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The influence of hand gestures on reading comprehension

Keri Koepke

The Influence of Hand Gestures on Reading Comprehension

By

Keri Koepke

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Abstract

Hand gestures used in conjunction with speech can provide more concrete and accurate information than through speech alone (Wang, Bernas, & Eberhard, 2004). The purpose of this study was to explore the effectiveness of hand gestures on reading comprehension. To examine this hypothesis the researcher designed an eight week study, incorporating the use of hand gestures into the reading lessons and collected data. Eleven second grade students participated in reading lessons which included vocabulary development, a reading strategy focus and practice, and reading of weekly story selection. Data derived from pre and post-reading/comprehension assessments, weekly comprehension tests, and Theme Skills tests showed that the participants' reading comprehension had increased through the use of hand gestures during reading instruction of new vocabulary words and reading strategies.

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CHAPTER ONE

Introduction

Creative strategies and interventions are needed in classrooms in order to meet the needs of all learners -especially those students who are at greatest risk for school failure. This is one of the biggest challenges educators face today as classroom teachers are addressing the No Child Left Behind (NCLB)(2001) legislation and aim to meet Adequate Yearly Progress (AYP) with all students (Skoning, 2010). Researchers have found that using kinesthetic instructional activities may reach many children who do not learn through more typical instructional formats (Rieg & Paquette, 2009; Skoning, 2010). By adding movement into the daily curriculum students are more engaged and provided with numerous learning experiences.

Nonverbal communication like gestures, convey messages from the speaker to the listener. Gestures include: body movements, head nods, facial cues, and hand-arm gestures (Sueyoshi & Hardison, 2005). These gestures, which are kinesthetic, have been found to reinforce a message when used in conjunction with speech, as well as, engage the listener more so than speech alone (McNeil, Alibali, & Evans, 2000; Wang, Bernas, & Eberhard, 2004). Cognitive and communicative benefits occur when teachers instruct students to use gestures as learning tools (Stevanoni & Salmon, 2005). In addition, Comprehension Process Motions (CPMs) (2008) is a kinesthetic comprehension strategy developed for readers to learn the abstract concept of comprehension processes and aids students in their abilities to initiate them without teacher prompting (Block, Parris, & Whiteley, 2008).

According to the Wisconsin Information Network for Successful Schools (WINNS) (2011) the state of Wisconsin had 871,550 students enrolled in grades K-12 for the 2010-2011 academic year. In the 2010-2011 school year, 84.6% of English Proficient students scored

Advanced/Proficient on the state standardized test, which means that 13.6% of the student population received a score of Basic/Minimal or were not tested. The urban district where the action research has been conducted had 80,934 students enrolled in grades K-12 for the 2010-2011 academic year and 62.7% of the English proficient students received a score of Advanced/Proficient on the state standardized test (WINNS)(2011) Thirty-seven percent were not tested or received a Basic/Minimal proficiency score. By incorporating the use of gestures, teachers can create the mind-body connection needed to meet the needs of our diverse student population in today's classrooms, therefore creating student success in reading and other curriculum areas. With increased success in reading, Advanced/Proficient scores should increase and Basic/Minimal scores should decrease on standardized tests.

The Catholic, choice elementary school which served as the site of the action research is located in an urban district in Southeastern Wisconsin. The students at this school continue to struggle in reading according to student data, which suggests needed improvement in language, vocabulary, word analysis, and reading comprehension. Since gestures have demonstrated improvement in comprehension and vocabulary, I believe the students can improve their reading levels and test scores through the use of teacher and student gestures. This chapter will provide detailed information about the Catholic, choice elementary school, why gestures can improve the reading comprehension and vocabulary of all students, and provide an overview of the research study that will take place.

School Description and Student Data

The Catholic, choice elementary school is located within an urban district in Southeastern Wisconsin. It is divided into four campuses: North, East, South, and West. The East campus currently has 244 students enrolled in grades K3-8 for the 2011-2012 school year. All of the East campus students are housed in one building into grade-level clusters: K3-K5, 1st-5th, and 6th-8th. Ninety-eight percent of the student population is African-American with 1% White and 1% Hispanic. A majority of the students attending this school qualify for free/reduced lunch and 1% of the students are identified as English Language Learners (ELLs). The students at the East campus have the opportunity to receive their religious and academic education here because of the Milwaukee Parental Choice Program (MPCP) (2011). This program allows the students' parents to choose which school their child will attend and the state money follows the child.

Programming Model and Decision-making Processes

According to the Archdiocese of Milwaukee, curriculum guides for grades K4-8 have been developed which identify what students should know and be able to do at the end of each grade level. The Curriculum Guide is a template however each individual school develops a plan to articulate what is taught, how it is taught, and how student achievement is assessed for each grade based on national, state, and local standards. The templates for each grade level are divided into the following categories: religion, language arts, reading, math, social studies, and science. Each category has bulleted lists of what each student is expected to know by the end of that particular grade level. Each principal from the four campuses meet to determine the curriculum guidelines and programs provided at each campus.

The East campus utilizes the Houghton-Mifflin reading series (2008). Every classroom has a 120 minute reading block every day. This block allows students to be placed into their appropriate reading level, even if that means they go into another teacher's classroom for reading instruction. Reading instruction within the classroom is also divided into various reading levels: language support, below level, on level, and above level. Students within each classroom are assessed at least 3 times per year on their reading readiness and grouped according to these levels. Grouping students according to their reading level and offering guided reading instruction in small groups provides the students with more individualized and differentiated reading instruction.

In many Wisconsin schools the decision making is done by the school boards, however, this Catholic, choice elementary school does not have a school board. The decision making model is still a top down model where all major decisions are made by the Archdiocese of Milwaukee. From there, the principals at all four campuses are notified of any rules, regulations, and changes that may occur which are brought to the attention of the staff during staff meetings. The principals and staff also contribute to the procedures and policies that are put into place within the four campuses, provided they are within the guidelines that the Archdiocese of Milwaukee has set into place.

Staffing Information

The East campus consists of 27 people on staff. In addition to the 11 certified, classroom teachers, the staff includes a reading specialist, specialized math teacher, a Title 1 teacher, and 5 instructional aides. The aides are utilized in the kindergarten classrooms for the majority of the school day, however, many of them work in the before and after school daycare

program or in other classrooms when needed. The East campus also employs a full-time gym

teacher, part-time music teacher, and a part-time art teacher.

Student Language

One percent of the student population is considered ELLs; however that is not enough for

the East campus to host an official program for ELLs. Unfortunately these students do not

receive language support in their classes either. Ninety-eight percent of the student population is

African-American. Many of the students at the East campus speak African-American English

(AAE). The dialectal difference between AAE and Standard English is a concern for the

teachers at the East campus. For centuries, Standard English has been deemed as the socially

acceptable oral and written language in most American classrooms as Standard English is

defined by social prestige, the ability to get a job, and the idea of sounding educated (Ann &

Peng, 2005). Therefore, the teachers at the East campus are working hard to prepare the students

for success by teaching children how to speak and write in ways that will prepare them for

academic success and not invoke prejudice and discrimination.

Student Academic Data

Each year the students at the East campus participate in Iowa Tests of Basic Skills (ITBS)

(2010). This assessment is given to the 1st-8th grade students only; however, last year the East

campus started participating in the Wisconsin Knowledge Concepts Examination (WKCE)

(2010) for grades 3-8. The teachers and staff at the East campus are excited to be able to

evaluate how the students are performing compared to the other schools within the state of

Wisconsin. In 2009-2010, 78% of the third graders scored Below Proficient and only 23% of the

students score At or Above Proficient on the reading section of the ITBS test (see Table 1).

Fourteen percent scored At or Above Proficient while 86% of the third grade students scored

Below Proficient on the language section (see Table 2).

Table 1
Student Reading Scores

Table 2
Student Language Scores

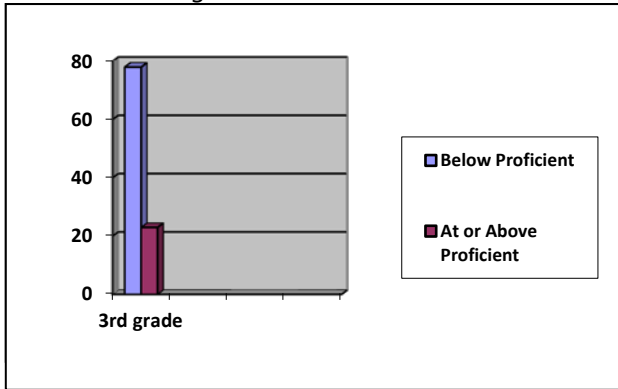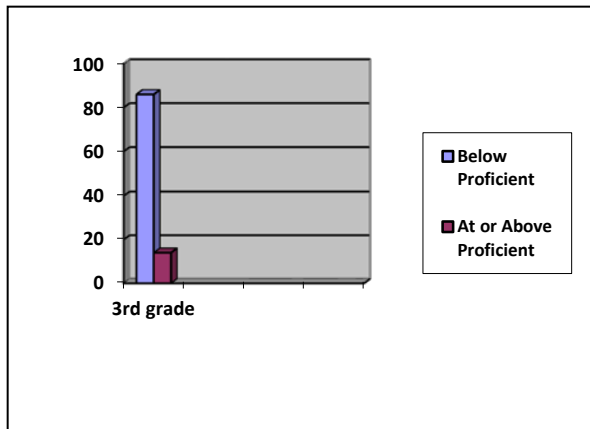The East campus is working at increasing the percentage of students who will score At or

Above Proficient on future standardized reading and language tests. Because of past low scores,

on the ITBS reading and language are the focus of instruction. The East campus wants students

to increase their reading and language skills so they perform well on the WKCE, as well as,

succeed academically.

Student Population

The second grade students at the East campus will be the participants for this action research. The second grade classroom currently has 23 African-American students, 1 Hispanic/Latino student, and most of them qualify for free/reduced lunch. Ten of the students have been identified as being at-risk for failure in reading and only eight are performing slightly above grade level expectations in reading. It is important for all of the students to be reading at or above grade level by the end of second grade if the East campus expects them to perform well on the WKCE next year. It is the hope of the researcher that by incorporating gestures into the instructional lessons, teaching the students to use gestures to help them recall information and provide more detailed responses, and utilize CPMs to increase reading comprehension will improve their vocabulary and comprehension scores on the ITBS.

Summary of Best Practice Research

Recent research has provided promising answers to the issues schools have faced when students are unable to keep pace in reading and writing. Studies have found that teaching literacy skills through the use of movement fully activates the brain and involves students in reading and writing as a holistic and meaningful communication process, as well as, being easily integrated across the curriculum. The Comprehension Process Motions (CPMs) approach provides young readers with a visual for the abstract concept of the comprehension processes needed to be metacognitive (Block et al., 2008).

In their study, Block et al. determined students who used the CPMs performed better than those students who did not. In addition to CPMs, gestures have been found to increase student learning of vocabulary (Kelly, McDevitt, & Esch, 2009). Even though the study conducted by

Kelly et al. tested vocabulary learning of foreign words, the same process could be used with new vocabulary words encountered in the East campus' reading curriculum. Research also confirms that gestures used by speakers benefited the listeners. Three studies conducted by Cabrera & Martinez (2001), Sueyoshi & Hardison (2005), and McNeil et al. (2000) were designed to investigate the effects gestures played on comprehension. All three studies found that their participants performed better on the comprehension tasks when the speaker provided gestures in addition to speech.

It was also noted in two other studies by Stevanoni & Salmon (2005) and Frick-Horbury (2002) when students were taught to use gestures, they were much more able to recall previous information and provided more detailed recollections of the information. In conclusion, the use of kinesthetic learning methods (gestures) is expected to increase student learning and subsequently teacher effectiveness (McNeil, et al., 2000; Wang et al., 2004; Block et al., 2008; Furuhata, 1999; Castro, 2010; Stevanoni & Salmon, 2005; Cabrera & Martinez, 2001; Frick-Horbury, 2002; Kelly et al., 2009; and Sueyoshi & Hardison, 2005). Educators and researchers are starting to recognize the overwhelming power of gestures in the communication process.

Overview of the Project

After reviewing research articles and data from studies conducted by educational, psychological, and language experts, the researcher concluded that gestures are powerful communicators and should not be overlooked. Understanding when and why gestures communicate will enable the researcher to meet the diverse needs of the students in her classroom. Since ten of the students in the class are already identified for being at-risk for reading failure, they are in need of reading/language support and interventions. Using the

knowledge the researcher has gained from reading research articles and studying in graduate courses on the subject of reading and language, I will incorporate gestures into the reading curriculum. The kinesthetic movement (gestures) will activate the Broca's area of the brain, which is known for and associated with a specific function, language (Musso, Moro, Glauche, Rijntjes, Reichenbach, Buchel, & Weiller, 2003). Utilizing gestures to guide and support the reading and language instruction of the students, in order to enhance their vocabulary growth and reading comprehension, is the focus of the action research project.

The first 4 weeks of the study will consist of current reading instruction for 60 minutes, 5 days a week. Each 60 minute reading lesson will consist of vocabulary development, a reading strategy focus and practice, and reading the weekly story selection. During the week, three days will focus on whole group instruction as described above but two days will focus on small guided reading groups. The guided reading group instruction will also consist of vocabulary development, a reading strategy focus and practice, and reading the weekly story selection for guided reading levels. During these first 4 weeks, the researcher will collect data from reading comprehension tests after each story and theme, anecdotal data, and pre reading/comprehension assessment reading levels. During the second 4 weeks of the study, the researcher will continue with the previous structure, as well as incorporate the use of gestures as an instructional tool to increase reading comprehension. The researcher will use specific gestures during reading instruction and teach the participants how to use gestures as reading comprehension tool. Again, data will be collected from reading comprehension tests after each story and theme, anecdotal data, and post reading/comprehension assessment reading levels. The researcher will compare the first 4 weeks data collection to the second 4 weeks data collection to note if gestures did increase student reading comprehension.

Data will include test scores of reading comprehension tests, pre/post reading levels scores, and anecdotal data. The students have already been given a reading/comprehension assessment from the beginning of the year to determine their reading level, based on the guided reading levels used the school. At the end of this study, students will be given another reading/comprehension assessment to re-evaluate their reading levels. The students will also be given a reading comprehension test after each story and theme in their reading series. These comprehension tests are taken from the Houghton Mifflin reading series (Houghton Mifflin Company, 2008) and will be used to determine if comprehension scores have increased. The researcher will also make observations and keep record of students' responses to questions during reading group discussions. I will do this through taking notes and add these responses to the assessment of the students' reading comprehension.

Conclusion

Data shows that the students at the East campus are at risk for reading and language development. The areas of particular difficulty for many of the students are: vocabulary, word analysis, and reading comprehension. The second grade students will need to be provided with rich, intensive reading and language instruction; however, that may not be enough. I hypothesize that the incorporation of teaching reading and language skills through gestures will engage the students, activate the brain, and provide comprehensible input; therefore increasing student learning. The purpose of this study is for the use of gestures to be the key to unlocking verbal comprehension and recall. While this chapter discussed the many aspects of my research, the next chapter reviews existing literature on: various types of gestures, gestures used by teachers, and gestures used by students. The literature I have reviewed has shown that gestures can improve: student engagement, learning a foreign language, second language comprehension,

reading comprehension, recalling information, language comprehension, abstract mathematical

concepts, and reading comprehension strategies. Overall, research on the use of body language

has led us to believe that gestures can promote learning for students.

CHAPTER TWO

Introduction

For years researchers have speculated whether or not gestures enhance comprehension. Studies have been conducted and suggest that a speaker's use of gesture is *intended* to aid the listener in comprehension of the message; however, it is not clear whether or not gestures actually benefit the listener (Hostetter, 2011). In many cases it has been found that the gesture a speaker uses communicates a portion of the message rather than the spoken message. For example, a study done by Melinger and Levelt (2004) "found that speakers who were asked to communicate multiple pieces of information about the stimulus to their listeners sometimes conveyed one of the pieces in their gestures without also mentioning it in their speech" (as cited in Hostetter, 2011, p. 297). According to Hostetter research also suggests that listeners are well equipped to recognize these gestures and use them to inform themselves about the speaker's message and meaning.

This chapter summarizes studies that provided data about the use of gestures and their benefit on comprehension and recall of verbal information. These studies are in three subgroups: gestures, teacher gestures, and instructing students to use gestures. These data results will be utilized in my research project on incorporating hand gestures to guide and support reading and language instruction in order to meet the diverse learning needs of my students.

Gestures

The two studies below investigate the use gestures have on students with Attention-Deficit/Hyperactivity Disorder (ADHD) and students learning a foreign language. If gestures are found to help these students then it can be inferred that the use of gestures will not harm any student's understanding and can actually benefit all students.

Researchers Xiao-lei Wang, Ronan Bernas, and Philippe Eberhard (2004) studied the effects hand gestures and teachers' speech can play on students with Attention-Deficit/Hyperactivity Disorder (ADHD). Previous research suggests that a teacher's nonverbal behaviors can increase the number of student responses during a given lesson than speech alone (as sited in Wang, Bernas, & Eberhard, 2004). This is especially important for children with ADHD and teachers that struggle to keep the attention of students diagnosed with ADHD. Students with ADHD "cannot focus on details, have difficulties in following directions and are easily distracted; they tend to talk excessively and frequently interrupt others; and they usually have difficulty sustaining attention in tasks and, consequently, fail to finish them" (as cited in Wang et al., 2004, p. 217). It is difficult for teachers to maintain the focus of students with ADHD and the surrounding students as their behavior tends to interrupt the learning of themselves, as well as, the students around them.

Hand gestures used in conjunction with speech can provide more concrete and accurate information than through speech alone, although more research needs to be done in order to determine exactly why hand gestures are an effective strategy (Wang et al., 2004). There are five types of gestures teachers use in the classroom: deictic (pointing movements used for directions and to attract attention), representational (imitate the shape or movements of objects), metaphoric (used to demonstrate abstract concepts), emblematic (gestures that are recognized by people of the same community/culture), and beating (a repetitive motion used to emphasize a person's point) (Wang et al.). The goal of this study was to determine if hand gestures are beneficial to students with ADHD and if so, which types of gestures are more beneficial to their learning.

Forty-five boys from the Midwest who were diagnosed with ADHD participated in the study. The boys were recruited through after-school programs by their special education teachers, parents, and graduate students enrolled in education classes (Wang et al., 2004). Parent consent and diagnostic information was given to the researchers about each of the participants. The average age of the boys were seven and a half years old and were receiving stimulant treatment at the time of the study. The researchers wanted to observe the children with ADHD under no medication; however, abruptly taking the children off of their medication could have adverse effects. Instead the researchers observed the children right before their next dosage of medication. This way, the medication would have very little effect on the children during the study.

The participants were divided into three subgroups of ADHD for the study: inattentive type, hyperactive and impulsive type, and a combination of inattentive and hyperactive/impulsive. After school, the children were asked to solve three sets of Tangram-like puzzles on Monday, Tuesday, and Wednesday. The three sessions were video recorded to observe the teacher-child interactions. There were 12 trained teachers from the after-school programs that administered the tasks and prior to administering the tasks, the teachers received information regarding the study and three weeks of training. During training, they were instructed on three scaffolding modalities and the gestures to use for the Tangram-like puzzle sessions. The scaffolding modalities were: speech-only, hand gesture-only, and speech and hand gestures.

