at all levels. ELL children’s reading comprehension might be directly influenced by their increased performance on word knowledge, and indirectly affected by their increased skills to use morphological analysis and contextual analysis taught in the intervention phase. Indeed, academic vocabulary knowledge is critical for ELL children’s reading comprehension within the context of K-12 classroom (Burgoyne, et al., 2009; DiCerbo, et al., 2014).

Wallace (2008) suggested that the lack of sufficient vocabulary knowledge is perhaps the biggest challenge for ELL children to comprehend academic content knowledge at appropriate grade levels or to read extensively beyond academic content
Well-accepted reading comprehension models also emphasize the role of word knowledge (e.g., the construction-integration model; Kintsch, 1988), and its direct influence on comprehension (e.g., Direct and Inferential Mediation Model of Reading Comprehension; Cromley & Azevedo, 2007). The findings of current study are also in line with some previous empirical studies. Proctor et al. (2005) found that word knowledge affected reading comprehension directly, but also indirectly through listening comprehension. Lesaux et al. (2014) conducted a randomized field trial to test an academic vocabulary intervention and they found a positive intervention effect on middle school ELL children’s reading comprehension in addition to vocabulary knowledge and morphological awareness. Morphological awareness was found to differentiate skilled readers from students with reading difficulties (Kieffer, 2013) and contribute uniquely to reading comprehension even after controlling for phonemic decoding, listening comprehension, reading vocabulary, word reading fluency, and passage reading fluency (Kieffer et al., 2012). Interestingly, Tomesen and Aarnoutse (1998) examined an intervention that combined morphemic and contextual analysis and found no effect on reading comprehension. Baumann et al. (2002) found that combined morphemic and contextual analysis instruction did not positively affect reading comprehension; another study carried out by Baumann and his colleagues (Baumann et al., 2003) found similarly results that instruction in morphological and contextual analysis alone did not impact children’s reading comprehension. The major factor to determine effect of word-learning strategy instruction on reading comprehension seems to be the principles of intervention, such as providing authentic rich and meaningful language context, fostering interest, explicitly teaching word meanings, and providing repeated exposure.
Self-regulated word learning

Cognitive strategies

The third research question asked whether the intervention would increase the cognitive strategy use for ELL children. The cognitive strategies in the current study were task-specific, (i.e., morphological analysis and contextual analysis). Results from visual analyses and effect size calculations suggest a positive intervention effect for advanced English proficiency level children. A negative intervention effect was observed for children with low to intermediate English proficiency level; however, as the intervention continued, positive effects emerged at the last few sessions in the intervention phase, and the positive trend continued and stabilized in the maintenance phase. The intervention effect was supported by effect size calculation and visual analyses of level, trend, variability, immediacy, and comparison across participants.

The results indicated that all of the ELL children in the study improved and stabilized their self-reported frequency of using the two taught word-learning strategies at the end of the intervention. This finding is confirmed by their improved performance on transferring these two strategies to understand untaught words as well as by their own narration of using these strategies to understand unknown words in reading contexts beyond the intervention sessions captured in the anecdotal notes.

Interestingly, a slight negative immediate intervention effect was observed for three children with low to intermediate English proficiency levels (Anna, Bow, and Kevin) and a slight positive immediate effect was present for the other three children (Akram, Wei, and Zhang) with intermediate to advanced English proficiency levels. It seems that, for children with low to intermediate English proficiency levels (Anna, Bow,
and Kevin), the perception of the frequency to use strategies took a number of cumulative relevant behaviors to stabilize. It also seems that these children took longer to learn and master the skills, which was consistent with their actual performance on morphological transfer and contextual transfer. A positive trend did not immediately appear when intervention was introduced.

**Metacognitive strategies**

The fourth research question was whether the intervention would improve the metacognitive strategy use by ELL children. The study focused on teaching ELL children two types of metacognitive strategies: goal-setting (Lock & Lathan, 1990) and self-monitoring (Zimmerman, 2000). To answer the question, scores from two items were averaged to measure children’s reported frequency of using metacognitive strategies for word learning. These two items were in the self-regulated word learning measure. Results from visual analyses and effect size calculations indicated a positive intervention effect for three children (Akram, Anna, and Zhang), and the effect stabilized for Akram and Zhang in the maintenance phase, but not for Anna, whose increased score decreased in the maintenance phase. Negative intervention effect was observed for Bow and Kevin, but the negative effect disappeared and positive effect was observed in the later sessions in the intervention phase, and the increased effect continued to be present in the maintenance phase. One student, Wei, reported high score on metacognitive strategies that reached ceiling throughout the intervention. Overall, the intervention was effective in improving and sustaining the metacognitive strategy use for most ELL children, despite of the lagging effect.
The results suggest that vocabulary instruction with the incorporation of metacognitive strategies led to significant enhancement in word knowledge and metacognitive strategy use for ELL children with no learning difficulties, congruent with previous work on vocabulary intervention with ELL children with learning difficulties (Kim & Linan-Thompson, 2013) over the effectiveness of including goal-setting and self-monitoring. The findings were also consistent with the results from Lubliner and Smetana’s (2005) metacognitive vocabulary intervention for fifth-grade general classroom children, regarding significant gains in vocabulary knowledge, reading comprehension, and metacognitive skills. The results also provide evidence for the effectiveness of vocabulary intervention embedded in authentic rich language context in combination with the teaching of metacognitive strategies as well as tasks-specific cognitive strategies. The effectiveness of the current intervention study was manifested in the improved performance of ELL children’s word knowledge, reading comprehension, use of cognitive strategies, and use of metacognitive strategies. Previous research has shown the superiority of combining cognitive strategies and metacognitive strategies over either cognitive strategies or regular instruction alone (e.g., Mason 2004; Jitendra, Hoppes, & Xin, 2000; Schunk & Rice, 1989; Souvignier & Mokhlesgerami, 2006; Stoeger et al., 2014). The uniqueness for current study is the presence of lagging effect for metacognitive strategies as well as cognitive strategies. It took several intervention sessions for children to learn and master the skills of morphological and contextual analysis as well as setting goals and monitoring their learning.
Motivational beliefs

The last research question was whether the intervention enhanced ELL children’s motivational beliefs for learning vocabulary. The two categories for motivational beliefs were task values and self-efficacy. Results for visual analyses and effect size calculations revealed intervention effect for children (Akram, Wei, and Zhang) who had relatively higher English proficiency level, which stabilized in the maintenance phase. Immediate intervention effect was also observed for Akram and Wei, but not for Zhang. Zhang shared his mastery performance compared to his classmates on vocabulary knowledge in the anecdotal notes.

No intervention effect was observed for the children who had low to intermediate English proficiency level. Despite of the no intervention effect, it is encouraging that these three children reported high motivational beliefs in all phases. Interestingly, the children who withdrew early on in the intervention demonstrated significantly lower motivational beliefs in the baseline phase compared with the six children who completed the intervention. It is likely that a motivational baseline, instead of an English proficiency level, is necessary for children to receive the intervention.

Further examination was administrated for individual child’s report on his or her self-efficacy and task values. For Akram, Zhang, and Wei, a positive immediate effect for task values was present once the intervention phase began, but a lagging effect for self-efficacy was observed. The lagging effect was found for Kevin and Bow on both task values and self-efficacy. Immediate effect existed for Anna for task values only, and her self-efficacy was high throughout the intervention phases. The findings in general can be explained by theories of self-efficacy and task values. Self-efficacy beliefs, or people’s
judgments of their capabilities to organize and execute the courses of academic action required to accomplished academic tasks (Bandura, 1986), take time to change. Self-efficacy beliefs can be changed depending on the particular tasks and individual’s prior experiences and backgrounds on the target tasks (Bandura, 1997). For self-efficacy beliefs to develop, four major resources include mastery experience, vicarious experience, verbal persuasions, and physiological states (Bandura, 1986, 1997). The cumulated experience of setting specific goals and monitoring academic performance could help the development of children’s self-efficacy beliefs (Schunk, Meece, & Pintrich, 2014).

The children who withdrew early on in the intervention phase reported substantially lower task values and self-efficacy for word learning compared to the reported scores by the six children who persisted through the intervention phases. This finding resonates with the theoretical underpinning for self-efficacy that, in the context of academic learning, students with a strong feeling of self-efficacy are more likely to undertake challenging tasks and persist in the face of adversity (Bandura, 1986; Liem, Lau, & Nie, 2008). On the contrary, students with less sense of self-efficacy tend to avoid challenging academic tasks. Similarly, children with higher task values or perceiving the task as important or interesting tend to use more self-regulatory strategies to obtain designated outcome (Bong, 2001); children with lower interests or values in a task are less likely to form the intention to learn or to implement strategic knowledge to achieve a certain goal (Garcia, et al., 1998).
Limitation

Although the study was designed to maximize internal and external validity of the intervention, there are a number of limitations to be considered in the interpretation of the results. The purpose of this study was to examine the effectiveness of self-regulated vocabulary-learning intervention on word knowledge, reading comprehension, and self-regulated word learning for ELLs. This study included a small sample (9 students) with a range of English proficiency levels (i.e., 3, 4, or 5) and typical learning ability. It is unknown whether ELLs with learning disabilities will benefit more or less from this intervention regarding word knowledge, reading comprehension, and self-regulated word learning, given that learners with disabilities might have different cognitive and metacognitive skills (Bishop, & Snowling, 2004).

Caution should also be given to the generalizability of this study until replicated studies are conducted with larger samples or with varied groups of ELLs. ELLs vary greatly with respect to socioeconomic status (Suárez-Orozco & Suárez-Orozco, 2009), first language (Ruiz Soto, et al., 2015), previous schooling experience (August & Hakuta, 1997; Rolstad et al., 2005), and parental involvement (Clair, Jackson, & Zweiback, 2012). For instance, to compare the effectiveness of intervention across diverse groups, stratification is necessary with a larger sample size and with groups of high-achieving, average-achieving, low-achieving, and with special need (see Kim et al., 2013).