After the video recordings were collected, the speech and gestures exhibited during the three sessions were transcribed and coded. The researchers reviewed the data and looked at three aspects: (1) the number of times the children responded in any way to the teacher's scaffolding

modalities, (2) how many seconds the students remained focused on the task, and (3) the success

of the students in accomplishing the task. The researchers also reviewed the five different types

of gestures used by the teachers during the sessions during the gesture-only and the speech and

hand gestures modalities. They "examined the different effects of the gestures on the students'

responsiveness, attention span, and success rate in completing the tasks" (Wang et al., 2004, p.

221).

The data results suggested that the students performed better during the speech and hand

gesture scaffolding modality than the other two modalities. The students responded more

frequently, could focus longer on the task, and had a higher success rate. The data also

suggested that representational and deictic gestures aided in an increase in frequent student

responses for both gesture-only and speech and hand gesture modalities. Students were also able

to focus longer with these two types of gestures in gesture-only and speech and hand gesture

modalities.

The study concluded that students with ADHD perform better on Tangram-like puzzle

task when scaffolded by their teachers with representational or deictic hand gestures. These

gestures can be used alone or combined with speech for an increase in student response, focus,

and success. "The results of this study suggest that hand gestures are indeed a very powerful

pedagogical means that teachers must take into account when teaching children who have special

needs" (Wang et al., 2004, p. 226). The data also suggests that teachers can maximize their

effectiveness in the classroom and engage students with ADHD by incorporating

representational and deictic gestures into their instruction.

The previous study focused on the effectiveness of teacher speech and hand gestures as a scaffolding technique with ADHD students and their performance and ability to complete a task. The following study focuses on how co-speech hand gestures benefit students learning and recalling the meanings of new words of a foreign language.

A study conducted by Spencer D. Kelly, Tara McDevitt, and Megan Esch (2009) explored the effects iconic gestures have on learning foreign language words. Their investigation stems off of previous research on the subject, which suggests that gestures ground language to meaning and can help people remember the meanings of new words or words of a new language (as cited in Kelly, McDevitt, & Esch, 2009). Additionally, "neuroscientists have demonstrated that gesture is tightly integrated with the meaning of speech during language comprehension", (as cited in Kelly et al., 2009, p. 315). The authors believed that co-speech gestures aid in learning new vocabulary of a second language by linking the words from a person's native language to the new foreign words.   They agreed with other researchers that iconic gestures may serve as helpful input during comprehension and learning of a second language.

Eighteen adult females and ten adult males enrolled in an Introduction to Psychology class participated in the experiment. Each participant received research credit and was unfamiliar with the Japanese language. The authors made two predictions for this experiment: (1) the semantic content of the co-speech gestures will aid in the learning of the new vocabulary words rather than their ability to draw attention, and (2) speech alone will not be as effective for learning new vocabulary. The simultaneous use of gesture and speech will produce better learning results.

The participants learned 12 Japanese verbs under four conditions: speech, speech and congruent gesture, speech and incongruent gesture, and repeated speech. During the speech and congruent gesture the instructor would use congruent iconic gestures with the Japanese word and the English translation, but in the speech and incongruent condition the instructor would use incongruent iconic gestures. The authors wanted to include these two conditions in order to determine if gestures enhanced learning because of the semantic overlap between speech and gesture or if any type of gesture would increase learning because it draws more attention to the word. When students were in the speech condition the instructor kept his/her hands at his/her side and remained the same for the repeated speech condition only the instructor repeated the training.

The Japanese words were taught in blocks of three within each one of the four conditions. During training in all conditions, the instructor would introduce the verb and then define it twice. Words that were taught in the repeated condition would then actually be repeated 12 times. To make sure that all of the words were taught in each of the four conditions, four training sets were developed. Unfortunately the authors did not go into detail about the development of these sets. The participants received a two-minute break after the first session and then began their second round of training. The order in which the words were taught was changed, but the same words were taught under the same conditions for each session. After the second session, there was another two-minute break and then the third session began. Following the third session, the participants took a five minute break before returning and taking two memory tests: (1) free recall and (2) recognition.

During the free recall test, the instructor would say each Japanese word, and the participants were to write down the English translation. During the recognition test, the

instructor said the Japanese word and the participants circled the English translation from a choice of four words. Two follow-up tests were scheduled after the initial training and testing day. One follow-up test took place two days later, and the second follow-up test was a week later. Only four participants did not complete the second follow-up test. All three of the testing days consisted of the same testing procedures; however, the order in which the questions were given was different.

From the data results the authors determined that the participants remembered more Japanese word meanings in the speech and congruent gesture condition than any of the other three conditions. The fewest words were remembered in speech and incongruent gesture condition. These results confirm the author's belief that gestures increase learning of foreign words because of their semantic content and not because of their visual captivity. It was also determined that speech and congruent gestures increased learning over words taught in the repeated speech condition. This also confirms the author's belief that the use of gesture and speech simultaneously will increase learning over the same amount of information through speech by itself.

In conclusion the findings are similar to another study by Feyereisen (2006), "showing that people remember sentences in one's native language better when they learn them with congruent representational gesture compared to non-representational gestures (beats) or incongruent representational gestures" (as cited in Kelly et al., 2009, p. 319). Feyereisen suggests that the meaning of the congruent gestures aid in memory because the congruent gestures are integrated with speech meaning and therefore creates a stronger and multimodal memory representation (as cited in Kelly et al., 2009). The authors conclude that teaching foreign words by utilizing speech and congruent gestures simultaneously increases word

learning. They also found that it took half as much time to teach the Japanese words in the speech and congruent gestures condition than any of the other conditions.

Kelly, McDevitt, and Esch's (2009) study focused on the benefits gestures have on student learning when paired with speech; specifically when students are recalling the meaning of new words. In the next related study, conducted by Susan Wagner Cook and Susan Goldin-Meadow (2006), the researchers explored the use of speech and gestures and the role they play on student learning of mathematical concepts.

Susan Wagner Cook and Susan Goldin-Meadow (2006) investigated the effects teacher-gestures have on student-gestures and whether or not student-gestures lead to learning. The researchers wondered if the use of gestures, by the teacher, during instruction would encourage students to gesture, therefore promoting new learning. A study conducted by Alibali and Goldin-Meadow (1993) suggested that children retain more of what they have learned when they demonstrate their understanding of the content through gestures, more so, than students who do not gesture (as cited in Wagner Cook & Goldin-Meadow, 2006, p. 213). In their study Wagner Cook and Goldin-Meadow explored the role gesturing plays beyond demonstrating a student's understanding. They felt that gesturing, in itself, can lead to new learning, not just reflecting knowledge of learning (Wagner Cook & Goldin-Meadow). One of their goals in the study was to increase the amount of gestures children use and their effects on the students' learning. The second goal was to find the relationship between the children's production of gestures and their learning.

Sixty-eight children, ages 9-10 years old, initially participated in the study. The participants were from public and private Chicago area elementary schools and came from lower

and middle class neighborhoods. The children took a pretest that consisted of 12 mathematical

problems: 6 equivalence problems with equivalent addends and 6 equivalence problems without

equivalent addends. Nineteen children got some of the pretest problems correct and were

eliminated from the study. The remainder of the study consisted of 30 girls and 19 boys, totaling

49 participants. After the children completed their pretests, they explained their solutions to the

6 equivalent addends problems to experimenter 1, at the whiteboard.

During instruction, experimenter 2 taught each child individually at the whiteboard.

Instruction consisted on how to solve the 6 equivalent addends problems, using the equalizer

strategy. After instruction, each child was given another mathematical equivalence problem with

equivalent addends to solve and explain at the whiteboard. The experimenters found that the

children demonstrated a number of correct and incorrect solutions to the problems, as well as,

explanations for their answers. These solutions and explanations were tabulated and analyzed

later in the study.

The instruction with experimenter 2 consisted of 5 different conditions: 1) speech alone,

no copying instructions 2) speech alone, child instructed to copy speech 3) speech and gesture,

no copying instructions, 4) speech and gesture, child instructed to copy speech, and 5) speech

and gesture, child instructed to copy gesture. The children in the 2 speech alone conditions

received instruction from experimenter 2 without any gestures, just speech alone. The children

in 3 of the speech and gesture conditions received instruction from experimenter 2 with gestures.

These gestures only consisted of sweeping her left hand under the left side of the mathematical

problem while she said "one side" and then sweeping her right hand under the right side of the

mathematical problem while she said "the other side". The participants in the copy-speech

condition were asked to copy the instructor's words during their explanations of their

mathematical problem solving. Participants in the copy-gesture condition were asked to copy the instructor's gestures during their explanations of their mathematical problem solving. In the no-copy condition groups, the participants "were reminded to explain their answers carefully on each problem" (Wagner Cook & Goldin-Meadow, 2006, p. 215).

If children asked questions during the training they were simply told to "solve the problem however you think best" by experimenter 2, no additional help was given. Following instruction, a posttest was given by experimenter 1. This test was similar to the pretest, consisting of 12 mathematical problems: 6 equivalence problems with equivalent addends and 6 equivalence problems without equivalent addends.

Each instruction session was videotaped for accuracy of the instructor for speech and gesture, depending on the condition. Out of the 49 videos, only 1 session showed a minor deviation from the script. The videos were also transcribed and coded for speech, gestures, and problem-solving strategies of the children. When transcribing the speech, the picture was turned off and gesture was coded with the sound turned off. The number of times each child produced the equalizer strategy, in either speech or gesture, was tabulated.

The results answered several questions. *Did the use of instructor gesture encourage the participants to gesture on their own?* The researchers could conclude from data results that the participants who did not gesture much during their pretest increased the amount of gestures they used on their posttest, if they were in the Speech + Gesture condition. There were no significant differences in the use of participant gestures for participants who were in the Speech only condition or for participants who already gestured on most of the pretest problems, regardless of whether they were in the Speech + Gesture condition or Speech only condition.

Were the participant's gestures imitations of the instructor's equalizer strategy gesture?
The participants in the Speech + Gesture condition significantly gestured more, using the
equalizer strategy, than the participants in the Speech only condition. It should be noted that
none of the participants produced the equalizer strategy gesture during the pretest problems.
This suggests that the participants understood the content of the instructor's gestures and
reproduced it. Data also reflected no effect of the researcher's manipulations on speech. The
participants produced the same amount of equalizer strategy in speech for both conditions. In
conclusion, adding instructor gesture to the mathematical lessons increased the participant's
gesture production of the equalizer strategy but did not affect their production of the equalizer
strategy through speech.

*Are participants who gesture during instruction more likely to be successful when solving
mathematical problems than participants who do not gesture during instruction?* The researchers
suggest that the participant's speech and gesture during instruction related to their successful
performance on problem-solving. These participants solved significantly more problems
correctly than the participants whom did not express the equalizer strategy through speech or
gesture during instruction. There were only slight differences in performance for participants
whom expressed the equalizer strategy in both speech and gesture than participants whom
expressed it through speech alone.

*Are participants who gesture during instruction more likely to retain their learning than
participants who do not gesture during instruction?*

The research study suggests that there is no significant difference. The participants who
produced the equalizer strategy in gesture performed slightly better than those who did not;

however participants who expressed the equalizer strategy through speech and gesture solved more mathematical problems correctly than the participants who did not express the equalizer strategy through speech or gesture during instruction. The participants who expressed the equalizer strategy through speech and gesture solved more mathematical problems than the participants who expressed the equalizer strategy through speech alone. Therefore, expressing learned information through both speech and gesture helped the participants retain their learning during instruction.

To conclude, this study asked whether the participants learned to reproduce the gestures the instructor modeled and whether the participants learned from the modeled gestures. Yes, the participants could have simply mimicked the instructor's gestures and not learned from them, as hand gestures do not solve mathematical problems. The researchers found that the gestures the participants produced during their instructional sessions did have an effect on how much learning was retained after their instruction (Wagner Cook & Goldin-Meadow, 2006). The participants that expressed the equalizer strategy through speech and gesture during instruction significantly solved more mathematical problems on the posttest than the participants who expressed the equalizer strategy through speech alone or did not express the equalizer strategy at all. This study's findings does support the researchers' initial hypothesis that adding teacher gesture during instruction promotes learning as it encourages children to produce their own gestures, in some capacity (Wagner Cook & Goldin-Meadow).

After review of these three studies it can be concluded that the incorporation of gestures with speech in the classroom increases student understanding and meaning of information. In the study by Wang et al. (2004), the use of these gestures with ADHD students increased student response, focus, and success. Student success was also prevalent in the study conducted by

Kelly et al. (2009). In their study the students remembered more Japanese word meanings when

gestures were used in conjunction with speech. Researchers Susan Wagner Cook and Susan

Goldin-Meadow (2006) concluded from their findings that adding specific teacher-gestures to

instructional lessons encourages children to gesture on their own and therefore promotes student

learning. The next studies will examine teacher gestures.

Teacher Gestures

Although there is little research done to support the use of gestures as a tool to aide

student comprehension, a study done by Penate and Bazo (1998) suggests the use of repetitions,

comprehension checks, and gestures helped students understand oral discourse within the

classroom more than without these interactional modifications (as cited in Cabrera and Martinez,

2001, p. 282). Researchers, Cabrera and Martinez (2001) wondered if students would score

significantly higher on comprehension tests when they listened to a story with interactional

modifications compared to a story without them. Their study included 60 Spanish-speaking 10

year-olds from three different classes at a school near Las Palmas, in the Canary Islands. The

subjects were randomly assigned to one of the two groups used for the experimental study.

For the method of this study two stories were selected and adapted to the linguistic level

of the students: *The Long Nose* (Story A) and *The Princess and the Pea* (Story B). For each

story, two versions were created. The first version contained linguistic simplifications such as:

short utterances, simple syntactic structures, few subordinate clauses, and simple and basic

vocabulary. The second version contained interactional modifications such as, 68 new utterances

added to the first version. Forty-eight of these new utterances were repetitions and 20 were

comprehension checks. In the second version, 87 words within the story were accompanied with

gestures. The male teacher memorized both versions of the two stories.

Once the students were randomly assigned to one of the two groups, Group 1 was taken into a room and told about the test and its purpose in Spanish. Afterwards, they listened to the first version of the first story (*The Long Nose*). Next, the students answered 10 questions from a test in their native language. This same process was done for Group 2 with the first version of the second story (*The Princess and the Pea*). After an hour from their first test, Group 1 was asked back into the room and was told the second version of the second story (*The Princess and the Pea*). Again, they answered 10 questions about the story in their native language. After Group 1 was finished, Group 2 came back in the room and was told the second version of the first story (*The Long Nose*) and also answered 10 questions about the story when they were finished. Once both versions of the two stories were told to all the students and all the tests were collected, the tests were separated by story; therefore, versions 1 and 2 of each story were intermingled.

To determine the results from this study an English as a Foreign Language (EFL) teacher rated all the tests on a 10-point scale and was unaware of the test conditions applied to each child, story, or test. The researchers found that although there were no significant scoring differences between Group 1 and 2 on either test, there were significant differences between scores of version 1 and 2 of both stories. The test results showed that when students in Group 1 and Group 2 listened to the stories read in version 2 (with repetitions, comprehension checks, and gestures) they performed better on their tests compared to version 1.

The researchers could conclude that the modifications teachers make for input from a linguistic standpoint are very important and will need to be enhanced with some form of interactions. The findings from this study proved that interactional modifications significantly enhanced student comprehension of storytelling. Their conclusions were consistent with Penate

and Bazo's (1998) study, which found that repetitions, comprehension checks, and gestures all affect comprehension levels of students in EFL primary classrooms (as cited in Cabrera & Martinez, 2001, p. 282).

The previous study demonstrated that the use of gestures by a speaker, in collaboration with repetition and comprehension checks, will increase listener comprehension. The next study also demonstrated the effectiveness of gestures in collaboration with speech to increase student comprehension and understanding.

Ayano Sueyoshi and Debra M. Hardison (2005) examined how gestures and facial cues aid in comprehension of second-language learners. After reviewing numerous research studies, the authors predicted that participants of high and low English proficiency levels would benefit from additional visual cues than speech alone. They also predicted that participants of higher proficiency levels would pay more attention to the facial cues because of their linguistic experience (Sueyoshi & Hardison, 2005).

A female graduate teaching assistant was chosen to be the lecturer for this study. "Ceramics for Beginners" was the chosen topic because the participants in the study did not have any prior knowledge on the subject. The female lecturer was given an outline for the lecture in advance and was able to change or omit any of the material. She was video recorded by two cameras while giving the lecture. One recorder focused on her face (facial cues) and the other was focused on her entire upper body (facial cues and gestures). Afterwards, the videos were edited into five small clips ranging from two to four minutes in length. The topics of each clip were: the history of ceramics, tools and techniques, hand-building procedures, kneading the clay, and shaping it on the wheel (Sueyoshi & Hardison, 2005).

The participants for the study were enrolled at a Midwestern university in an Intensive

English Program (IEP) or English for Academic Purposes Program (EAP). The participants

heard about the study through an announcement in their classes at the university and those who

wished to participate did so outside of their usual academic classes. Twenty-nine females and 13

males participated in the study. All of the participants were considered English as a Second

Language (ESL) student and ranged in English proficiency levels. The participants from the first

and second lowest levels in the IEP formed the lower proficiency level group and participants

from the highest level in the IEP and all participants in the EAP courses formed the higher

proficiency group (Sueyoshi & Hardison, 2005). IEP level placements were determined through

in-house placement testing of listening, reading, and writing skills (Sueyoshi & Hardison).

The participants were randomly assigned to one of the three stimulus conditions:

audiovisual-gesture-face, audiovisual-face, and audio only. The audiovisual-gesture-face

condition showed the female speaker giving a lecture on video. The participants were able to see

her facial cues and gestures while they listened to the lecture. The audiovisual-face condition

showed the female speaker's facial cues while the participants listened to her lecture but gestures

were not visible. Participants in the audio only condition could only hear the female speakers

lecture. The experiment occurred in a regular classroom and was conducted with five to eight

participants at a time; therefore, numerous sessions were conducted.

During the lecture session the participants received a booklet which contained written

instructions on the first page. The participants were instructed not to take notes and to answer

four multiple-choice questions after each one of the five clips. They were not allowed to read the

questions in advance and were monitored by one of the researchers. Following the lecture, the

participants were asked to complete a questionnaire in their booklet. The questionnaire was used

to collect data on the "preferred activities for language skill development, perceptions of the

value of gestures, and gesture use" for high and low English proficiency level participants

(Sueyoshi & Hardison, 2005, p. 679).

To determine the data results from this study the number of correct responses, on the

multiple-choice questions, was calculated separately according to each proficiency level for each

stimulus condition. The lower level English proficient group performed the best under the

audiovisual-gesture-face condition and the worst in the audio only condition. The higher level

English proficient group performed the best under the audiovisual-face condition and worst in

the audio only condition. The researchers believed the data results confirmed their prediction

that visual information will aid in comprehension than through speech alone. What was

interesting to discover in the data collection of the questionnaires was that the lower English

proficient participants said that they preferred gestures to facial cues. The higher English

proficient participants said that the presence of facial cues helped aid their comprehension.