In the current study, self-regulated word learning intervention was a treatment package with vocabulary strategies of morphological analysis and contextual analysis, as well as self-regulated intervention of planning and monitoring, with the instructional methods of modeling and positive feedback. It was impossible to differentiate the effect
of individual strategy or method on the intervention result. Future interventions focusing on the effect of one or two factors can be administered controlling other factors in experimental designs.

One limitation to be concerned was the ceiling effects in the baseline phase for the variable of words from context among children with high English proficiency level, and for the variables of metacognitive strategies, self-efficacy among some other children. The ceiling effects can lead to the underestimation of intervention effects. In fact, the intervention effects for children with high English proficiency, despite significant, was smaller than the effects for children with low English proficiency on the variable of word knowledge. Moreover, floor effect was observed for the variable of words from context and context transfer for some children with low English proficiency level in both baseline and intervention phase, indicating the intervention might be to difficulty for these children. The floor effect can lead to misjudgment of the variability and intervention effect of the instruction.

Another limitation concerns the limited number of baseline data points. The current study applied two criteria to determine stability establishment in the baseline phase using children’s word knowledge performance, one being the lack of a clear trend of improvement and the other being the variability of word knowledge within a range of 30% (3 points with the maximum score being 10 points) (Byiers et al., 2012; Hayes et al., 1999). Both criteria were met. Word knowledge for all children in the baseline phase, especially for those children from group A (Akram, Bow, and Anna), revealed either a stable trend or a slightly negative trend; the variability also met the criterion, with standard deviation ranging from .51 to .75 for children in group A. However, it seemed to
take longer for the variables that measured self-regulated word learning to stabilize. For instance, almost all children showed a negative trend in the baseline phase for the variables measuring self-regulated word learning, which is acceptable because the negative trend was not in the desirable direction. However, the negative trend continued for most children for the first one or two sessions in the intervention phases. It is not known whether children’s performance on these variables reached stability in the baseline phase. This issue might be solved by extending the number of baseline sessions from three to five or six, or until stable baseline was obtained for the four variables for self-regulated word learning. However, given the constraints of the academic semester and the fact that intervention instruction in the baseline phase included only direct instruction for target words, waiting for the baselines to stabilize for children’s reported scores on self-regulated word learning might introduce threats to internal validity by introducing differential attribution. For instance, weariness for children in all three groups was more likely to happen by extending baseline phase and cutting the number of intervention sessions. In fact, children from group B had expressed weariness when the baseline phase continued into fifth and sixth sessions, which might have led to the withdrawal of two children. Ming from group C withdrew after participating nine sessions in the baseline phase.

**Conclusion and implication**

Taken together, the findings of the current study clearly demonstrate the promise of teaching task-specific cognitive strategies and metacognitive strategies to improve upper elementary ELL children’s word knowledge, reading comprehension, and self-regulated word learning. All students in this study significantly improved their
performance on word knowledge, reading comprehension, and self-regulated word
learning, although there was a lagging effect for ELL children with low English
proficiency level. This study indicates the feasibility of helping ELL children become
mastery independent and proactive academic vocabulary learners, by teaching task-
specific cognitive and metacognitive word learning strategies, in combination with well-
received principles of vocabulary instruction. The findings also contribute to the small
body of evidence supporting the importance of self-regulated learning for vocabulary
learning and reading comprehension among ELL children with a variety of English
proficiency levels. Interestingly, a motivational threshold seemed to be present for such
intervention to be successful. ELL children in the present study with a lower motivational
threshold withdrew from the intervention regardless of their English proficiency level.

The findings have several implications for understanding the vocabulary learning
as well as the vocabulary instruction for ELL children. Given the sizable gap in English
vocabulary between ELL children and English-only students, vocabulary instruction for
ELL children should provide direct instruction for some general and content-specific
academic vocabulary, if possible, in combination with effective word learning strategies.
Vocabulary instruction should be guided by the understanding of the complexity of
vocabulary knowledge, the development of word awareness, the provision of rich and
engaging language context, and the importance of metacognitive and motivational
factors.

The findings from the study also inform future research. This study applied a
sing-subject experimental design with a relatively small group of participants. Moving
forward, there is a need to design between-group experiment with random assignment
with a larger sample by testing the intervention effectiveness at the group level and the potential interaction between the intervention and ELL children’s characteristics (e.g., English proficiency level, first language background, or initial motivational beliefs). This type of experiment complements the single-subject experimental design well. Multiple intervention conditions, with cognitive strategies and metacognitive strategies alone or in combination, might also be conducted to examine the effectiveness of vocabulary instruction. This type of design allows researchers to disentangle the specific effect of one component on vocabulary knowledge and reading comprehension.


Sternberg, R. J. (1987). Most vocabulary is learned from context. In M. G. McKeown & M. E. Curtis (Eds.), The nature of vocabulary acquisition (pp. 89-106). Hillsdale, NJ: Erlbaum


Appendix A: Family Recruitment Letter

Dear families,

I am a doctoral student researcher in the department of Teaching, Learning, and Teacher Education at the University of Nebraska-Lincoln. I will be working with readers from your son or daughter’s class. Your child has been recommended by the teacher to take part in this instruction.

The purpose of this instruction is to teach useful self-regulated word-learning strategies to young English learners so that they will be able to use these strategies to learn new words whenever and wherever they see new words in future learning. I will look at the effect of the instruction by using both student response on self-regulated learning skills measure as well as independent practice on word knowledge and reading comprehension.

Your voluntary response to this request constitutes your informed consent to your child’s participation in this instruction. Your child will be also asked if he or she would like to participate. Your child is not required to participate. If you and your child decide not to participate, you may withdraw at any time point and your decision will not affect your or your child’s current and future relationship with the elementary school or the University of Nebraska-Lincoln.

If you would like your child to participate in this activity, please sign and return the attached form, “Parent/Guardian Consent Form”. Please contact me for any information or further questions by calling (402) 560-3264 or through email qizhen.deng@huskers.unl.edu.

Sincerely,

Qizhen Deng
Ph.D. Candidate
64 Henzlik Hall
University of Nebraska-Lincoln
qizhen.deng@huskers.unl.edu
Appendix B: Parent/Guardian Consent Form

Project Name: Improving Independent Word-learning skills for English Learners: The Effective of Self-regulated Word Learning Instruction

Research Purpose: The purpose of this study is to examine the effectiveness of a word-learning intervention that is based on both “self-regulated learning” theory and “vocabulary acquisition” theory. This instruction will teach your child useful word-learning strategies (e.g., word-part clues, context clue analysis), as well as self-regulated learning strategies (e.g., planning and monitoring) in order to improve their independent word learning skills and motivation. This intervention is based on seven key principles that have long been proven highly effective with both typical mainstream students and English learners with learning disabilities.

This study was among the first to bridge the self-regulated learning theory from educational psychology community and the vocabulary acquisition principles in literacy community in an attempt to investigate the impact of self-regulated word learning instruction with typical English learners at upper elementary level. Students with English proficiency level 3 or above are mostly likely to benefit from the intervention because they will be able to understand the instruction and they have an emergent awareness of word structure and reading context. It is hypothesized that this instruction will improve your child’s word learning skills, academic word knowledge, motivation, and reading comprehension. The uniqueness of the study is that your child will learn word-learning skills that they can use whenever or wherever they see new words.

Procedure: Each English learner will work with the instructor for 3 or 4 sessions a week, about 30 minutes per session, and a total of about 18 to 20 sessions (5 to 6 weeks). Each session will include three parts: (1) self-regulated word-learning skills measure (3 to 4 minutes), (2) word learning strategies instruction (22 to 24 minutes), and (3) independent practice of words knowledge and reading comprehension (3 to 4 minutes).

Risk: There are no known risks associated to your child’s participation in this study.

Benefits: The precise benefits cannot be guaranteed, but if benefits exist they may include an increased word knowledge and reading comprehension, improved motivation in word learning, as well as improved skills in using word-learning strategies. These skills will allow your child to continue to learn new words independently across subject content areas both in and out of school. Your child might learn word-learning skills that they can use whenever or wherever they encounter new words.

Confidentiality: All information obtained from this study will be kept strictly confidential. Your true name will only be available to the principle investigator (Qizhen Deng) and the second investigator (Dr. Guy Trainin). Your child’s name will be assigned a pseudonym. Files with your child’s name will be maintained ONLY for the purpose of a master copy, and will be stored and locked in a cabinet in the office of the principal investigator, Room Henzlik 41, at the University of Nebraska-Lincoln. Any following
data analysis or report will NOT include identifiable information. Data might be presented at scientific conferences or published in scientific journals.

**Opportunity to Ask Questions:**
You have the right to ask questions and have those answered before and at any point during the study. Please contact Qizhen Deng at (402) 560-3254, qizhen.deng@huskers.unl.edu, or Dr. Guy Trainin at (402) 472-3391, gtrainin2@unl.edu. If you have questions about your rights in research studies, please contact UNL Institutional Review Board at (402) 472-6965.

**Freedom to Withdraw:**
You may decide not participate in this study. Even if you agree to participate, you may withdraw at any time. Either way, there will be no penalty for you from your school or the University of Nebraska-Lincoln.

**Parental/Guardian Rights and Assurances**
I have received a copy of the Consent Letter for the aforementioned research project approved by University of Nebraska-Lincoln. Having read the application I am familiar with the purpose, methods, scope, and intent of the research project.

Please check one of the following:

_____I give consent for my child to participate in the research project.

_____I DO NOT give consent for my child to participate in the research project.

I understand that during the course of this project my child’s responses will be kept strictly confidential and that none of the data released in this study will identify me or my child by name or any other identifiable data, descriptions, or characterizations. Furthermore, I understand that I and my child may discontinue my participation in this project at any time or refuse to respond to any questions.