Overall the study concluded that "nonverbal cues may play an important role in

interactions that promote interlanguage development for second language learners (L2) by

facilitating negotiation and comprehension as well as output" (Sueyoshi & Hardison, 2005, p.

688). The researchers feel that more investigation on the role of facial cues and gestures for L2

listening comprehension needs to be done. They felt that the selection of topics used in the

studies needs to be wider and that it is "necessary to recognize individual variation in both a

speaker's production of nonverbal cues and a listener's response to them" (Sueyoshi & Hardison,

p. 689

Similar results from the study above were found in the next research study. This study included two experiments that investigated the effects of reinforcing gesture, conflicting gesture, and absence of gesture on student comprehension of verbal instructions.

Nicole M. McNeil, Martha W. Alibali, and Julia L. Evans (2000) conducted a study to determine if gestures served as a form of external support for language comprehension. Two experiments were included in their study to determine if the researcher's predictions about gestures were accurate. The researchers predicted that reinforcing gestures would not contribute to comprehension for simple spoken messages; however, reinforcing gestures would contribute to comprehension for complex spoken messages. In the first experiment, kindergarten and preschool children were tested with the same spoken messages, but in the second experiment only preschool children were tested with simple and complex spoken messages.

Fifteen preschool children and 14 kindergarten children were screened for participation in this study from a university laboratory school. The children consisted of nine preschool girls, six preschool boys, seven kindergarten girls, and seven kindergarten boys. Prior to the actual experiment, each child was pretested to determine if he/she could demonstrate his/her understanding of positional and directional words: above, below, up, and down. All of the children were tested individually in a laboratory –like setting with a female experimenter.

After the pretest the children played a communication game. During the communication game, instructions were given from a speaker on a video. The children were given a set of blocks and then asked to select a certain block from the set. The communication game consisted of two parts: (1) children were to select a block with an animal on it and (2) children were asked to select a block with a particular feature on it. For example, the instructor may ask the child to

"find the block that has an arrow pointing up, and a smile face with a rectangle about it"

(McNeil, Alibali, & Evans, 2000, p. 138).

The first part of the game was to make sure the children understood the game. They were to select a block from a set of four blocks and then place the block on a post. They repeated this task three times. In the second part of the game, the children repeated the task of locating the block and placing it on the post six times. During each spoken instructional task, the speaker on the video used one of the three types of gesture: no gesture, reinforcing gesture, or conflicting gesture. Each child was asked to locate a particular block twice with no gestures, twice with reinforcing gestures, and twice with conflicting gestures.

The researchers designed a second experiment to ensure that the data results were not altered due to age differences of the participants. They tested another group of preschool age children using simpler spoken messages (than those from experiment one) and complex spoken messages (the same from experiment one) in the communication game, as mentioned in the previous experiment. The participants consisted of seven girls and six boys from same university laboratory school as the participants from experiment one. The procedures for this experiment were identical to experiment one with two changes: (1) the blocks had either a rectangle or an arrow and (2) the speaker gave a task to the child that focused on either rectangle position or the direction of the arrow.

The results were analyzed when researchers compared the speaker's spoken instructions to the children's selection of blocks for each instructional task. In experiment one each instructional task included two pieces of information within the spoken message therefore children could receive a score of zero to two. Since there were two tasks per gesture type, each

child could receive a total score of zero to four. In experiment two the instructional task included only one piece of information within the spoken message so the children could receive a score of zero to one. A total score of zero to two could be given for each gesture type (two tasks per type).

The data from experiment one suggests that the preschool children were not better at comprehending the spoken messages in the speech condition alone compared to the kindergarten children. The preschool children found the messages to be complex and could not understand them through speech alone. The preschool children performed better when the speaker used reinforcing gestures than when she did not. The kindergarten children did not show a significant difference between comprehension through speech alone and comprehension with reinforcing gestures; however, they performed less accurately when the speaker used conflicting gestures with the spoken tasks. It appeared as if conflicting gestures actually hindered speech comprehension for the kindergarten children.

The data from experiment two suggests that the preschool children were better able to comprehend the simpler spoken messages (experiment two) than the complex spoken messages (experiment one). Messages accompanied with reinforcing gestures aided the children's comprehension of the complex messages, but did not aid performance for the simple messages. The children performed similarly with the simple messages in both reinforcing gesture condition and the no-gesture condition. Conflicting gestures did not affect the performance of the children on the simple message tasks.

The researchers conclude that their data results from the two experiments support their predictions that the influence of reinforcing gestures depends on the complexity of the message

(McNeil et al., 2000). Their data results "indicate that input from the nonverbal channel can lead children to shift into and out of different 'comprehension states'. In this way, speakers' gestures contribute to patterns of dynamic variation in listeners' spoken language comprehension." (McNeil et al., 2000, p. 147). In conclusion they believe that reinforcing gestures can scaffold children's comprehension of complex messages but not simple messages. They also suggest that conflicting gestures will not affect children's comprehension of simple messages.

A concept that was discovered in the previous study was explored by Singer and Goldin-Meadow (2005). They investigated whether or not children learn when their teacher's gestures and speech differ.

Researchers Melissa Singer and Susan Goldin-Meadow (2005) explored the effects of teacher gestures when their gestures do not match the information being taught. Children often pay attention to the gestures their teachers naturally make during instruction. Sometimes the gestures match the message the teacher is trying to convey and other times they do not. "Gesture-speech mismatch occurs when a gesture conveys information that is different from the information conveyed in the speech it accompanies." (Singer & Goldin-Meadow, 2005, p. 85). The researchers gave an example of gesture-speech mismatch within a math problem. A teacher gave a student the math problem $7 + 6 + 5 = \_\_\_ + 5$. The teacher pointed to the $7 + 6$ and then pointed to the$\_\_\_ + 5$ side of the math problem and said that the student needed to make this side equal to this side (Singer & Goldin-Meadow).   In this example two messages were being conveyed through the gesture and also through the speech. When the teacher pointed to the 7 and 6, the message being conveyed was adding the 7 and the 6 would give the student the answer for the blank on the $\_\_\_ + 5$ side of the math problem. Therefore, the question the researchers wanted to answer was whether or not children take advantage of the second message conveyed in

the mismatched gesture. For their study, two questions were asked: 1) Does teaching children

more than one strategy for solving a problem facilitate their mastery of the problem? 2) Does it

matter whether those strategies are presented in speech, in gesture, or both (Singer & Goldin-

Meadow, 2005)?

A total of 160 children at the end of third grade, going into fourth grade, were the

participants for this study. The children ranged in age from 8 to 10 years old and were from

public and parochial schools in the Chicago area. Of the 160 participants, 58 were boys and 102

were girls. For the study, the researchers presented the children one or two strategies for solving

mathematical problems but varied the instruction. The instruction was either accompanied by

matching gesture, mismatching gesture, or no gesture. The participants were randomly assigned

to one of the 6 instruction conditions. These conditions were the result of organizing the

instruction around two factors: 1) the number of strategies taught in speech: a) equalizer, a

strategy that highlights the principle underlying problem b) add-subtract, a strategy that

highlights a procedure for solving the problem 2) the relations between speech and gesture: In

the two no-gesture conditions, the experimenter did not gesture at all; In two of the matching-

gesture conditions, the experimenter's gestures matched her speech; and in two of the

mismatching-gesture conditions, the experimenter gestured differently from her speech (Singer

& Goldin-Meadow, 2005). There were approximately 27 children assigned to each of the 6

conditions.

Prior to the instruction sessions, children were given a pretest, from experimenter 1,

which contained 6 addition problems on a piece of paper. Afterwards, each child was asked to

explain how he or she had solved the math problems, on the chalkboard. Any child that solved

any of the pretest questions correctly were eliminated from the study, resulting in 160 student

participants for the study.

During the instruction sessions, experimenter 2 gave all the children instruction for four

additional problems in mathematical equivalence. In all 6 conditions, experimenter 2 taught the

children the equalizer strategy, in speech, for the first trial, for each of the 4 problems. The

instruction differed depending on which condition the students were in: If the children were in

the no-gesture condition, experimenter 2 taught the equalizer strategy through speech and no

gesture; If the children were in the matching gesture, experimenter 2 taught the equalizer strategy

through speech with matching gestures (equalizer in gesture); and If the children were in the

mismatching-gesture, experimenter 2 taught the equalizer strategy through speech with

mismatching gestures (add-subtract in gesture). The children were asked to solve and explain

the problems after their instructional session.

For the second trial, of the same four math problems, experimenter 2 taught the children

in the one-strategy-in-speech condition the same equalizer strategy. Again, she differentiated her

instruction according to which condition the students were assigned, as was done for the first

instructional trial. Children in the two-strategy-in-speech condition were taught an add-subtract

strategy through speech. Again she differentiated her instruction according to which condition

the students were assigned: If the children were in the no-gesture condition, experimenter 2

taught the add-subtract strategy through speech and no gesture; If the children were in the

matching gesture, experimenter 2 taught the add-subtract strategy through speech with matching

gestures (add-subtract in gesture); and If the children were in the mismatching-gesture,

experimenter 2 taught the add-subtract strategy through speech with mismatching gestures

(equalizer in gesture). Once again, the children were asked to solve and explain the problems after their instructional session.

Each instructional session was videotaped so that the experimenter's instructional gestures could be checked to be sure they were correct for each child's condition: no-gesture, matching-gesture, or mismatching-gesture. After each child's instructional session, experimenter 1 came back and administered a posttest to each child. The number of posttest problems correct, showed growth in learning due to the fact that none of the children got any problems correct on the pretest. The posttest and pretest data results were compiled and compared.

This study's data results were: students in the one-strategy-in speech/mismatching gesture condition got 3 out of the 4 math problems correct and performed better than any of the other children in the other 5 conditions. The students in the one-strategy-in speech/matching gesture condition got close to 2 problems correct and the students in the one-strategy-in speech/no gesture condition got close to 1 ½ problems correct. Overall, the students that received instruction in only one strategy performed better than the students that received instruction in two strategies (Singer & Goldin-Meadow, 2005). Students in the two-strategy-in speech/mismatching gesture condition got close to 2 math problems correct, students in the two-strategy-in speech/matching gesture condition got close to 1 ½ problems correct, and students in the two-strategy-in speech/no gesture condition got less than 1 problem correct . Results suggest that students that received the mismatching-gesture during instruction performed better than the students in the matching-gesture and no-gesture conditions for both one-strategy-in-speech and two-strategy-in-speech instructions (Singer & Goldin-Meadow). These findings confirm that teaching children more than one strategy for solving a problem facilitates mastery, as long as the second strategy is through gesture and not through speech alone (Singer & Goldin-Meadow).

Researchers Melissa Singer and Susan Goldin-Meadow (2005) can conclude from their study that children do take advantage of learning through gesture, even if it does not match their teacher's speech. In this particular study, the gestures seemed to be good at making the children aware of the relationship between the principle and algorithm (Singer & Goldin-Meadow, 2005). The researchers felt this could be due to the fact that mismatching gestures allow the two strategies to be taught simultaneously rather than sequentially, as it would be through speech alone (Singer & Goldin-Meadow). When teachers present the two strategies simultaneously through speech and mismatching gesture, the relationship between the two can be highlighted, and promotes learning (Singer & Goldin-Meadow).

Based on the data results and findings of these four studies, students performed better when they listened to a speaker who used gestural cues, repetitions, and comprehension checks as found in the study by Cabrera and Martinez (2001). Sueyoshi and Hardison (2005) believed using reinforcing gestures scaffold children's comprehension of complex messages but not simple messages. Their study also determined that conflicting gestures would not affect children's comprehension of simple messages. Similarly, McNeil et al.'s study (2000) determined that students with low English proficiency perform better when gestures and facial cues are present with teacher speech; however, students with high English proficiency levels performed better with just facial cues and teacher speech. Could these findings be linked to Sueyoshi and Hardison's study (2005)? It could be suggested that the lecture was found to be more complex for the lower English proficient students and therefore they relied on both the gestures and facial cues of the speaker to fully comprehend the information. Additionally, the higher English proficient students could have found the lecture to be simple, or at their level, and therefore did not need additional gestural cues to comprehend. On the other hand, Singer and

Goldin-Meadow (2005) concluded that students can learn when their teacher's gestures and speech differ. Data results from their study suggested that "children profit from gesture when it conveys information that differs from the information conveyed in speech" (Singer & Goldin-Meadow, 2005, p. 88).

Instructing Students to Use Gestures

The previous studies concluded that a teacher's use of gestures aid in student comprehension, but what about student use of gestures? Would student use of gesture benefit them in comprehension and recall as well? The next five studies examined student gestures and their effect on comprehension.

Elizabeth Stevanoni and Karen Salmon (2005) investigated different kinds of gestures and the influence gestures have on memory. There were three types of gestures the researchers included in their study: gesture-instructed, gesture-modeled, and gesture-allowed. Gesture-instructed meant that the children were asked to tell and demonstrate a recalled event. Gesture-modeled occurred when the interviewer modeled gestures during the instructional phase as a means to increase the use of the children's spontaneous gesture. Gesture-allowed simply meant the children were not told to use gestures, and gestures were not modeled for them. The participants were asked to recall an event under one of the three conditions. A fourth condition, gesture free, was included in the study. In this condition, the participants were restricted from using gestures when recalling the event.

Sixty children, 30 female and 30 male, were utilized for this study. All of the children were given parental permission to participate and were from various ethnic backgrounds but mostly from middle socio-economic classes. All of the children individually experienced

visiting the pirate, a set of props that was set up at the children's school. A research assistant

played the part of the pirate and took the children through four scenes: becoming a "real" pirate,

making a map, winning a key, and finding the treasure. The "pirate" used a standardized script

as he guided the children through the 10 minute event. Approximately two weeks after the

event, the children were interviewed individually to recall their experiences.

At first the children were engaged in conversation about general topics to ease their

anxiety levels. To start the recall process, the interviewer stated the same phrase to all the

children, no matter the condition of the recall experience. "A few weeks ago, you visited a pirate

here at school. I've never visited a pirate and I'd like you to tell me everything you can

remember about your visit to the pirate, everything that happened and everything you saw and

did" (Stevanoni & Salmon, 2005, p. 221). During free recall, the interviewer used non-directive

prompts to encourage the children, such as: "uh huh", "tell me more", and "you're doing well".

After free recall, the children were each instructed to recall the four scenes from *visiting a pirate.*

The children were interviewed under one of the four conditions as previously mentioned.

Children who were in the gesture-allowed condition were seated at a table next to the interviewer

but children in the gesture-not-allowed condition were asked to wear a "memory" apron and

instructed to keep their hands in the special memory apron and stay seated while they talked.

Children who were in the gesture-modeled condition, saw the interviewer moving her hands and

body which was consistent with the verbal instructions. The interviewer also cleared the space in

the room, following the prompt, to allow the child space to move around. The interviewer and

child also remained standing during the interview. During the gesture-instructed condition, the

interviewer moved her hands and body, again consistent with the verbal instructions, but would

also ask the children to use their hands and body during their account of the event. The room

was also cleared so that the child had space to move about and both interviewer and child

remained standing.

All of the interviews were audiotaped and videotaped for transcribing verbatim and

coding for core actions and objects. Errors were also coded if a child mentioned an action or

object in the event that did not actually occur. Coded gestures were defined as a movement of

the arms and hands in front of the torso. Gestures were recorded in relation to "hands,

handedness, shape of hand, palm and finger orientation, and gesture space" (Stevanoni &

Salmon, 2005, p. 222). Then they were recorded in terms of motion, such as: "shape of the

trajectory, space where the motion was articulated, and direction" (Stevanoni & Salmon, 2005, p.

222). Children in the gesture-modeled and gesture-instructed conditions were told to use their

hands and bodies during recall so additional foot movements were also coded with only these

two groups of children.

The researchers summarized the overall correct information reported verbally and

gestured within each of the four conditions in order to determine the data results. The data

concluded that the children in the three conditions where gesture was allowed recalled more

information than that of the children in the gesture-not-allowed condition. It was also noted that

the children in the gesture-instructed condition reported twice as much accurate information that

those in both the gesture-modeled and gesture-allowed conditions.

The researchers determined from their study that instructing children to use gestures

during verbal recall has cognitive and communicative benefits as children in the gesture –

instructed condition could recall and convey twice as much information as those in the other

three conditions. The results were consistent with other studies where children were told to re-

enact an event. Instructing gesture aids verbal accounts but also conveys meaningful information that is not conveyed through speech alone. Asking children to gesture actually results in more detailed recall of an event.

Similar to Stevanoni and Salmon's study (2005), Frick-Horbury (2002) also studied the effects on recall with self-generated gestures. The purpose of her study was to determine if people would be able to recall information better through a visual of themselves using gestures or a visual of themselves without gestures.

Donna Frick-Horbury (2002) conducted an experiment to test her hypothesis regarding the use of hand gestures and verbal recall. Previous research on the related subjects stated that gestures can serve as visual or semantic cues, imagery cues, motoric cues, and enhances verbal retrieval (as cited in Frick-Horbury, 2002, p. 138). In addition, a study by Bernstein (1961) concluded that people from low socio-economic backgrounds used more hand gestures than those of higher socio-economic backgrounds (as cited in Frick-Horbury, 2002, p. 138). The author's interpretation of these data found participants of low socio-economic status to have lower verbal skills and therefore, relied more on gestures as a means to communicate than those participants of higher socio-economic status (Frick-Horbury). Other research studies determined that a difference between high and low verbal skills correlated with differences in cognitive processing (as cited in Frick-Horbury, 2002, p. 138). Another finding suggested that hand gestures would benefit memory because the imagery of the gesture would cue the memory of the verbal material (as cited in Frick-Horbury, 2002, p. 139).   Based on these research findings, the researcher believed that hand gestures could serve as an auxiliary code for memory retrieval (Frick-Horbury).

The researcher gathered 36 participants for this experiment. Each subject participated in the study as a way of fulfilling a course requirement for his/her undergraduate work. The subjects were divided into two groups depending on their Scholastic Aptitude Test (SAT) verbal scores, meaning participants who had high SAT scores were placed in the high verbal-skill group and participants who had low SAT scores were placed in the low verbal-skill group. The higher verbal-skill group consisted of seven men and 11 women. There were five men and 13 women in the low verbal-skill group.

For this experiment the researcher selected 40 words based on their imagery, concreteness, and meaningfulness ratings. These ratings were determined by a scale of 1-10, 1 being low and 10 being high in imagery, concreteness, and meaningfulness value. In order for words to be considered concrete, they had to have an imagery value of at least 6.2 or higher and a concreteness value of 6.9 or higher. For words to be considered abstract they had to have an imagery value of 5.0 or less and a concreteness value of 4.2 or less. All of the words used in the experiment had to have a meaningfulness value of 6.0 or higher. After being rated on the above mentioned scales, 71 concrete words and 65 abstract words were selected. Afterward, only 20 abstract words and 20 concrete words were randomly selected and used for the experiment.

Before testing of the 36 participants began, the researcher collected their SAT verbal scores and split them into high and low verbal-skill groups based on their median split. Then the participants were split into two more groups for the experiment, cued and un-cued. The cued participants would later view the video footage of themselves during recall but the un-cued participants would view a still shot of themselves. The participants were randomly assigned into one of these two groups. The researcher told the participants that they would be given a word and then asked to describe the word within 35 seconds. They were instructed to describe the

word as if they were explaining it to someone who was unfamiliar with the object or concept.

Each participant went through this process for a series of previously selected words. At no time

were the participants asked to use their hands in order to illustrate the words.

The participants were also told that they would be taped for scoring purposes. The

videotape was positioned so that the participants were viewed from the neck down. There was

also a number card (1-40) for each word displayed in view to be used later during the recall

phase. Once the participants were all recorded giving their descriptions of the 40 words, the

researcher spoke to each one of them for five minutes following their individual taping session.

Then they were given a sheet of paper numbered 1-40 with the bottom half of the paper marked

as "Free Recall".

The participants in the cued group were shown the video footage of themselves and their

gestural descriptions, if they had any, but without audio. The participants were then instructed to

determine the target word they were describing and had to write the word in the appropriate

numbered space. The participants were also told to write any words they remembered under the

"Free Recall" space on the page if they remembered an un-cued word during any other portion of

the video tape recall session. The participants in the un-cued group followed the same directions

as those of the cued group with exception of the video tapes. These participants only viewed a

still shot of themselves during the first description. They were then asked to recall as many of

the words in order and write them down on their sheets of paper, which were also numbered 1-

40. Two weeks later, all the participants were asked to come back again and the above

mentioned recall procedure was repeated for a delayed recall test.

The results "were calculated on the basis of the percentage of loss of words from the immediate retrieval interval to the delayed retrieval interval for total recall, abstract-word recall, and concrete-word recall as a function of group and SAT" (Frick-Horbury, 2002, p. 142). The un-cued/low group had a significant loss from the immediate retrieval interval to the delayed retrieval interval compared to the un-cued/high group, cued/high, and cued/low group. There were no significant differences between the cued/low and cued/high groups, nor the cued/high and un-cued/high groups. The findings for abstract recall from immediate to delayed retrieval displayed a significant loss for the un-cued/low group which was more than the un-cued/high group, cued/high group, and cued/low group. There were also no significant differences between the cued/high and cued/low groups or the cued/high or un-cued/high groups though. For concrete-word retrieval, the results revealed that the un-cued/low group had a significant loss from the immediate retrieval to the delayed retrieval than did the un-cued/high group, cued/high group, and the cued/low group. There were no significant differences among the cued/low and cued/high groups. There was also no significant difference between the cued/low and un-cued/high group, however there was a significant difference between the cued/high and un-cued/high groups.

Based on these findings the researcher can conclude that the cue of hand gestures helped to reduce the loss of recall over a two week period of time for both the high and low verbal-skill groups for both word types. The findings also show that the participants with low SAT verbal scores performed similarly to the cued/high group and performed better than the un-cued/low group with the help of the gesture cue. Overall, the researchers findings suggests that subjects with high SAT verbal scores show little to no difference with the cued or un-cued gesture for recall, however, subjects with low SAT verbal scores show that gesture cues helped facilitate

recall and therefore these subjects scored similarly to those subjects with high SAT verbal

scores.

In conclusion, the researcher's hypothesis is correct. Self-generated hand gestures can

act as immediate retrieval cues for verbal material and over long retention intervals. The

researcher determined that people with low verbal skills can perform on the same level as those

with high verbal skills when they use gestures for retrieval cues.

Frick-Horbury (2002) suggested that self-generated gestures aid in verbal recall when

participants in her study were able to view themselves via video. Block, Parris, and Whiteley

(2008) look into teaching students gestures as a means to enhance their understanding of how the

comprehension processes work. They consider these gestures to increase student

comprehension, as well as, assist teachers in identifying student needs.

Cathy Collins Block, Sheri R. Parris, and Cinnamon S. Whiteley (2008) investigated the

effect of adding kinesthetic learning aids to transactional strategy lessons with the belief that

there was a correlation between kinesthetic learning aids and an increase in student

comprehension and metacognition. Through their own data and research collection on the

subject by Collins (2005) and Viadero (2005), the researchers have found that kinesthetic

motions, like comprehension process motion (CPM), provide mental representations for abstract

concepts such as comprehension strategies (as cited in Block et al., 2008, p. 461): "CPMs are

kinesthetic hand placements and movements that portray the visual and physical representations

of abstract, unseen comprehension processes such as finding main ideas, inferring, making

predictions, and clarifying" (Block et al., 2008, p. 461). For example, the hand placements for

the comprehension process of clarifying would be used anytime students had a question about

something they were reading. Clarifying would look like this: first the students would close their hands together with their thumbs touching the center of their chests. This is representative of their minds being closed to the meaning of what they are reading. When their minds open up to see or understand a new meaning, they would open their hands to a splayed position and move them outward towards their shoulders.

The purpose of this study was to discover if adding CPMs to reading lessons would increase student comprehension and metacognition. There was a specific hand motion or CPM for each comprehension process: finding the main idea, making a prediction, inferring, and clarifying. The researchers also wanted to determine which CPM lessons were most effective, how many CPMs were used automatically by the students, and how much instructional time on each CPM was needed for student mastery, such as the number of days per week and how many minutes per lesson.

The participants for this study consisted of 257 experimental students and 256 control students from two U.S. urban elementary schools. Each participating school was identified as an underperforming school in lower socioeconomic status communities. The majority of the participants came from non-English speaking families or low socioeconomic status backgrounds. Both schools were chosen because the teachers voiced an interest and need in learning how to teach their students comprehension processes more effectively.

The teachers and the students in the study were randomly assigned to an experimental or control group using a stratified randomization procedure. After each teacher had been assigned to an experimental or control group, the schools' principals also randomly assigned students to

one of the two groups using the performance scores of the prior year's state reading tests. By the end of the assignment process, 19 experimental and 19 control groups were formed for the study.

Before beginning the study, all the participating teachers received two days of professional development. During the two days of instruction all the teachers received lessons and procedures for the study, locations for treatments, and names of the participating students. There was a difference in training that occurred between the control-group and experimental group teachers. The difference took place on the second day when a CPM (control-group lesson) lesson was modeled to the control-group teachers and each control-group teacher taught a lesson to a small group of their peers; however, the experimental-group teachers were the only ones to receive all the CPM lessons rather than having a CPM modeled or practiced teaching a CPM lesson in small groups.

In this study, 19 experimental and 19 control groups participated for 60 days in reading instruction. Each control group was taught the same comprehension processes as the experimental groups, in small-group settings outside of their regular classrooms, for a period of 45 minutes; however, the experimental groups were taught with the assistance of the kinesthetic teaching aids, the CPMs, where the control groups were not. Throughout the study, the experimental-group teachers documented the following observations: the CPMs taught, the number of instructional days of direct instruction on each CPM, the number of minutes per lesson on each CPM, and the number of students who independently initiated CPMs during a lesson.

During the last 10 days of the study, the experimental and control groups took a standardized SAT-9 and criterion-referenced test (CRT) of comprehension processes. "The CRT

was the Texas Primary Reading Inventory (TPRI), which was the statewide mandated test of

explicit and implicit comprehension" (Block, et al., 2008). All of the subjects also received

multiple-choice tests created by the basal reading series provided. Twelve weeks following

instruction and the post-test data collection, experimental-group teachers recorded the number of

students who independently initiated CPMs during a 20-minute CPM read-aloud lesson. The

follow-up observations provided evidence of students' retention and independent metacognitive

use of comprehension processes.

The results of the post-tests provided data that demonstrated the experimental-group

subjects out performed the control-subjects on five explicit comprehension processes, the SAT-9

comprehension mean score, the vocabulary subtest scores, and the ability to infer and perform

other implicit comprehension processes. Even at the kindergarten level, the experimental-group

students were able to identify twice as many implicit meanings as the control-group

kindergarteners. Twelve weeks following instruction and the post-test data collection,

experimental-group teachers recorded the number of students who independently initiated CPMs

during a 20-minute CPM read-aloud lesson. The follow-up observations provided evidence of

students' retention and independent metacognitive use of comprehension processes. The

researchers also determined that six instructional lessons of a minimum of 20 minutes in length

were needed on one CPM before moving onto another CPM.

Overall, this study showed that students who used CPMs greatly out performed the

control-group students. The CPMs assist teachers in recognizing their individual students' needs

quickly, therefore meeting the diverse needs of their students. This study has proven the benefit

of adding kinesthetic Comprehension Processes Motions to comprehension lessons because

CPMs can make abstract, metacognitive aspects of comprehension processes visible, understandable, and accessible to young readers.

Because of Collins Block, Parris, and Whiteley's (2008) study the use of student gestures can be utilized as an assessment tool for teachers regarding comprehension. In the next study, two different types of gestures are also used to assess the memory recall of students.

Hilary Cameron and Xu Xu (2011) conducted two experimental studies that investigated the effects of two different types of hand gestures on memory recall. The researchers wondered how much of an effect representational gestures and pointing gestures had on preschool age children and their ability to recall an unfamiliar story. Representational gestures have meaning independent of the objects around the speaker. For example: nodding yes to indicate a yes answer or holding a fist to the ear to mean "telephone". They are used to represent attributes, actions, and relationships of various entities. Pointing gestures, also categorized as deictic gestures, refer to something around the speaker and are used to indicate a location, to get attention, or to "point out" objects (Cameron & Xu, 2011). The researchers conducted one experiment testing their hypothesis that representational gestures would aid preschool age children in their memory recall of an unfamiliar story. A second experiment was conducted to examine the effects of the pointing gesture and increased memory recall of the same age children.

For this study two methods were used. For the first method a total of thirty preschool age children ranging in age from 48 months to 63 months were participants in this study. The participants were enrolled in a preschool program, in an eastern state, located near the state's capital. The parents of the twenty boys and ten girls were given information describing the

purpose and procedures for the study prior to the experiment. The experiment was conducted as part of the preschool program's daily activities and was also approved by the Institutional Review Board (IRB).

In order to eliminate the possibility of previous exposure "a simple and repetitive story with a clear sequence of events was created specifically for the purpose of this experiment" (Cameron & Xu, 2011, p. 158). The story consisted of ten farm animals, each with their own sound and action, not gesture. For example: the cow said "moo" and walked to the barn. The children were asked to recall the animals in the story, their sounds, and actions. The order in which the children recalled the information was recorded, as well as, which animals they recalled, the animals' sounds and actions.

For this experiment, the children were divided up into two conditions. Fifteen children were assigned to the gesturing condition and the other 15 were assigned to the non-gesturing condition. Before the children were randomly assigned to either condition, input was needed from the teachers because the researchers felt that children of this age, range in their levels of attentiveness, verbal comprehension, and communication skills. They were concerned that these variances "might lead to inequality between the two conditions" (Cameron & Xu, 2011, p. 158). The information collected from the teachers was used to pair the children up according to similarities in: "gender, age, ability to read instructions, verbal comprehension skill, and verbal communication skills" (Cameron & Xu, 2011, p. 158-159). Once the children were paired up, they were randomly assigned to one of the two conditions. In the gesturing condition, the children were encouraged to gesture when retelling the story but the children in the non-gesturing condition were asked to keep their hands on a bar that was attached to the table while retelling the story.

The experiment took place in a room with bare walls, child-sized chairs and tables, and limited decorations so that the children were not distracted during the experiment. The farm animal story was told to each child, individually, while the storyteller modeled representational gestures during the story, in both conditions. For example, the whiskers of a cat, was one gesture that was used to illustrate the key characteristic of that animal (Cameron & Xu, 2011). Once the story had been told, the children were immediately asked to retell the story in sequential order. The storyteller used a checklist to note which animals, sounds, actions, and order the children were able to recall. The storyteller also noted if the student used any hand gestures or other types of movements during the recall. The students in the gesture condition were encouraged to gesture, like the storyteller, during their recall, however the students in the non-gesture condition were asked to hold onto the bar attached to the table while they recalled the story.

The results for the first method were determined after the data from the checklists were tallied for animal names, sounds, and actions for each child, the researchers could conclude that the children in the gesturing condition recalled more of the story than those in the non-gesturing condition. The researchers noted that only 8 of the 15 children in the gesturing condition used hand gestures after being encouraged to do so and that 9 of the children displayed other movements during their recall besides hand gestures. Two out of those 9 were from the non-gesturing condition.

The researchers wanted to further analyze the data of all three groups: the use of hand gestures, no hand gestures or movement, and body movement. They found that the children who used hand gestures remembered slightly more of the story details than the children who demonstrated some type of bodily movement during recall, but significantly more than the children who did not gesture or move at all. The children who demonstrated some sort of body

movement during recall also remembered a significant amount more than the non-movement children and only slightly less than the hand gesture children. Overall, the researchers could conclude that children who used representational hand gestures and/or body movements when retelling a story could recall a significant amount more than children who did not gesture or move at all.

As mentioned in the first method, 30 children enrolled in a preschool program, located near an eastern state's capital, were the participants for the second method of this study. The children ranged in age from 48 months to 63 months. Again, the parents of the participants were given information describing the purpose and procedures for the study prior to the experiment. During this experiment 19 boys and 11 girls participated. Just like the first experiment, the second experiment was also conducted as part of the preschool program's daily activities and was approved by the Institutional Review Board (IRB).

Another short story was created specifically for this experiment so that it was unfamiliar to all the children participating in the study. The story contained one character, a dog, and his attempts to find his way home. During the story, he stops at ten different locations until he finally gets back home. A map was used during the telling of the story, which depicted a black-and-white picture of each of the ten locations the dog stops at throughout the story.

Once again, the teachers of the children provided information to the researchers about their "age, abilities to attend to instructions, and their abilities to comprehend and communicate the details of a story" (Cameron & Xu, 2011, p. 162) so that the students could be paired-up according to similar abilities. The children were also matched for gender, 14 out of the 15 pairs. Meaning, one of the 15 pairs contained one boy and one girl. Once the children were paired up,

then they were randomly assigned to either the gesturing condition group or the non-gesturing condition group.

Again, the experiment took place in a room with bare walls, child-sized chairs and tables, and limited decorations so that the children were not distracted during the experiment. The map used during the story was displayed on top of the table, facing the child. During this experiment, the storyteller wanted the children to have time to get familiar with the room before beginning so ten minutes were given to allow each child to adjust and engage in conversation with the storyteller. Once the child seemed adjusted, the storyteller began to tell the story about the lost dog, Buddy. During the story, the storyteller would point to each location on the map that was mentioned. After the story had been told, the child was asked to recall the story in sequential order. The children in the gesturing condition group were asked to point to the locations on the map as they recalled the story; however the children in the non-gesturing group were asked to hold onto the bar attached to the table and look at the map instead.

While each individual child recalled the story events, a checklist was once again used by the storyteller to record the student responses and movements. The storyteller recorded whether or not a student was able to recall the locations, location details, action at each location, sequential order of the locations, pointing gestures, body gestures, or no gestures.

The results from the second method were determined when data from the checklists were tallied according to correct responses for location names, location details, and actions at each location. Any type of gesture or non-gesture was also noted for data results. The results showed all the children in the gesturing condition used pointing gestures when recalling information from the story. The children in the non-gesturing condition did not gesture at all and kept their

hands on the bar. Results from the checklists suggest that children who gesture (pointing) significantly recalled more location names, details, and actions than the children in the non-gesturing condition. The researchers noted that all the children in the gesturing condition were able to recall all 10 locations compared to only 5 children in the non-gesturing condition. They also noted that 13 children in the gesturing condition were able to correctly recall the order of the locations, in comparison to only 4 children in the non-gesturing condition.

Researchers Hilary Cameron and Xu Xu (2011) concluded that gestures aid preschool children in recalling information and then verbally communicating that information to others. Gestures have been found to enhance a child's recalling performance by "facilitating more than just one aspect of the retelling process" (Cameron & Xu, 2011, p. 164). The researchers felt that more studies need to be conducted in order to fully determine the effects gestures have on the various aspects of the retelling process. More research conducted on gestures can shed light on the subject and its effectiveness on memory retrieval and speech production (Cameron & Xu). In conclusion, the data findings from both studies determined that hand gestures, whether representational or pointing (deictic), significantly increased preschool aged childrens' recall of story events and details.

In Cameron and Xu's (2011) study, the use of gestures enhanced the recalling performance of children, therefore enabling them to verbally communicate more information. The next study conducted by Nicoladis (2002) further investigated the effects of gestures on verbal utterances, as well as, other hypothesis' regarding gestures and language proficiency.

Author Elena Nicoladis (2002) conducted an experiment to answer four research questions: 1) Is a child's language proficiency related to the rate at which a child will gesture?

2) When children use iconic gestures, do they also create longer utterances? 3) Do children

compensate for low language proficiency by using gestures with no accompanying speech? 4)

When having difficulty recalling a word, do children use iconic gestures?   Previous research

conducted by Nicoladis (1999) suggested that the use of iconic gestures is directly related to the

mean length utterances (MLU) of younger children but not for deictic and conventional gestures

(as cited in Nicoladis, 2002, p. 247). She also found from her previous study (1999) that

younger children produced longer utterances when their speech was accompanied by iconic

gestures (as cited in Nicoladis, 2002, p. 248). She believed this was due to the fact that the use

of iconic gestures allowed them to access words more easily. This was true for the adults in

Frick-Horbury & Guttentag's (1998) study (as cited in Nicoladis, 2002, p. 248). In other studies

conducted by Nicoladis (1996; 1997) she determined with her colleagues that younger children

do not rely on the use of gestures to help them when speaking a second language with a native

speaker of that language; however Nicoladis wondered if the data results would be different with

older children (as cited in Nicoladis, 2002, p. 248).

    The research study conducted consisted of 8 French-English bilingual children. Their

average age range was 4 years and 3 months old. All the participants were from middle to upper

middle class families and lived in or near Edmonton, Alberta, Canada. Not all of the participants

were bilingual because they were from one parent-one language families. Four of the

participant's homes spoke mainly French and consisted of two parents. Three out of these 4

participants went to a French daycare facility and 1 attended an English daycare. The

participants relied on extended family, friends, and the outside community to learn English. The

other 3 participants heard French spoken primarily by the mother and English by the father. Two

of these 3 attended English daycares while the other one attended a French daycare. The 8th

participant was addressed mostly in English by his family but occasionally in French by his

mother and older brother. He went to a French daycare as well.

The participants were videotaped, individually, in two one-hour sessions: one in French

and one in English. Depending on the language context being videotaped, the researcher created

an environment where the participant would naturally hear that language. The participant also

included conversational partners for each language and participant. All of the session contexts

were free play with the only limitation being the avoidance of book reading. The researcher

followed this procedure in order to get a sample of the participant's everyday conversation with

the conversational partner. The actual free play activities that were chosen by the participant and

the conversational partner varied from participant to participant and session to session.

All sessions were transcribed for speech according to CHAT (Mac Whinney, 2000)

conventions by a native English speaker who was also fluent in French (as cited in Nicoladis,

2002, p. 250). A native speaker of French checked all the French transcripts for accuracy. Each

language utterance was coded as either: English-only, French-only, mixed, either, or

unintelligible. For the purpose of this study, the French-only and English-only utterances were

analyzed. The participant's gestures were also coded according to gesture type: conventional,

deictic, or iconic. Gestures were coded according to whether they were accompanied with

speech or in absence of speech as well.