**Consent, Right to Receive a Copy:**
Be signing, you are agreeing that you understand this information and that you agree to be part of the study. You will receive a copy of this form to keep.

Your child’s name: ____________________________

Signature of Parent/Guardian: ___________________ Date:_____________

**Information about researchers:**
Qizhen Deng, PhD Candidate Researcher
Office: (402) 560-3264
qizhen.deng@huskers.unl.edu

Guy Trainin, Associate professor, researcher
Office: (402) 472-3391
gtrainin2@unl.edu
### Appendix C: Fidelity Checklist

**Procedural Checklist for Baseline/Maintenance Sessions**

Session No.: ____________________ Date:___________________

<table>
<thead>
<tr>
<th>Baseline/Maintenance Sessions: Steps and Elements</th>
<th>Met or Not Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students complete Self-regulated Word Learning Measure. Researcher read all questions to students.</td>
<td>YES____ NO_____ YES____ NO_____</td>
</tr>
<tr>
<td>Introduction.</td>
<td>YES____ NO_____</td>
</tr>
<tr>
<td>Independent Practice.</td>
<td>YES____ NO_____</td>
</tr>
<tr>
<td>Reading Fluency.</td>
<td>YES____ NO_____</td>
</tr>
<tr>
<td>Target Words Direct Instruction.</td>
<td>YES____ NO_____</td>
</tr>
<tr>
<td>Review and Feedback.</td>
<td>YES____ NO_____</td>
</tr>
</tbody>
</table>

**Procedural Checklist for Intervention Sessions**

Session No.: ____________________ Date:___________________

<table>
<thead>
<tr>
<th>Intervention Sessions: Steps and Elements</th>
<th>Met or Not Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students complete Self-regulated Word Learning Measure. Researcher read all questions to students.</td>
<td>YES____ NO_____ YES____ NO_____</td>
</tr>
<tr>
<td>Introduction.</td>
<td>YES____ NO_____</td>
</tr>
<tr>
<td>Self-goal setting.</td>
<td>YES____ NO_____</td>
</tr>
<tr>
<td>Word-learning strategies (word-part and context clues).</td>
<td>YES____ NO_____</td>
</tr>
<tr>
<td>Independent practice.</td>
<td>YES____ NO_____</td>
</tr>
<tr>
<td>Self-monitoring.</td>
<td>YES____ NO_____</td>
</tr>
<tr>
<td>Review and Feedback.</td>
<td>YES____ NO_____</td>
</tr>
</tbody>
</table>
### Appendix D: Target Words

A Sample List of Target Words for the topic of *Immigration to America*

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Title of reading text</th>
<th>Target words for word-part clues (Grade level)</th>
<th>Target words for context clue (Grade level)</th>
<th>Transfer Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A Land of Immigrants</td>
<td>immigrate (6)</td>
<td>native (4)</td>
<td>import (MA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>emigrate</td>
<td>country (4)</td>
<td>emigration (MA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>immigration</td>
<td>immigrant (6)</td>
<td>boycott (CA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(type: definition)</td>
<td>propaganda (CA)</td>
</tr>
<tr>
<td>2</td>
<td>A Land of Opportunities</td>
<td>belief (6)</td>
<td>opportunity*</td>
<td>dissect (MA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>disbelieve</td>
<td>practice*</td>
<td>unemployable (MA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>unbelievable</td>
<td>slave (5)</td>
<td>culture (CA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(type: example)</td>
<td>agriculture (CA)</td>
</tr>
<tr>
<td>3</td>
<td>Getting to America</td>
<td>especially (4)</td>
<td>voyage (5)</td>
<td>newness (MA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>special</td>
<td>difficult (3)</td>
<td>superspecial (MA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>especialness</td>
<td>crowded (3)</td>
<td>accelerate (CA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(type: synonym or antonym)</td>
<td>ameliorate (CA)</td>
</tr>
<tr>
<td>4</td>
<td>Ellis and Angel Islands</td>
<td>inspection (5)</td>
<td>greet (4)</td>
<td>innovation (MA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>inspect</td>
<td>serious (3)</td>
<td>spectator (MA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>inspective</td>
<td>background (4)</td>
<td>ethnicity (CA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(type: definition and example)</td>
<td>emperor (CA)</td>
</tr>
<tr>
<td>5</td>
<td>Becoming an American Citizen</td>
<td>require (5)</td>
<td>citizen (5)</td>
<td>preschool (MA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>requirement</td>
<td>history (3)</td>
<td>requireable (MA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prerequisite</td>
<td>law (4)</td>
<td>civilization (CA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(type: general)</td>
<td>science (CA)</td>
</tr>
</tbody>
</table>

*Note. All words are around 4th grade level (Marzano & Marzano, 1988; Marzano, 2004).*