Since the participants' dominant languages were unknown prior to this study, 3 variables

were used to determine each participant's dominant language: MLU, the number of utterances

within each language, and the Peabody Picture Vocabulary Test (PPVT). To determine the

MLU, the total number of words, not morphemes, used in either language was divided by the

total number of utterances used in each language respectively. The PPVT "is a standardized test of comprehension vocabulary" (Nicoladis, 2002, p. 252). The participants took Version A in English and Version B in French. A participant's dominant language was determined by which language was used more on 2 out of 3 or 3 out of 3 dominance measures. The data results suggested that 4 participants were more dominant in French and 4 participants were more dominant in English. The participants who were found to be French dominant heard only French at home and the participants who were English dominant heard some English at home.

This research study's results suggested children do gesture more when speaking in their dominant language than they do in their second language. The finding above is true for iconic gestures but not for deictic or conventional gestures (Nicoladis, 2002). Nicoladis could also conclude from her findings that children speak longer when they use iconic gestures when speaking. It should also be noted that the length of utterances were even longer when children were speaking their dominant language and using iconic gestures than when speaking their non-dominant language and using iconic gestures (Nicoladis).

To examine if gestures would be produced without speech in order to compensate for weak language proficiency, the researcher looked for patterns within the data results. She felt that if the participants were using gestures to compensate for weak language proficiency, she would see them use more gestures without speech in the non-dominant language session (Nicoladis, 2002); however this pattern was not observed with the participants and therefore suggests that children do not use gestures to compensate for low language proficiency in the absence of speech.

Overall, only 20% of iconic gestures were produced where the participants were having word finding difficulty; however the researcher did note a slight trend in the use of iconic gestures and the age of the participants. She saw that the youngest participant produced 7% of her iconic gestures in instances of word finding difficulty and that the oldest participant produced 67% of iconic gestures when having word finding difficulty.

In conclusion this study examined the way bilingual preschoolers used gestures in both their French and English languages. The research suggests that all 8 participants used both conventional and deictic gestures in similar ways in relation to their stronger and weaker language. The participants used conventional and deictic gestures in the absence of speech when communicating with someone in their weaker language than with someone in their dominant language. The researcher suggests this last result may find that children will use conventional gestures in the absence of speech to compensate for low language proficiency (Nicoladis, 2002).

This study also determined children will use iconic gestures more in their dominant language than their non-dominant language. Iconic gestures were found to be used more often when having word finding difficulties in older preschoolers than younger preschoolers. Overall, iconic gestures were not found to be used as a means to compensate for lower language proficiency but were found to be used with the participant's dominant language. As children become more proficient in their dominant language, iconic gestures can be expected to be used more (Nicoladis, 2002). It has been suggested by Frick-Horbury & Guttentag's (1998) study that iconic gestures help with the memory of individual words which may explain the strong correlation between the use of iconic gestures and spoken language proficiency (as cited in Nicoladis, 2002, p. 261).

Data results from this section suggest that when children are allowed to use gestures their comprehension increases; however, when teachers instruct their students on the gestures they want them to use, their performance levels increase even more. Stevanoni and Salmon (2005) determined that instructing children to utilize gesture during recall had cognitive and communicative benefits. They found when children used the gestures they were able to recall twice as much information than children who did not because they are able to provide more detailed information. Frick-Horbury (2002) determined that self-generated gestures acted as retrieval cues for verbal material over long retention intervals; therefore children who use gestures will be more likely to retain the information learned and be able to use the same gestures later for memory retrieval at a later date. Cameron and Xu (2011) concluded that student gestures also helped students with recalling information at a later time. They also found the use of gestures to increase the amount of information that students verbally recalled. Nicoladis' (2002) study found that students will compensate for low language proficiency by using conventional gestures and will incorporate iconic gestures more in their dominant language. Block et al. (2008) concluded that gestures can make abstract content, like comprehension processes, more visible to students. They suggest the use of CPMs to be beneficial to young readers who are struggling with the concepts of comprehension processes.

Conclusion

This chapter summarized research studies which concluded that gestures can improve memory recall, comprehension of speech for students acquiring a foreign language, students with ADHD, low English proficiency levels, ESL students, complex information to the learner, low-verbal-skill levels, promote learning through student use of gestures, creating awareness of the mathematical relationships between principles and algorithms, and students struggling with the

abstract concept of the comprehension processes (Block et al., 2008; Frick-Horbury, 2002; Stevanoni & Salmon, 2005; McNeil et al., 2000; Sueyoshi & Hardison, 2005; Cabrera & Martinez, 2001; Kelly et al., 2009; Wagner Cook & Goldin-Meadow, 2006; Singer & Goldin-Meadow, 2005; Cameron & Xu, 2011; Nicoladis, 2002; and Wang et al., 2004). When studies like these determine that gestures assist struggling students, it is also suggested that gestures can assist non-struggling students. Several studies mentioned in this chapter concluded that representational, deictic, and iconic gestures benefit listeners more so than any other type of gesture (Wang et al., 2004; Sueyoshi & Hardison, 2005; and McNeil et al., 2000). If teachers learn to include these types of gesture into their instruction, it can increase their students' understanding of the information. An even more effective teaching strategy would be to include teaching the students to use these types of gestures, in addition to the teachers use. These instructional gestures can serve as memory cues for later recall and will benefit the students during the recall process by assisting them in providing more detailed and richer responses (Stevanoni & Salmon, 2005; and Frick-Horbury, 2002).

The next chapter will discuss incorporating gestures as an instructional strategy and teaching tool in my classroom to benefit student comprehension. Even if the gestures do not increase a student's performance, they will not hinder their performance either and may assist in keeping the child engaged in the learning process. My focus for the background of this research project is to understand more about when and why gestures communicate so that I can design effective interventions within my classroom (Hostetter, 2011). The gestural strategies I incorporated were researched-based and were a result of this chapter's research review. It is my hope that student comprehension will increase as a result of gestural instruction.

CHAPTER THREE

Introduction

The purpose of this study was to investigate the effectiveness of incorporating hand gestures to guide and support reading and language instruction in order to meet the diverse learning needs of students. The research question guiding this study was: Will hand gestures increase reading comprehension?

Various studies conducted by researchers have determined that gestures assist struggling students with comprehension. Hand gestures used in conjunction with speech can provide more concrete and accurate information than through speech alone (Wang, Bernas, & Eberhard, 2004). Gestures can also scaffold children's comprehension of complex messages, as well as, aid students in recall (Stevanoni & Salmon, 2005; McNeil, Alibali, & Evans, 2000). The researcher was proposing the utilization of gestures as an instructional strategy and teaching tool in the classroom to increase student reading comprehension. This chapter details the sample population, description of procedures used, and data collection of the action research study.

Sample Population

This study took place in a Catholic Choice School located in the inner city in the Midwest. Eleven participants from the researcher's second grade classroom, 3 boys and 8 girls, participated in the study. The participants ranged in age of 7 to 8 years old, 10 were African-American students, and 1 was Hispanic/Latino. The researcher chose to use the students from her second grade classroom because many of them were reading below or on-level as second graders yet struggled with reading comprehension. Student reading levels were assessed according to the beginning of the year reading assessment which was created from the Houghton Mifflin leveled readers series (Houghton Mifflin Company, 2008). The researcher wanted to

improve their reading comprehension by assessing the effects of hand gestures as a comprehension aide. The next section will detail the procedures used in this research.

Procedures

Prior to beginning the study, the researcher informed the participants' parents about the action research study through a letter of consent (Appendix A) during parent-teacher conferences. Once the consent letters were signed the researcher began the 8 week study.

The first 4 weeks of the study consisted of current reading instruction for 60 minutes, 5 days a week. Each 60 minute reading lesson consisted of vocabulary development, a reading strategy focus and practice, and reading the weekly story selection. Within five days of instruction, three days focused on whole group instruction as described above while two days focused on small guided reading group lessons (Appendix B). The guided reading group instruction also consisted of vocabulary development, a reading strategy focus and practice, and reading the weekly story selection for guided reading levels. During these first 4 weeks, the researcher collected data from pre reading/comprehension assessment reading levels, reading comprehension tests after each story and theme, and anecdotal data.

During the second 4 weeks of the study, the researcher continued with the previous structure, as well as incorporated the use of gestures as an instructional tool to increase reading comprehension. The researcher used specific gestures during reading instruction for vocabulary words and the reading strategy focus for that week (Appendix C). These gestures included movements to illustrate various vocabulary words for each story and the abstract concepts of five reading strategies: summarize, evaluate, question, predict, and monitor/clarify. In addition to modeling these gestures, she taught the participants the gestures and to use them whenever

possible during the reading hour. The researcher first demonstrated a gesture for each

vocabulary word and had the students copy her hand gestures. Next, the researcher repeated the

use of the hand gesture each time she said the vocabulary word during the vocabulary lesson.

Then the researcher taught the hand gesture, for the reading strategy, for the week. Again, the

students were asked to copy the hand gesture for the reading strategy. Finally, the students were

instructed to practice the vocabulary word gestures anytime they occurred within the reading

selection. They were also asked to repeat the reading strategy hand gesture at the end of each

class as the researcher reviewed the meaning of that particular reading strategy concept. All data

was collected from reading comprehension tests after each story and theme, anecdotal data, and

pre-post reading/comprehension assessment reading levels.

Data Collection

Prior to the study, the participants had already been given a pre-reading/comprehension

assessment from the beginning of the year to determine their reading level, based on the guided

reading levels used at the school. This assessment was created from the Houghton Mifflin

leveled reading series (Houghton Mifflin Company, 2008). During the first four weeks data was

collected through a pre and post reading/comprehension assessment (Appendix D), anecdotal

data, reading comprehension tests after each selection (Appendix E), and a theme skills tests

upon completion of each theme in the Houghton Mifflin reading series (Houghton Mifflin

Company, 2008) (Appendix F). Next the researcher made observations and noted participants'

responses to questions during guided reading group discussions. After that she administered the

reading comprehension test for the selection at the end of the week and recorded the participants'

scores. These comprehension tests are taken from the Houghton Mifflin reading series

(Houghton Mifflin Company, 2008) (Appendix E). Finally, the researcher administered the

theme skills reading comprehension posttest at the end of the theme of the Houghton Mifflin

reading series (Houghton Mifflin Company, 2008) (Appendix F).

During the second four weeks data was collected in exactly the same manner. Anecdotal

notes were collected primarily during guided reading sessions. After reading a leveled reader

selection for two days, the researcher wrote down the students' responses to comprehension

questions, as well as, student use of gestures for the reading comprehension strategies. At the

end of the study, the participants were given a final reading/comprehension assessment to re-

evaluate their reading levels. The researcher compared the first 4 weeks data collection to the

second 4 weeks data collection to note if gestures did increase student reading comprehension

Conclusion

The purpose of this action research was to investigate the effects of hand gestures on

reading comprehension in my second grade classroom. The first four weeks involved daily, 60

minute, reading instruction in the areas of: vocabulary development, modeling and practice of

reading comprehension strategies, guided reading, and weekly reading of a Houghton Mifflin

theme selection (Houghton Mifflin Company, 2008). The second four weeks continued as

described above with the addition of gestures for vocabulary words and reading comprehension

strategies. The researcher modeled the use of the gestures and instructed the students to copy the

gestures whenever the vocabulary words and reading strategies occurred within the selection or

reading lesson. Comparisons were made between the data collected from the first 4 weeks to the

second 4 weeks of the study. This chapter outlined the sample population, detailed the

procedures used, and explained the data collection process during an eight week study. The

effectiveness of hand gestures on reading comprehension will be summarized and the results

discussed in the following chapter.

CHAPTER FOUR

Introduction

The research study data was gathered to measure the effectiveness of hand gestures on reading comprehension. The researcher believed that the incorporation of hand gestures into daily reading lessons would increase student reading comprehension. Within the course of the intervention, the researcher investigated the effectiveness of incorporating hand gestures to guide and support reading and language instruction. Various studies conducted by researchers have determined that gestures assist struggling students with comprehension. Hand gestures used in conjunction with speech can provide more concrete and accurate information than through speech alone (Wang, Bernas, & Eberhard, 2004). Gestures can also scaffold children's comprehension of complex messages, as well as, aid students in recall (Stevanoni & Salmon, 2005; McNeil, Alibali, & Evans, 2000). The researcher believed utilizing gestures as an instructional strategy and teaching tool in the classroom could increase student reading comprehension. This chapter contains the data collected, visual representations of data analysis, and a summary of the results.

Overview and Data Collection

The pre-reading/comprehension assessment (Appendix D) was given prior to the beginning of the study to pre-determine the students' reading levels. In the beginning of the school year the students were already given a guided reading assessment to determine their reading level at that time. Although the pre and post-reading/comprehension assessments test for word solving, retelling and comprehension accuracy, the focus of the study was on comprehension, therefore, only the comprehension scores will be displayed. The pre-

reading/comprehension assessment scores will be displayed later in Table 2 with the post-reading/comprehension assessment scores.

Once the researcher determined if the participants were reading below, on, or above the second grade reading level, she was able to group them accordingly for guided reading instruction. As mentioned in the previous chapters, the first 4-weeks of the study consisted of current reading instruction for 60 minutes, 5 days a week. Each 60 minute reading lesson consisted of vocabulary development, a reading strategy focus and practice, and reading the weekly story selection. Within five days of instruction, three days focused on whole group instruction as described above while two days focused on small guided reading group lessons. The guided reading group instruction also consisted of vocabulary development, a reading strategy focus and practice, and reading the weekly story selection for guided reading levels. During the second 4-weeks of the study the researcher continued with the structure as described during the first 4-weeks of the study, however also incorporated the use of gestures as an instructional tool to increase reading comprehension. Again, these gestures included movements to illustrate various vocabulary words for each story and the abstract concepts of five reading strategies: summarize, evaluate, question, predict, and monitor/clarify (Appendix C). Figures 1-11 represent each individual student's comprehension test results at the end of every story. The stories were grouped according to their occurrence within the first 4-weeks of the study and the second 4-weeks of the study so that the researcher could compare the data results. For example, stories one and six were grouped to show the improvement of the first story without gestures to the first story with gestures. Any missing data indicates a score of zero percent or an absence on the day of the comprehension test.
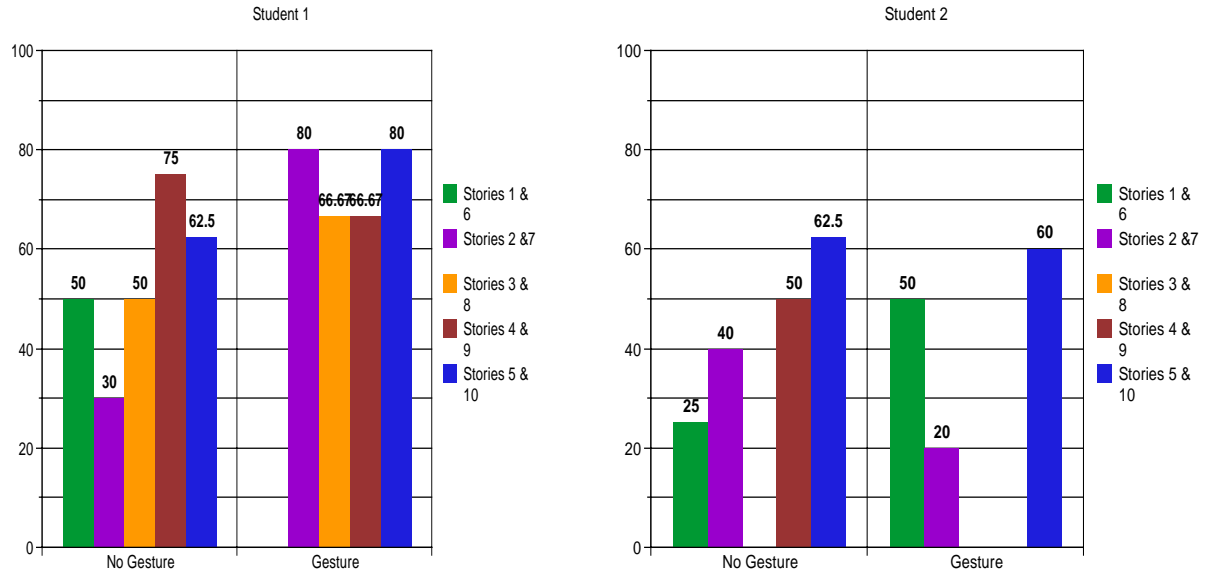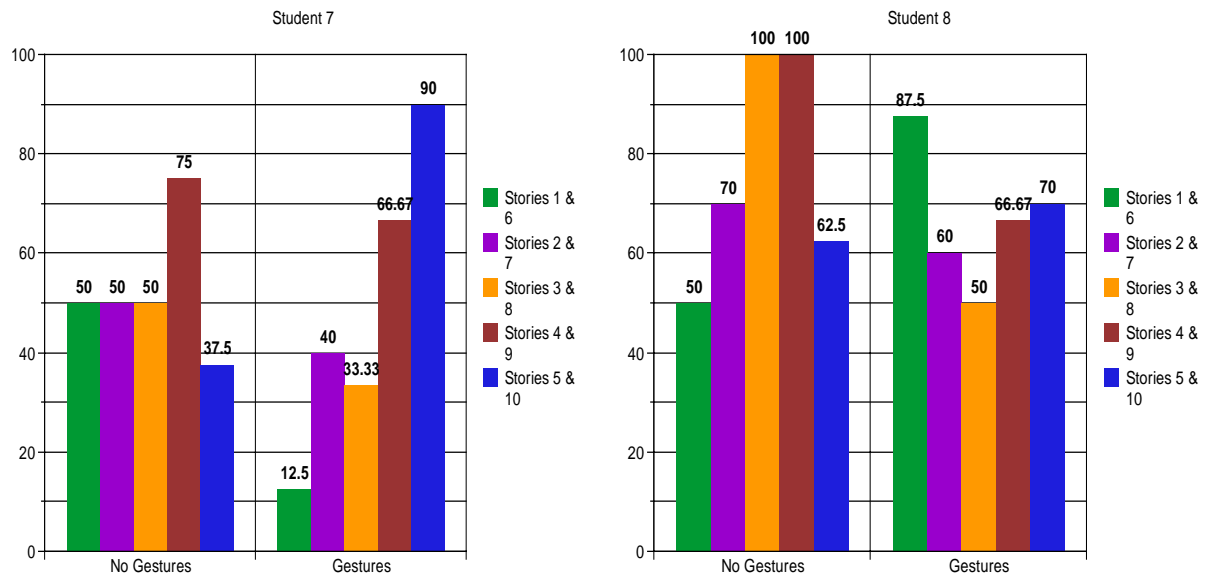
Figures 1 and 2   *Comprehension Results for Students 1 and 2*
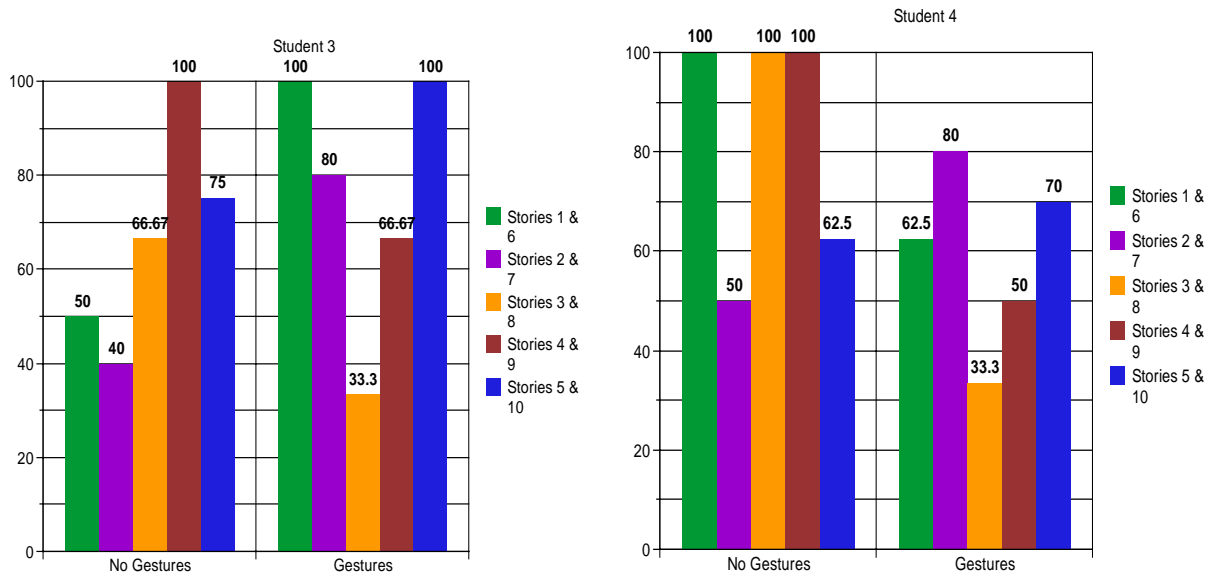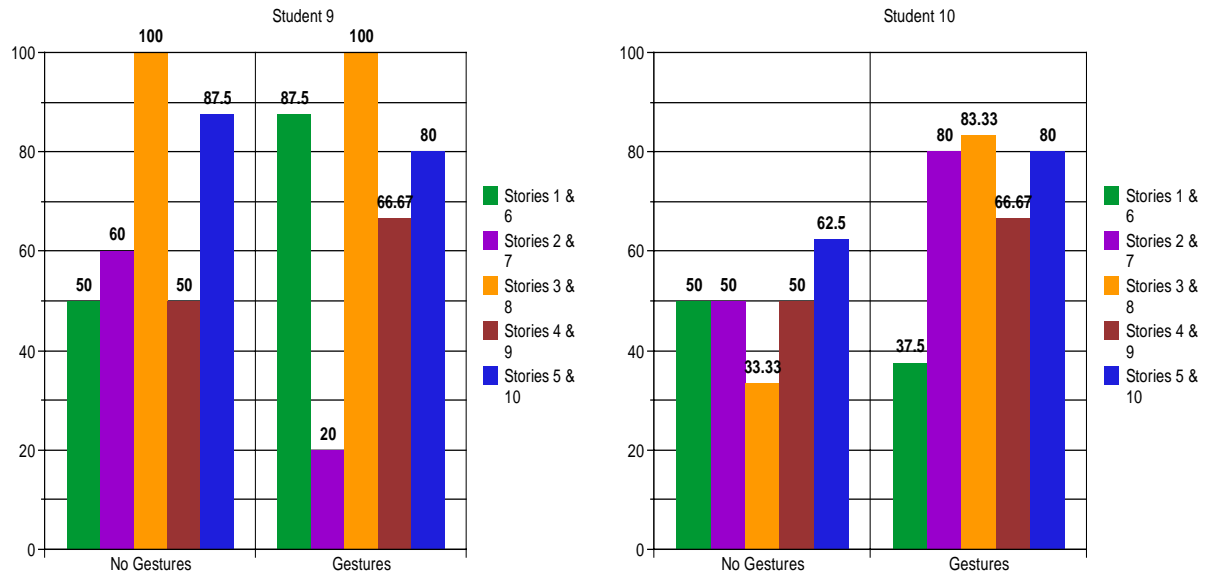