*Words not identified by grade level. MA: morphological analysis; CA: contextual analysis.*
Appendix E: Sample Lesson Plan

Lesson Plan for Intervention Phase (Lesson one)

Lesson Objectives
1. Lesson Topic: Immigration to America
2. Lesson Passage (Hiebert, 2005, Level D, Book 2): A land of Immigration
3. Target words taught during instruction: morphemic (*immigrate, emigrate, immigration*) and context (*native, country, immigrant*)
4. Target words not taught but measured: morphemic (*migrator, emigration*) and context (*boycott, propaganda*)
5. Context clue type taught: definition
6. Word parts taught: im-, e-, migr-, -ate, -ion.
7. Materials: (1) Types of Helpful Context Clues Chart; (2) Word-Part Clue Chart; (3) Learning Journal worksheet; (4) Reading Passage; and (5) Independent Practice worksheet.

Introduction
1. Inform students that today we will be learning one new context-clue strategy and one new word-part clue analysis family as well as self-regulated learning skills of setting goals and monitoring learning.

Word-learning Strategies
1. Context Clue Strategy (10 minutes)
   a. Explicit Instruction and Modeling
      i. Present *Types of Helpful Context Clues Chart* and give student a copy. Tell student that he or she can sometimes use context clues to figure out the meanings of some unfamiliar words during reading. Remind her or him context clues can be words, phrases, and sentences around an unfamiliar word that might give clues about the word. Caution student context clues can sometimes be misleading. Point to the first type of context clue, *definition*, as I tell student it is the context clue strategy we are going to learn today. Read the definition to students. Explain the signal words.
      ii. Model the use of definition context clues by reading a sentence that include the target word *native* with the sample sentence “The first or original people who lived in North America before the arrival of white settlers are called Native Americans”. The modeling process includes 5 think-aloud steps: (1) identify and underline the difficulty word in red as I say “I am going look for context clues to help me understand this word”; (2) identify and underline any signal words or punctuation in blue (e.g., is, are, means, refer to, is defined as); (3) identify and underline the definition context clues in green; (4) guess the meaning of the word; (5) use a dictionary if necessary.
   b. Guided practice
      i. Ask students to follow the modeling procedure and think aloud as they are engaged in the process. Point to the passage and the sentence “Immigrants are people who leave their home country to
live in a new country”. Say: Let’s figure out the meaning of the word “immigrant”, what types of context clue might we look for? Confirm it is definition type of context clue. Say: Can you tell me what is the signal word in the sentence? Confirm it is the word “are” as I underline the signal word in blue. Say: What is the definition context clue? Confirm and underline it in green. Say: Let’s guess the meaning of the word “immigrant”. Confirm its meaning.

ii. Similar procedure will be administered for another target word “country” with the sample sentence “An area of land that is controlled by its own government is called a country”. The sample sentence is printed on a worksheet.

**Word-part Clue Strategy (10 minutes)**

1. Explicit Instruction and Modeling
   a. Explain to students that they can sometimes use word-part clues to figure out the meanings of new words. Present the Word-Part Clues Chart and inform students that we are going to learn a new word root, prefixes and suffixes. Tell students that roots are word parts that come from the Greek and Latin language. A root word can stand alone as a word in English, such as **differ**, **migrate**, and can be part of a word. A root is not a word in English, but only a part of a word, such as **tele** in the word **telephone** or **migr** in the word **migrate**. I will introduce the concept of word family/word tree by presenting a picture with words sharing the same root, **migr**-

   b. The modeling of the use of word-part clues includes (1) point to and underline the word **immigrated** from the passage in the sentence “Children whose families have lived in the United States for hundreds of years may not have heard about their family members who immigrated”, and print the word **immigrate** on a small white board and read it aloud; (2) Ask students if they know what it is, confirm and provide the definition of the word: to come to a country of which one is not a native; (3) Say that “I am going to try to break the word down into smaller meaningful parts and explain that the word is made up of three word parts: **im** + **migr** +**ate**, while presenting a card with the mathematical equation and read it aloud **im + migr +ate=immigrate**; (4) Explain the prefix of Latin origin **im**- means “in or into”, Latin root **migr**- means “to move from one place to another”. The suffix of **-ate** is a verbal suffix. Remind students that a suffix is a word part added to the end of a root word that changes the meaning; (5) Put the meanings of the word parts together to get the meaning of the whole word. The word **immigrate** literally means “to move into another place”; (6) I will ask and explain “can you tell me how this literal meaning of the word **immigrate** relates to its real-life meaning?