Figures 3 and 4   *Comprehension Results for Students 3 and 4*
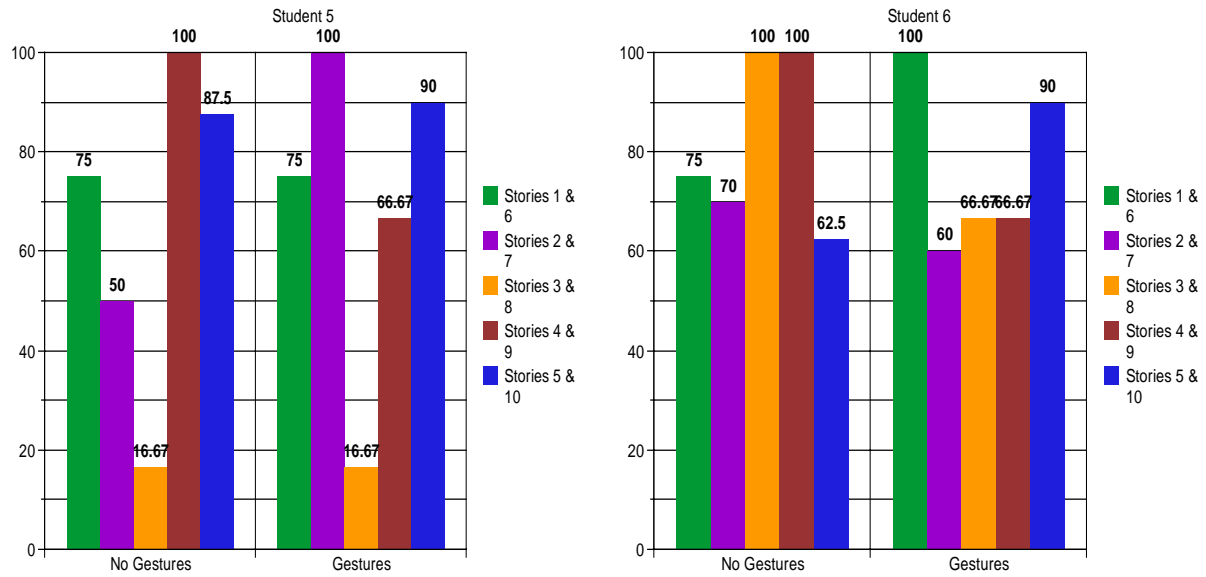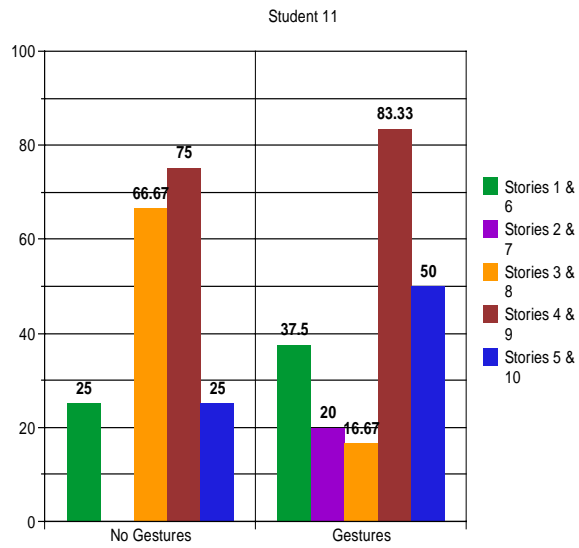
Figures 5 and 6   *Comprehension Results for Students 5 and 6*

Figures 7 and 8   *Comprehension Results for Students 7 and 8*

Figures 9 and 10   *Comprehension Results for Students 9 and 10*

Figures 11   *Comprehension Results for Student 11*

Although individual students did not show an increase in reading comprehension after each story during the second 4-week study when compared to each story in the first 4-weeks, Figure 12 represents the class averages of each story's comprehension test during the first 4-weeks and the second 4-weeks of the research study. The eleven participants performed better on three out of five reading comprehension tests during the second half of the study, which incorporated hand gestures.
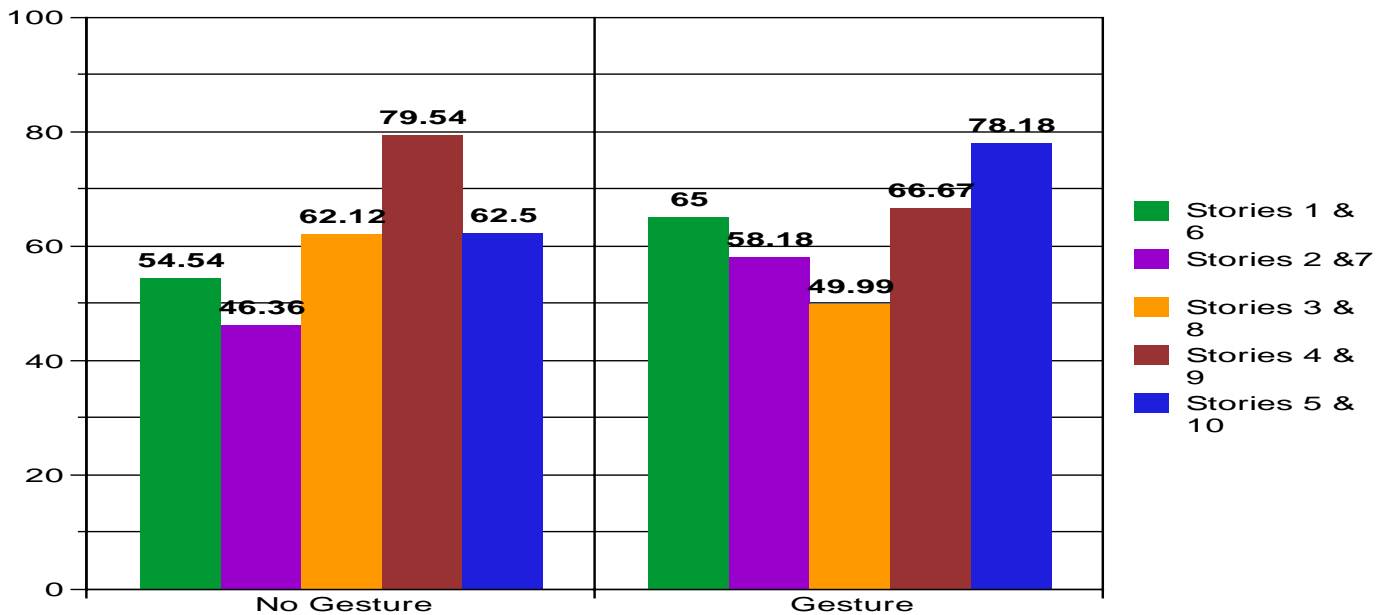
Figure 12   *Class Average Scores on Comprehension Tests*

In addition to comprehension test scores after each story during the 8-week study, the researcher also collected data from the theme skills tests which were given after the students completed each Houghton Mifflin theme in their reading series (Houghton Mifflin Company, 2008). The theme skill assessment tested for understanding and application of the reading

strategies taught during a particular theme, knowledge of vocabulary words from the stories

within that theme, and comprehension of new reading selections. During Theme 3, hand gestures

were not utilized during instruction. As the research study continued, half of Theme 4 was

taught without gestures while the other half included hand gestures. Towards the end of the

research study all of Theme 5 had hand gestures incorporated into the lessons. Table 1 gives the

results of the class average for the group on all 3 theme skills tests. Overall, the class improved

their scores by 7.96%. This is more evidence of improved comprehension as the hand gestures

were used.

Table 1

Class Average of the Theme Skills Tests

	Theme 3	Theme 4	Theme 5
Class Average in %	50.9	43.27	58.86

In addition to administering three Theme Skills Tests, the researcher collected data from

the post-reading/comprehension assessment. This assessment was given at the end of the study

to evaluate the students' increase or decrease in scores when compared to their pre-

reading/comprehension assessments (Table 2).

After the 8-week study was conducted and all data was collected, the researcher

compared the pre and post-reading/comprehension assessments. Since the focus of the research

was the effects of hand gestures on reading comprehension, the researcher did not compare the

data results for the word solving or retelling sections on the assessments. Table 2 displays the

pre and post scores for comprehension. Five out of the eleven participants showed an increase in

reading comprehension while four students did not increase nor decrease. Two out of the eleven

participants decreased in reading comprehension. Green indicates an increase, red a decrease,

and yellow a static score.

Table 2

Pre and Post reading/Comprehension Assessment Results: Comprehension scores

Student #	Pretest	Posttest	Increase or Decrease
1	50	75	+25
2	25	100	+75
3	100	100	0
4	75	67	-8
5	50	100	+50
6	100	100	0
7	0	0	0
8	75	75	0
9	100	100	0
10	33	50	+17
11	0	50	+50

The data results indicated that incorporating hand gestures into reading lessons did

significantly increase student reading comprehension scores for some students and minor

increases in reading comprehension occurred for others. On average, the students performed

better after having hand gestures utilized as a teaching and learning tool for three out of the five

stories (Table 3). Again, green indicates an increase and red a decrease in score.

Table 3

Class Average Results

	No Gestures	Gestures	Increase or Decrease
Stories 1 and 6	54.54	65	10.46+
Stories 2 and 7	46.36	58.18	11.82+
Stories 3 and 8	62.12	49.99	12.13-
Stories 4 and 9	79.54	66.67	12.87-
Stories 5 and 10	62.5	78.18	15.68+

It should be noted that due to illness within the classroom when story 8 was taught, 3 out of the 11 participants had multiple absences. The illness continued into the following week and 2 out of 11 participants were absent multiple days when story 9 was taught as well.

Conclusion

The hypothesis for this study was reading comprehension would increase through incorporation of hand gestures to guide and support reading and language instruction. In this chapter the results from the eleven participants' comprehension tests (for each story) were depicted, pre and post-reading/comprehension assessments were compared, the class's average scores for each Theme skills test were displayed, and student comprehension scores were color coded as having either increased, decreased, or static. While this chapter discussed the data collected to measure the effectiveness of hand gestures on reading comprehension of second grade students, chapter five presents conclusions drawn from this data.

CHAPTER FIVE

Introduction

In the previous chapter data analysis and results from the research study were summarized. This research study was created to explore the effectiveness of hand gestures on student reading comprehension. In this chapter connections to existing research will be related, explanations for the results will be presented, as well as strengths and limitations of the study will be considered. Lastly, I will synthesize the chapter's main ideas to formulate recommendations for future research studies.

Connections to Existing Research and Common Core Standards

In order to develop the research study, the researcher identified a problem within the classroom and discovered that although many of her students were at or above word solving readers, many of them were below level in reading comprehension. In Chapter Two existing research pertaining to this study was summarized. This section will connect existing research to the design of this study and the Common Core Standards for second grade students.

Reading comprehension is the act of understanding text. Although the definition seems simple enough, the act of reading comprehension is not as simple to teach or learn because it is an intentional, active, and interactive process which occurs throughout a reading. Prior to the start of my study I examined research that had been conducted on the effects of gestures on student learning, hand gestures on effective teaching, and the affect hand gestures had on student comprehension and recall. A primary objective of this action research was to connect the existing research studies to the design and implementation of my study. First, research validated teachers' need to incorporate gestures into their instruction because representational and deictic

gestures can maximize a teacher's effectiveness within the classroom, particularly with ADHD students (Wang, Bernas, & Eberhard, 2004). In addition, Kelly, McDevitt, and Esch's study (2009) suggested that modeling gestures for students cements language to meaning and could help students remember the meanings of new words because of their semantic content. Furthermore, Cabrera and Martinez's study (2001) findings were consistent with Penate and Bazo's (1998) study which determined that repetitions, comprehension checks, and gestures all affect comprehension levels of students (as cited in Cabrera & Martinez, 2001, p. 282). Additionally, reinforcing gestures were found to scaffold children's comprehension of complex messages but not simple messages within McNeil, Alibali, and Evans (2000) study. These research findings were considered when designing my research study. A combination of deictic, representational, reinforcing, and iconic gestures were used by the researcher during instruction in order to scaffold the participants understanding of complex messages and vocabulary development. The repetitive use of these gestures throughout the study aided student learning which was evident through comprehension checks during the course of the 8-week study.

Second, research considered the positive effects student gestures could have on comprehension. Stevanoni and Salmon (2005) explored the impact gestures have on memory. They concluded that students who gestured during verbal recall of an event were able to recall more information. Similarly, Donna Frick-Horbury (2002) determined that the cue of student hand gestures helped students to reduce their loss of recall over a two week period of time. She observed self-generated hand gestures could act as an immediate retrieval cue for verbal material. In addition, Cathy Collins Block, Sheri R. Parris, and Cinnamon S. Whiteley (2008) verified Comprehension Processes Motions (CPMs) to make abstract, metacognitive aspects of comprehension processes visible, understandable, and accessible to students. Finally, in Elena

Nicoladis' study (2002), data results suggested that when students are allowed to use gestures

their comprehension increases; however, when teachers instruct their students on the gestures

they want them to use, their performance levels would increase even more. The results of these

findings inspired me to foster the use of student gestures within my study. Student gestures were

apparent during the study when the participants mimicked my hand gestures for vocabulary

words and reading strategies. The students were also observed gesturing on their own without

being prompted by the researcher.

Finally, existing research studies recommended further investigation of hand gestures and

their effects on increased learning of students. Hostetter (2011) stated that numerous studies had

been conducted on gestures; however, it was still unclear whether or not gestures actually benefit

the listener. Likewise, Sueyoshi and Hardison (2005) agreed that researchers need to investigate

the role of facial cues and gestures for listening comprehension. They also felt the selection of

topics used in studies needed to be wider in order to recognize the individual variations in both a

speaker's production of nonverbal cues and a listener's response to them (Sueyoshi & Hardison,

2005). Finally, researchers Hilary Cameron and Xu Xu (2011) felt more studies needed to be

done in order to fully determine the effects gestures had on the various aspects of the retelling

process. They also predicted further research could shed light on the subject and its effectiveness

on memory retrieval and speech production. After reading and researching the studies

summarized in Chapter Two, I designed my own gesture-related study to answer the question:

Would hand gestures increase reading comprehension? I created not only gestures to represent

vocabulary, but also movement specific to reading strategies.

Common Core Standards (Common Core State Standards Initiative, 2010) provide

teachers with a clear and consistent framework to prepare students for specific learning

objectives. This study met numerous standards in relation to vocabulary development and

reading comprehension, they are: Use knowledge of language and its conventions when writing,

speaking, reading, or listening; Vocabulary Acquisition and Use: Use sentence-level context as a

clue to the meaning of a word or phrase; Vocabulary Acquisition and Use: Identify real-life

connections between words and their use (e.g., describe foods that are spicy or juicy); Use

context to confirm or self-correct word recognition and understanding, rereading as necessary;

Ask and answer such questions as who, what, where, when, why, and how to demonstrate

understanding of key details in a text; Comprehension and Collaboration: and Ask for

clarification and further explanation as needed about the topics and texts under discussion

(Common Core State Standards Initiative, 2010).