2. Guided Practice
   a. The guided practice includes (1) Present a card with these words as a family **immigrant, immigrate, immigration, immigrated, emigrate, emigration, emigrated**, and **migrate**, and tell students that they are going to
use the word-part clue strategy to help them learn the meaning of the word “immigration”; (2) Point to the sentence in the passage “Many countries have immigration restriction that allows a person entering the country with a valid visa”, and underline the word “immigration”; (3) Say that “I am going to try to break it down into smaller meaningful parts to understand it”. Ask: Can you break down the words into smaller part? Can anyone tell me the root word, the prefix and suffix? What what is the meaning of the word root? Student should know the word begins with im- and ends with -ed, inbetween migrate; (4) Confirm students know the prefix im- means “into”, migrate means “to move from one country into another”, and -ion means “state or condition”. The word immigration means the state of immigrating; (5) ask “Can anyone tell me the meanings of the word parts after you combine the word parts?” Students guess the meaning and put the meaning in the sentence and see if it makes sense; (6) Write the word migrate on board, and ask students to think of other words sharing the root.

b. Same procedure will be administered for the target word “emigrate”.

**Self-goal setting**
1. Inform students to set specific learning goals.
2. Distribute a learning journal (Appendix G). Encourage students to set challenging but achievable goals.
3. This journal requires students to decide the number of words they want to learn during the session, the word-learning strategies they want to apply, and the comprehension they want to accomplish for the passage topic.

**Independent practice**
1. Distribute the reading passage and the independent practice worksheet.
2. Inform students to independently read the text passage and answer the questions about the reading on the worksheet (Appendix I). The worksheet includes two parts: (1) word knowledge and (2) reading comprehension.

**Self-monitoring**
1. Inform students the importance of self-evaluation of their learning process.
2. Distribute the self-monitoring worksheet (Appendix G). This worksheet asks students to (1) highlight the words they learned; (2) count the number of words they learned and circle the corresponding number of words; (3) monitor what strategies they used; (4) monitor what they learned about the passage.

**Review and Feedback**
1. Provide positive and corrective feedback.
Appendix F: Self-regulated Word Learning Measure

Administration

Begin by telling children that I wished to find out how they learn new words. I emphasized this was not a test and there were no right or wrong answers. “I am going to ask you some questions about new words that you just read. This is not a test and there are no right or wrong answers, so there is not anything you need to worry about. No one in your class or in your family will know how you answer any of these questions. Your answer will only help me understand what you think about and what you do to learn words. Try to answer the questions as honestly as you can”.

Distribute the form. While pointing to each Garfield, I asked, “You see these four Garfields? Look to the first Garfields. How is the first Garfield feeling? Correct. He has a huge smile on his face. He is very happy. Look at the second Garfields. How is the second Garfield feeling? Right. He is a little happy. How is the third Garfield feel? Yes. He looks a little upset. How is the fourth Garfield feel? Correct, He is very upset.”

Read the questions. “I am going to ask you some questions about words you just read. Think about each question, circle the answer that is closest to your own thoughts. Remember, answer the questions the way YOU feel, NOT how you think Garfield would feel.” I read each question aloud. If necessary, read the question again.

1. When you are reading in school, how often do you break a new word down into smaller word parts to understand it?

   All the time  A lot of times  A few times  Never

2. When you reading in school, how often do you look the words or sentences around a new word to understand it?

   All the time  A lot of times  A few times  Never

3. When you are reading in school, how often do you plan and set goals for word learning before you read?

   All the time  A lot of times  A few times  Never
4. When you are reading in school, how often do you look back and see if you meet your plan or goal of word learning?

- All the time
- A lot of times
- A few times
- Never

5. I think word-learning strategies are useful.

6. I like learning new words.

7. I will be able to use word-learning strategies in all classes (e.g., math).

8. I can learn a lot of new words.

9. I can learn many more words than my classmates.

10. I can use very useful strategies to learn new words.
Appendix G: Word Learning Journal

Name_____________      Date____________

Before Reading – Setting Goals

Goal 1: How many words do you plan to learn today? (Circle the number)

More than 6 words ★★★★★★★★
6 words ★★★★★★★
5 words ★★★★★★
4 words ★★★★★
3 words ★★★★
2 words ★★★
1 word ★★
0 word No star

Goal 2: How do you plan to learn these words?

Use many strategies ★★★
Use 2 strategies ★★
Use 1 strategy ★
Use 0 strategy

Goal 3: How much do you want to learn about the topic?

Main idea and many details. ★★★★★★
Main idea and 2 details. ★★★★
Main idea and 1 detail. ★★
Main idea. ★
Nothing.
After Reading—Self-monitoring

How many words did you learn today? Highlight and count the words you learned today.

<table>
<thead>
<tr>
<th>More than 6 words</th>
<th>★★★★★★★★</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 words</td>
<td>★★★★★★★★</td>
</tr>
<tr>
<td>5 words</td>
<td>★★★★★★★★</td>
</tr>
<tr>
<td>4 words</td>
<td>★★★★★★★★</td>
</tr>
<tr>
<td>3 words</td>
<td>★★★★★★★★</td>
</tr>
<tr>
<td>2 words</td>
<td>★★★★★★★★</td>
</tr>
<tr>
<td>1 word</td>
<td>★★★★★★★★</td>
</tr>
<tr>
<td>0 word</td>
<td>★★★★★★★★</td>
</tr>
</tbody>
</table>

| immigrate | ★★★★★★★★ |
| emigrate  | ★★★★★★★★ |
| immigration|★★★★★★★★ |
| native    | ★★★★★★★★ |
| country   | ★★★★★★★★ |
| immigrant | ★★★★★★★★ |

What strategies did you use to learn words?

- Word-part, context clue, and other strategies
- Word-part & context clues
- Word-part clue
- Context clue
- No strategy

How much did you learn about today’s topic?

- Main idea and many details.
- Main idea and 2 details.
- Main idea and 1 detail.
- Main idea only.
- Nothing.
Appendix H: Strategies Charts

Vocabulary Rule Chart

To figure out the meaning of an unfamiliar word when you read,
1. **Look for Context Clues.** Read the words, phrases, and sentences around the new word to see if there are clues to its meaning.
2. **Look for Word-part Clues.** Try to break down the new word down into smaller meaningful parts: word root, prefix, and suffix. Put the meanings of the word parts together, and guess the meaning of the whole word.
3. **Guess** the meaning of the word;
4. **Put the meaning in the original sentence.** Check whether it makes sense in the reading.
5. **Use a Dictionary.** If necessary, use a dictionary to confirm the meaning.

Word-part clues Chart

1. Look for the **ROOT WORD**, which is a single word that cannot be broken down into smaller words or word parts. See if you know what the root word means.
2. Look for a **PREFIX**, which is a word part added to the beginning of a word or word root. The prefix changes the meaning of the word or word root. See if you know what the prefix means.
3. Look for a **SUFFIX**, which is a word part added to the end of a word or word root. The suffix changes the meaning of the word or word root. See if you know what the suffix means.
4. Put the meanings of the **ROOT WORD** and any **PREFIX** or **SUFFIX** together. See if you can build the meaning of the word.

Types of Helpful Context Clues Chart

1. **Definition.** The author gives a direct definition of a word in the sentence (signal words: is, are, include, means, etc).
2. **Synonym.** The author uses another word or sentence that has similar meaning to the word you want to understand.
3. **Antonym.** The author uses another word or sentence that means about the opposite of the word you want to understand.
4. **Example.** The author gives you several words or ideas that are examples of a new word.
5. **General.** The author gives you general clues to the meanings of a word, often spread over several sentences.
Appendix I: Independent Practice Sample

1. The main idea of “A Land of Immigrants” is that __________
   a. everyone who lives in any country is an immigrant.
   b. all children in the United States are immigrants.
   c. people come to the United States to be immigrants.
   d. someone in most families in the United States was an immigrant.

2. What is an immigrant? What else did you learn from the reading?
   ___________________________________________________________________
   ___________________________________________________________________

3. Circle either “yes” or “no”. If you circle “yes”, continue to the rest of the questions. If you circle “no”, go on to the next word.

   immigrate

   Have you ever seen or heard this word before?
   o NO---go the next word
   o YES---please answer the following questions

   How well do you know this word?
   o I’ve heard it, but I’m not sure what it means.
   o I think I know what it means.

   I think the word may have something to do with:
   o move away
   o live
   o country
   o noise

   I think this word may be a:
   o Verb
   o Noun
   o Adjective
   o Adverb

   I think this word means: __________________________________________________

   immigration

   Have you ever seen or heard this word before?
   o NO---go the next word
   o YES---please answer the following questions

   How well do you know this word?
I’ve heard it, but I’m not sure what it means.
I think I know what it means.

I think the word may have something to do with:
- move
- live
- noise
- long time

I think this word may be:
- A verb
- A noun
- An adjective
- An adverb

I think this word means: ________________________________

**emigrate**

Have you ever seen or heard this word before?
- NO---go the next word
- YES---please answer the following questions

How well do you know this word?
- I’ve heard it, but I’m not sure what it means.
- I think I know what it means.

I think the word may have something to do with:
- leave
- live
- new country
- noise

I think this word may be:
- A verb
- A noun
- An adjective
- An adverb

I think this word means: __________________________________

4. Break the words down into smaller parts and guess its meaning
   (for example: **dislike** = dis + like ; it might mean **do not like**):
   **import** = __________________________ It might mean________________________
emigration = __________________ It might mean __________________

5. The sentences have definition context clues. Use them to figure out which words fits in each blank.

<table>
<thead>
<tr>
<th>a. immigrant</th>
<th>b. native</th>
<th>c. migration</th>
<th>d. country</th>
<th>e. climate</th>
</tr>
</thead>
</table>

1) The first or original people who lived in North America before the arrival of white settlers are called ____ Americans.
2) An area of land that is controlled by its own government is called a ____.
3) ____ are people who leave their home country to live in a new country.

6. Read the sentences and answer the questions.

Someone who boycotts is someone who refuses to buy or use something to show dislike or objection.

What does the word “boycott” mean? _____________________________

Propaganda means ideas that are often false and that are talked a lot or spread in order to help or injure a person, cause, or organization.

What does the word “propaganda” mean? ___________________________