With the Common Core Standard in mind, I created action research so the participants

would benefit from the use of hand gestures during explicit instruction of vocabulary

development and reading strategies. The idea being, explicit instruction of vocabulary

development and reading strategies would increase reading comprehension. Vocabulary

development is essential to comprehension because students need to understand the words they

read in order for comprehension to occur. When students have knowledge of the words they

read, they are able to read more fluently and accurately, therefore supporting reading

comprehension. Providing hand gestures as a tool to increase vocabulary development allowed

the researcher to bridge the gap of student knowledge and use of language and its conventions

when writing, speaking, reading, or listening. Many of the hand gestures used to represent the

vocabulary words were adapted from American Sign Language (ASL) gestures, therefore,

students were able to identify real-life connections between words and their use (Signing Savvy,

2012). Development of reading strategies is equally important and increasingly recognized.

Danielle McNamara (2009) wrote strategy instruction is needed and effective, especially for struggling students. Cathy Collins Block, Sheri R. Parris, and Cinnamon S. Whiteley (2008) stated researchers have found that kinesthetic motions, like comprehension process motion (CPM), provide mental representations for abstract concepts such as comprehension strategies (as cited in Block et al., 2008). They describe CPMs as "kinesthetic hand placements and movements that portray the visual and physical representations of abstract, unseen comprehension processes such as finding main ideas, inferring, making predictions, and clarifying" (Block et al., 2008, p. 461). Therefore, the hand gestures aided the students in learning the reading strategies which are aligned to the following Common Core Standards: Use context to confirm or self-correct word recognition and understanding, rereading as necessary (Monitory & Clarify); Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text (Evaluate, Predict, Questions); Ask for clarification and further explanation as needed about the topics and texts under discussion (Questions and Monitor & Clarify). My study used hand gestures as a learning and recall tool for vocabulary development and reading strategy instruction.

Explanation of Results

In the previous section, connections to relevant research were discussed. In this section, the results of the study are explained. After examining and comparing the data from three assessments in this study, the results were found to be noteworthy. First, when pre and post-reading/comprehension assessments (Appendix D) were compared, five of the eleven participants increased their comprehension scores by at least seventeen points. One student declined by eight points and the remaining five students showed no growth due to a variety of circumstances I noted during the post assessment. Student 4 declined during the post-

reading/comprehension assessment due to missing one key element in her response to one of the comprehension questions. Students 3, 6, and 9 showed no growth because they had scores of 100% on both pre and post-reading/comprehension assessments. I believe Student 7 showed no growth because she misunderstood the questions being asked, therefore providing an incorrect answer. The results suggested that reading comprehension scores had increased for five students after the 8-week study. This indicated that reading comprehension had increased after hand gestures (Appendix C) were incorporated and taught during reading instruction.

In addition to analyzing pre and post-reading/comprehension assessments, the researcher also compared weekly comprehension tests (Appendix E). When comparing the comprehension test results from story 1 and story 6, one student showed no growth, six students increased their scores, and four students decreased in scored. The reading strategy for story 1 was Questions and the reading strategy for story 6 was Summarize. It should also be noted that story 1 was a non-fiction selection and story 6 was a fiction selection. The students could have had a harder time going from the Question reading strategy to the Summarize reading strategy because even with hand gestures, summarizing is more detailed and requires more information for the students to recall.

In linking stories 2 and 7, six students increased their scores and five students decreased. The reading strategies for these stories were Predict (story 2) and Evaluate (story 7). Story 2 was a fictional selection and story 7 was non-fiction. Although six students increased their scores, I believe that going from Predicting to Evaluating was more difficult and abstract, which could explain why the remaining five students did not increase their scores.

Associating stories 3 and 8, three students showed no growth, two students increased their scores, and six students decreased. The reading strategies for these stories were Evaluate (story 3) and Questions (story 8). Both stories were fiction. During week 8, three out of the 11 participants had multiple absences which could explain the decrease in comprehension scores.

When assessing stories 4 and 9, three students increased their scores and eight students decreased. The reading strategies for these stories were Monitor and Clarify (story 4) and Predict (story 9). Both stories were fiction. Two out of 11 participants were absent multiple days when story 9 was taught which could have affected the results of their comprehension scores.

Last, when comparing stories 5 and 10, nine students increased their scores and two students decreased. The reading strategies for these stories were Questions (story 5) and Monitor and Clarify (story 10). Story 5 was a non-fiction selection and story 10 was fiction. I believe that after 4 weeks of incorporated hand gestures into reading instruction, this final week demonstrated that hand gestures used continually could increase student reading comprehension. My conclusion was the added tool of gestures within reading instruction finally started to solidify with the majority of the participants and may be the reason more students increased their comprehension scores.

When I averaged the 11 participants' comprehension test scores for all ten stories, the class overall showed an increase in scores for three out of the 5 weekly story comparisons. The two weekly comparisons, where scores decreased, were from Stories 3 & 8 and Stories 4 & 9. During weeks 8 and 9, as mentioned before, multiple students had significant absences due to

illness. This could be the contributing factor to the decrease in participants' scores for those weeks.

A final assessment analysis was performed for the Theme Skills tests (Appendix F), which measured understanding and application of the reading strategies taught during a particular theme, knowledge of vocabulary words from the stories within that theme, and comprehension of new reading selections. For Theme 3's Skills test the following reading strategies were assessed: question, predict, and evaluate. Theme 4's Skills test assessed monitor & clarify, question, and the summarizing reading strategies. Occurring in Theme 5's Skills test was evaluate, question, predict, and monitor & clarify. Prior to each Theme Skills test, the researcher used the hand gesture assigned to each reading strategy when she gave the directions for each reading section of the test, some participants mimicked her and others did not. The Theme Skills test class averages showed a decrease in scores from Theme 3 (instruction without gesture) to Theme 4 (instruction with some gesture towards the end of the theme). I believe this is due to the initial change to instruction. The students may have been overly focused on gesturing instead of learning what the gestures, not the gestures themselves. There was an increase in scores moving from Theme 4 to Theme 5 (instruction with gesture). This may have occurred for several reasons. The first being the students were used to using hand gestures by then and so they were not overly focused on the gestures themselves. Secondly, the students may have started internalizing the concepts the gestures represented. Lastly, the students may have used the gestures to aide their recall and comprehension of the stories, vocabulary, and reading strategies. Overall, the students increased their Theme Skills test scores from the beginning of this research study (Theme 3) to the end (Theme 5). These results confirmed that hand gestures can benefit reading comprehension for most students.

In total, the findings of all three assessments led me to believe that incorporating hand gestures into reading instruction can positively impact student reading comprehension. By the end of the study, five out of the eleven participants increased in reading comprehension scores from their pre to post-reading/comprehension assessments while only four students did not increase nor decrease. In addition, all of the participants performed better on three out of five weekly reading comprehension tests during the second half of the study, which incorporated hand gestures. Lastly, the data results of the Theme Skills tests indicated that incorporating hand gestures into reading lessons did significantly increase student reading comprehension scores for some students and minor increases in reading comprehension occurred for others. Overall, the class improved their scores by 7.96%. The evidence of improved comprehension after hand gestures were used from all three assessments allowed me to answer my initial research question: Will hand gestures increase reading comprehension? The answer is yes, hand gestures can increase reading comprehension.

The strengths and limitations of this study will explain which aspects of the study went particularly well and which aspects could benefit from improvements.

Strengths and Limitations

In this research study there were strengths and limitations. The first strength included a structured and predictable routine in which the participants were familiar. The researcher was able to incorporate the use of hand gestures into the routine and lessons without disrupting the predictability and structure of a typical reading hour. As the researcher, the classroom teacher was able to make the students feel at ease through the use of an expected routine and structure of the reading hour. As the study progressed, the students were able to make the transition of

incorporating hand gestures easily during the second half of the study, as that was the only change to the reading hour. The second strength was the use of assessments with which the participants were already familiar. Each participant had already been exposed to the reading/comprehension assessments, weekly comprehension tests, and the Theme Skills tests. Although the exact assessments varied, the format and time in which these assessments occurred were familiar and predictable. Lastly, a strength that could be considered is the fact that the researcher was the participants' classroom teacher. I was able to look at the district, school, and classroom data. From this, I saw a need for vocabulary development and increased reading comprehension. I was able to connect the existing research to solutions for my students' challenges in reading comprehension. With the comforts of the regular teacher making changes, the students were able to adapt as participants in this study and were provided a familiar learning environment which decreased their anxiety level.

This study provided insights on increasing student comprehension through the use of hand gestures; however, there were some limitations as well. One limitation was that the study was too short. When incorporating hand gestures to increase student understanding of reading strategies, teaching one strategy per week is not enough time for mastery. Comprehension is a long process, particularly for young students. It is this researcher's belief that given more time the participants would have had numerous exposures to each reading strategy and hand gesture for those strategies. This would have provided multiple exposures and more time for mastery of the reading strategies with hand gestures.

A second limitation was that the study occurred at one school with only eleven participants. Using this small a population does not allow the researcher to generalize the results to a larger population. Also, with such a limited group, any absences had a huge impact on the

results. A comparative study using two classes in rural, suburban, and urban schools could

provide more data about which types of participants benefit from the use of hand gestures during

reading instruction. Does the incorporation of hand gestures only benefit urban students or can it

benefit all students despite their race, culture, or socio-economic status?

Finally, the frequency and use of hand gestures by the participants was not included in

this study. While the researcher may have noted students utilizing the reading strategy or

vocabulary word gestures during a lesson, without being prompted by the researcher, she does

not have an accurate log of such events to report. Video recording and taping the lessons to later

record the number of gestures used by the participants throughout the study would have provided

more data to the researcher. All of these factors potentially affected the performance of the

participants either in a positive or negative way. Further reflection upon the studies strengths

and limitations led the researcher to recommendations for future research.

Recommendations for Future Research

Several recommendations come to the forefront based on further reflection of this study.

One recommendation would be to design a 6-month study with both a control group and

experimental group. Both groups would receive reading instruction from the same researcher;

however the experimental group would receive instruction with hand gestures later on in the

study while the control group received no change. The study would consist of typical reading

instruction for both groups for the first 3-months of the study. During the second 3-months, the

control group would receive no change in their instruction while the experimental group would

receive instruction that incorporated the use of hand gestures for each reading strategy, such as:

question, predict, monitor & clarify, evaluate, and summarize. This would provide all

participants the same amount of time in learning the various reading strategies multiple times

throughout the 6-month study, the only change would be the incorporation of the hand gestures

for the experimental group during the last 3-months.

A second recommendation would be to reinforce the use of gestures in a variety of ways.

A photograph of the hand gesture that corresponds to its particular reading strategy would be

posted on a reading strategies bulletin board during the second course of the study for the

experimental group only. This would provide a gestural reference point for the students. The

students could also work with partners and teach each other the gestures used for each

vocabulary word and reading strategy while reading a selection. The researcher may allow the

students to make up the gestures for some of the vocabulary words or reading strategies. This

would provide students to take ownership in the gestures that are used within the classroom.

A third recommendation would be to video record all the lessons for both groups. This

would provide the researcher data on the amount of times students gestured during instruction for

the 6-month study. The researcher could use the data gained from the videos to compare and

analyze the assessment results with the amount of times students did or did not gesture during a

particular week of instruction or theme. This would provide more insight as to the results of the

assessments and effectiveness of hand gestures on increased reading comprehension.

One final recommendation would be to test the hypothesis that hand gestures increase

reading comprehension, with this study, at other schools with various participants. Ideally

replicating this study in a rural, suburban, and inner city schools would allow the researcher to

generalize the results to a larger population. Further research conducted in these settings could

provide specific data as to which types of students benefit from the use of hand gestures during

reading instruction. Does race, ethnicity, socio-economic status, or gender make a difference?

Conclusion

Throughout this chapter the methods of the study were connected to existing research, a summary of the results was reported and explanations for those results were provided. Future research recommendations were also prepared based on reflections of the study's strengths and limitations. This study demonstrated the positive impact hand gestures can have on reading comprehension. On three out of five reading comprehension tests, the students performed better after receiving instruction with hand gestures. Pre and post-reading/comprehension assessment scores showed ten out of the eleven participants either increased or maintained their reading comprehension scores. In addition, the class improved their Theme Skills test scores by 7.9% after the 8-week study. This suggests that hand gestures can increase reading comprehension.

As a result of my action research I realized the impact hand gestures had on increasing reading comprehension of second graders in an urban setting. Not only did hand gestures engage my students more in their reading lessons with me, but I imagine that it helped them take abstract concepts, such as the evaluate reading strategy, and make them more tangible and clearly understood. As a result of my research, my future teaching will change significantly. With the background I have gained from this research, I see the significance of vocabulary development and explicit reading strategy instruction on increased reading comprehension. Utilizing hand gestures as one learning tool within my classroom can help second grade, urban students to succeed.

Having completed a Master's Program with hopes of becoming an educational leader, I will share the knowledge I have gained with my colleagues. I hope to present the findings of my research study with my co-workers and provide hand gesture training to those who are interested

in learning. Communicating current research studies on hand gestures, vocabulary development,

reading comprehension, and kinesthetic learning with my colleagues is another personal goal. It

is important for educators to share our knowledge with one another so we can provide the best

instruction for the diverse learning needs of our students.

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Appendices
Appendix A

December 2011

Dear Parent/Guardian,

I am a student in the English as a Second Language (ESL) masters degree program at Cardinal Stritch University. I am conducting an 8 week study to investigate the effectiveness of hand gestures on reading comprehension. I believe utilizing gestures as an instructional strategy and teaching tool in my classroom can increase student reading comprehension.

Procedure: The first 4 weeks of the study will consist of current reading instruction for 60 minutes, 5 days a week. During the second 4 weeks of the study, I will continue with the current reading instruction, as well as incorporate the use of gestures as an instructional tool to increase reading comprehension. I will compare the first 4 weeks data collection to the second 4 weeks data collection to note if gestures did increase student reading comprehension.

Confidentiality: All data gathered on your child will be kept confidential and locked in a file cabinet and password protected computer in my classroom. To ensure confidentiality, a pseudonym will be used for your child's name.

Risks: I do not anticipate this study will cause any type of risk, psychological or otherwise.

Benefits: Your child will be able to use hand gestures as a tool to increase his/her own reading comprehension. Data results will be shared with educators so that they can understand the benefit of hand gestures on reading comprehension and may incorporate them into their classrooms as a learning tool for their students.

Participation is Voluntary: If you are not comfortable with your child participating in this study, please let me know on the consent form.

Use of Your Information: My goal is to present the results of this study to my peers during the Spring/Summer of 2012. Only aggregate (combined) data from all participants will be used, and in no case will any names be associated with this study.

Contact Information: If you have any questions, concerns, or comments on this study, please contact me:
Keri Koepke
Blessed Savior School East Campus
5140 N. 55th Street, Milwaukee, WI 53218
414-438-1745   kkoepke@wolfmail.stritch.edu

If you have any complaints about this study, please call or write:
Joan L. Whitman, COEL, IRB Chair
6801 N. Yates Road BOX 375, Milwaukee, WI 53217
414-410-4343   jlwhitman@stritch.edu

_____ I have received an explanation of the study.
_____ I agree to permit my child to participate in the study.
_____ I do not agree to permit my child to participate in the study.

_____
Name of minor child

_____
Signature of parent

This research has been approved by Cardinal Stritch University Institutional Review Board for the protection of Human Participants for a period of 18 months

Appendix B

Table 4

Weekly Reading Activities

Day	Learning Activities
1	**Teacher Read Aloud** **Vocabulary Development** **Comprehension Strategy** **Read the Selection** **Comprehension Practice Activities**
2	**Vocabulary Development Review** **Comprehension Strategy Review** **Reread the Selection with Guided Comprehension Questions** **Comprehension Practice Activities**
3	**Vocabulary Development Review** **Comprehension Strategy Review** **Reread the Selection with Think About the Selection Questions Following** **Comprehension Practice Activities**

4	**Centers:**
	  1) **Comprehension Practice Activities**
	  2) **Guided Reading with the Teacher**
	     • **Vocabulary Development**
	     • **Comprehension Strategy**
	     • **Read the Selection**

5	**Centers:**
	  1) **Comprehension Test**
	  2) **Comprehension Practice Activities**
	  3) **Guided Reading with the Teacher**
	     • **Vocabulary Development Review**
	     • **Comprehension Strategy Review**
	     • **Reread the Selection and Answer the Responding Questions**

Appendix C

Vocabulary Words

The Great Ball Game
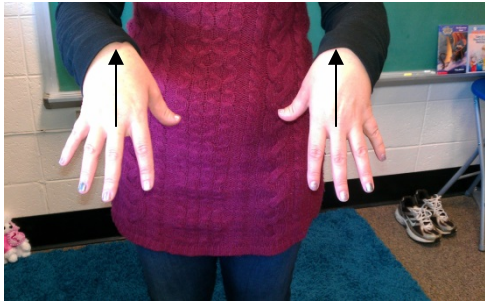
Figures 13 and 14   *Accept*

Figures 15 and 16   *Advantage*
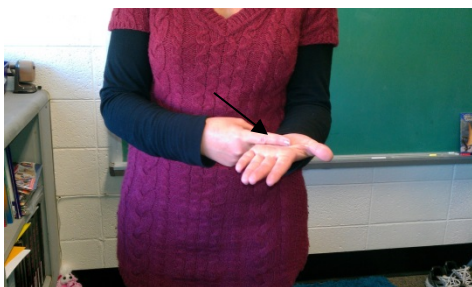
Figure 17   *Argument*

Figures 18 and 19   *Penalty*
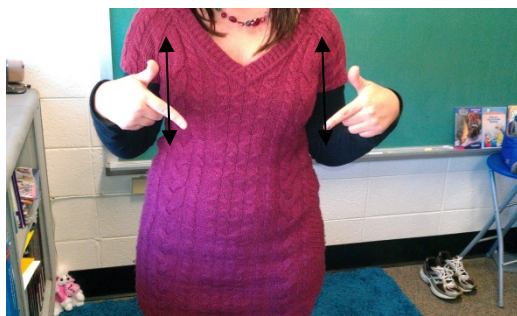
Figure 20   *Quarrel*

Brothers and Sisters
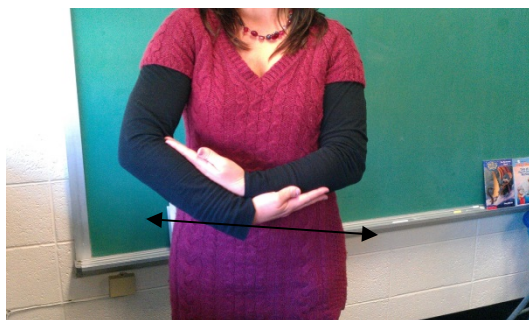
Figure 21   *Newborn*

Figure 22   *Distract*

Figures 23 and 24   *Twins*
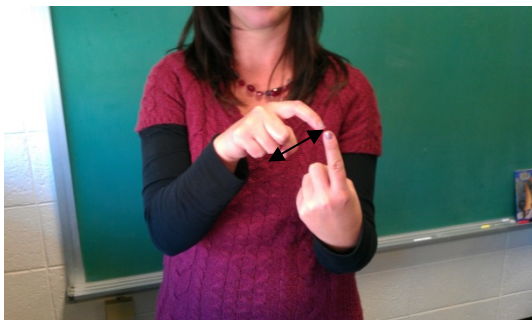
Figure 25   *Pest*
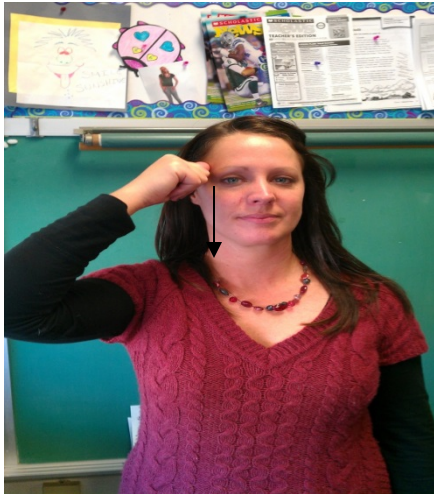
Figures 26 and 27   *Teenage*

Jalepeno Bagels
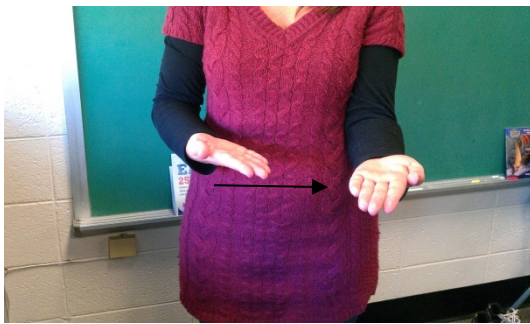
Figures 28 and 29   *Bakery*

Figure 30   *Culture*
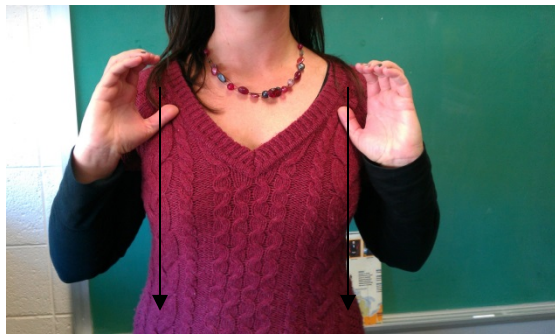
Figures 31 and 32   *Customer*

Carousel

Figures 33 and 34   *Angry*
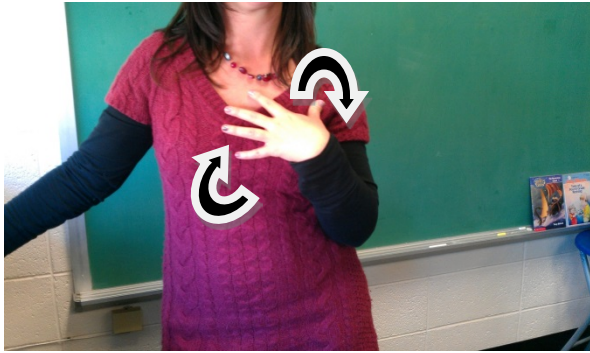
Figure 35   *Fussed*

Figure 36   *Grumbled*
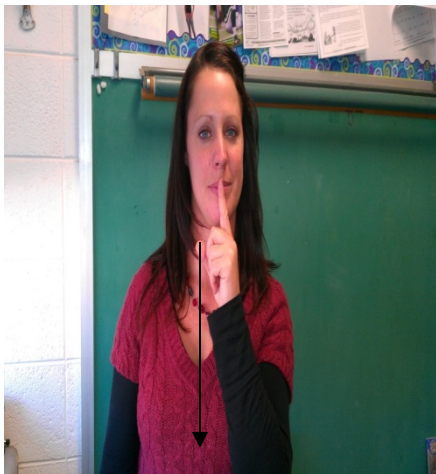
Figures 37 and 38   *Promised*

Thunder Cake
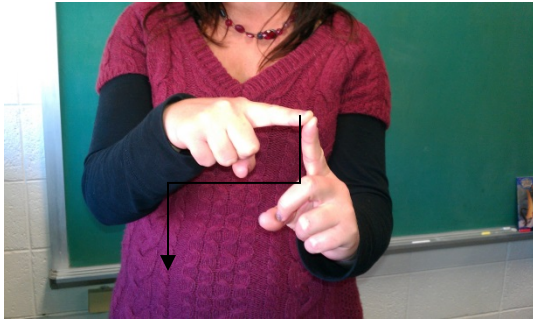
Figures 39 and 40   *Bolt*
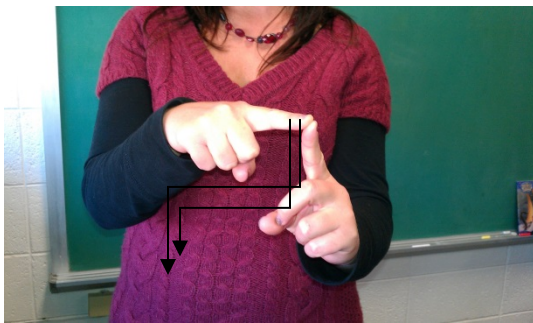
Figures 41 and 42   *Lightning*

Figures 43 and 44   *Thunder*
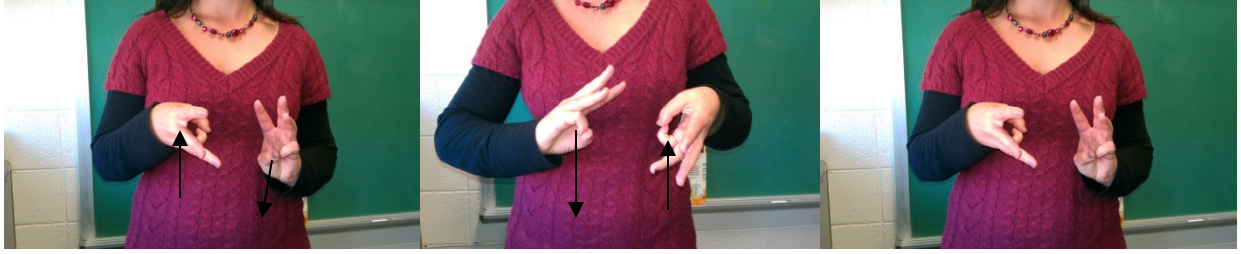
Figures 45, 46, and 47   *Weather*
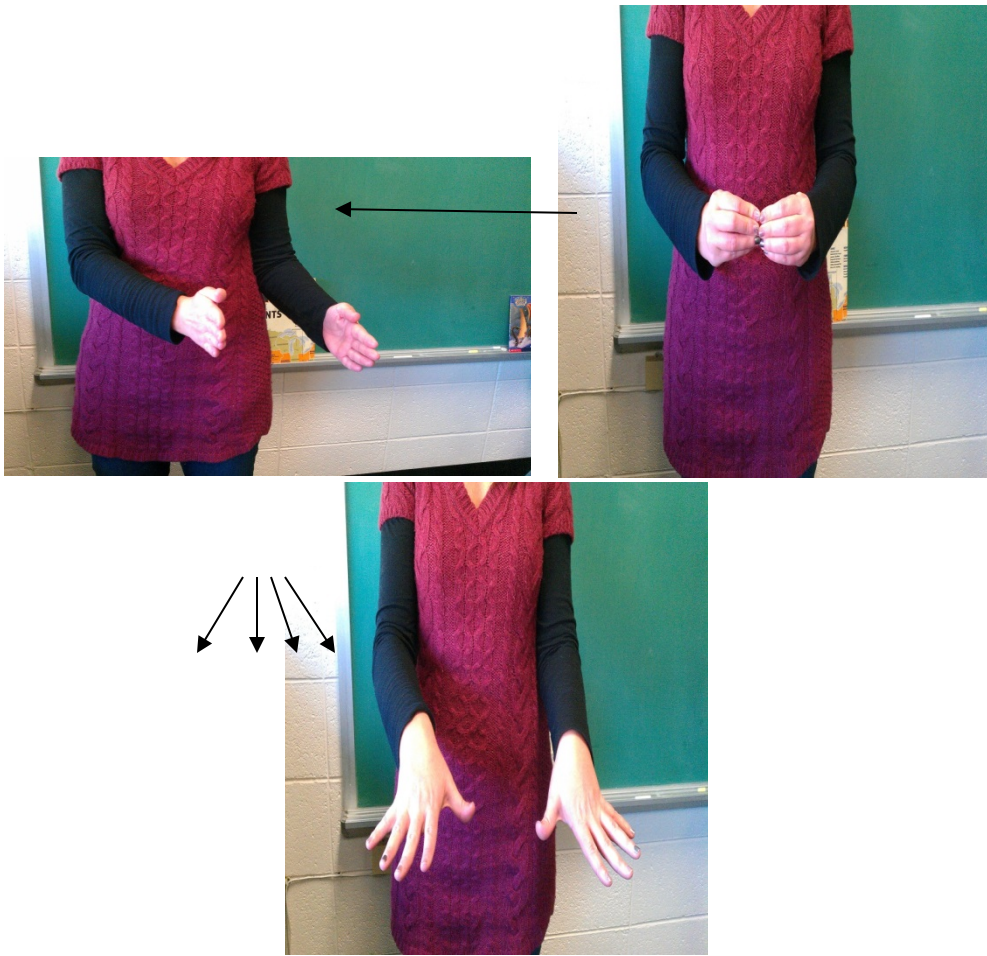
Reading Strategies

Figures 48 and 49   *Summarize*
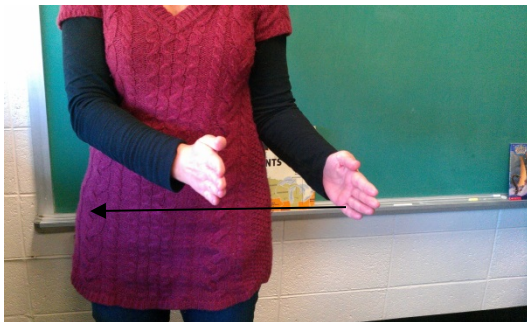
Figure 50   *Monitor*
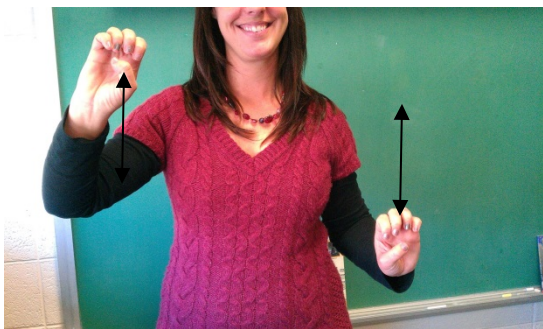
Figures 51, 52, and 53   *Monitor & Clarify*

Figure 54   *Evaluate*

Figure 55   *Predict*

Appendix D

Pre and Post-Reading/Comprehension Assessments

Guided Reading Assessment
Updated 5-23-08
Turtle's Small Pond 2.4.3   Alpha Level J

Student: _____

Date: _____ Test Administrator: _____

Recommendation:

_____

_____

	Minimal	Basic	Proficient	Advanced
Word Solving				
Retelling				
Comprehension				
Fluency				

Word Solving: 106 words

Once, a long time ago, Turtle lived in a small pond. In the summer, Turtle played under

The tall trees growing on the bank. When he was tired, he rested in the sun. "This is the

best pond in the whole world," Turtle thought. And it was. In the winter, Turtle swam to

the bottom of the pond and dug a hole in the soft mud. He slept all winter long. In the

Spring Turtle woke up and swam to the top of the pond. It took him a long time to reach

The surface. "I don't remember the pond being this deep last spring," Turtle thought.

Guided Reading Assessment
Updated 5-23-08
Turtle's Small Pond   2.4.3   Alpha Level J

)

Retelling:

1.What was the problem in the story?

Turtle's pond changed

Beaver was in his pond

Both thought the pond was theirs

2.Turtle and Beaver are trying to settle an argument. How did they plan to settle the argument?

Underwater contest

Wood chopping contest

Race across the pond   .

Comprehension:

1. How did Turtle's pond change?

)

Beaver cut down trees

He used the wood to make a dam

The pond got deeper

2. Turtle was tricking Beaver. Do you think this was fair?

Turtles usually can swim faster than beavers. It makes it fair because he gave Beaver a head start

3.How did Turtle trick Beaver?

Beaver shook his tail, which flung Turtle on land

Turtle told him to go first

Turtle held Beaver's tail half way

4. How could the ending have changed?

Beaver leaves the pond

Beaver finds his own pond

)

4

Guided Reading Assessment
Updated 7-12-08
Jump and Swim 2.5.4 Alpha Level H

Student: _____

Date: _____ Test Administrator: _____

Recommendation:

_____

_____

	Minimal	Basic	Proficient	Advanced
Word Solving				
Retelling				
Comprehension				
Fluency				

Wording Solving: 132 Words
Page 2:

Robbie was nervous. Today he had to jump off the diving board.

"Maybe a thunderstorm will come," Robbie thought as he walked to
the pool. "Then my swimming lesson will be canceled." But when Robbie
looked up, he saw the weather was bright and sunny.

Page 3:

It wasn't that Robbie was afraid of the water. He dove underwater all
the time at the beach. But jumping into a pool was different. He wouldn't
be able to touch the bottom.

Page 4:

Robbie's teacher told him that all he had to do was start swimming
after he jumped in. But what if he couldn't come up for air? What if he got
water in his nose? What if he didn't know which way was up?

"Okay, everyone!" called the teacher. "Line up at the diving board!"

Guided Reading Assessment
Updated 7-12-08
Jump and Swim 2.5.4 Alpha Level H

Retelling:

1. Who was afraid to dive in the water?
   Robbie was afraid of the water.

2. Who showed Robbie how to dive off the diving board and how did they jump?

Sample Responses

Peter	Lara	Olivia
Solider	Held her knees	Sprang high and twirled

3. Who did Robbie show how to dive?
   Robbie showed Dave how to dive.

Comprehension:

1. What kind of day is Robbie hoping for when he gets to the pool?
   He was hoping for a thunderstorm to come.

2. Why is Robbie afraid to jump into the pool?
   He is worried that he won't be able to touch the bottom of the pool.

3. How does Dave help Robbie?
   Dave is scared too. Robbie jumps in to show Dave how to do it.

Guided Reading Assessment
Updated 5-23-04
The Best Job for Scooter   2.4.1   Alpha Level J

Student: _____

Date: _____ Test Administrator: _____

Recommendation:

_____

_____

	Minimal	Basic	Proficient	Advanced
Word Solving				
Retelling				
Comprehension				
Fluency				

Wording Solving: 92 words
Page 2:
Mr. and Mrs. Hall's dog had four puppies.

One puppy had short brown fur and white paws.

He ran around in circles and barked.

Mr. Hall named him Scooter.

The Halls gave away the puppies one by one-all except Scooter.

For some reason, no one seemed to want him.

Page 3:
"Well," said Mr. Hall, "we can't keep Scooter. We'll just have to find a job for him."

"I know," Mrs. Hall said.

"I saw an ad in the paper. Steve is looking for a watchdog for his store.

Let's take Scooter there."

Retelling:
1. What was one of Scooter's jobs?
   watch dog, herd sheep
   or sit, stay, come

2. Where does Scooter do his jobs?
   Steve's Store
   Farm

3. Why did Scooter have a hard time paying attention when he was learning the police commands?
   He was thinking about the ride in the police car and all the good smells he smelt.

4. What happens when Scooter goes to Frank's farm?
   Scooter doesn't care for herding. He likes to play and swim.

Comprehension:
1. Why doesn't Scooter make a good watch dog?
   He doesn't want to guard the store. He falls asleep.

2. Do you think Scooter will like his new home with Bart? Why or why not?
   Possible response: Scooter will be a good pet because he can do all the things he likes to do, run, play, sleep and eat.

Guided Reading Assessment
Updated 7-12-08
<u>The Show Must Go On</u> 2.6.3 Alpha Level L

Student: _____

Date: _____ Test Administrator: _____

Recommendation:

_____

_____

	Minimal	Basic	Proficient	Advanced
Word Solving				
Retelling				
Comprehension				
Fluency				

Word Solving: 109 words
<u>Page 2:</u>

Ms. Martin, the coach of King's School drama club, cleared his throat. "Quiet please," she said.

Everyone settled down.

"Yesterday, you all voted to perform a musical for our spring play," Ms. Martin said. "There's just one problem we need to solve before we can begin rehearsing."

<u>Page 3:</u>

"What's the problem?" asked Haley.

"We need to buy copies of the music for our cast and orchestra. Right now, we have only thirty dollars left in our cash box. We need one hundred dollars," answered Ms. Martin.

"That's not all," Elena piped up. "We also need art supplies to make scenery. We used all of the paint for our last show."

Guided Reading Assessment
Updated 7-12-08
The Show Must Go On 2.6.3 Alpha Level L

)

Retelling:
1. What does the drama club want to do?
   They want to put on a musical for their spring play.

2. How much does it cost to buy the copies of the music and the art supplies?
   The music costs $100 and the art supplies costs $100. A total of $200 is needed for the spring play.

3. What do they decide to do for a fundraiser?
   They decide to have a gingerbread raffle.

)

Comprehension:
1. How was the drama club able to put on their spring play?
   Possible response: They worked together and were able to raise money.

2. How is Alex's idea special?
   Possible response: The raffle can raise enough money. Everyone would have a part to play in getting the raffle ready.

3. Why do you think everyone worked so well together to get ready for the raffle?
   Possible response: They all want the raffle to be a success.

4. Getting the gingerbread scenes ready took many steps. Which part do you think you would enjoy the most? Why?

)

1Guided Reading Assessment
Updated 5-25-08
Attack of the Giant Squirrel 3.3.1 Alpha Level N

Student: _____

Date: _____ Test Administrator: _____

Recommendation:

_____

_____

	Minimal	Basic	Proficient	Advanced
Word Solving				
Retelling				
Comprehension				
Fluency				

Wording Solving: 150 words

One day, Garnor and his dad were walking around the family's farm. Suddenly a squirrel

scampered by. "Squirrels are such pests, "Garnor's dad

Said. "They dig holes and eat flowers from our gardens." "How can you not like

squirrels? They're great acrobats," Garnor said. "It's always fun to watch them leap from

tree to tree." After dinner that night, Garnor watched a funny television show with his

parents. Suddenly, in the middle of the show, a reporter came on the screen. "A terrifying

event has occurred in the town of Cruger!" the reporter announced. "A colossal squirrel

has destroyed the farmlands surrounding the town. People are fleeing in fear.

2Guided Reading Assessment
Updated 5-25-08
Attack of the Giant Squirrel 3.3.1 Alpha Level N

Retelling:

1. Why is everyone afraid of the squirrel?

2. How does Garnor figure out what to do?

3. What problems do squirrels cause for humans?

Comprehension:

1.What is the problem in the story?

A huge, giant squirrel is coming to attach the town and people need to get out.

2.What is the solution?

Garnor is told by a squirrel that the way to stop Carl the Giant Squirrel, is to scare him with a huge. Ganor records a 'little' cat meow and plays the recorder when the Giant Squirrel approaches ant this scares him off.

3.What makes this story a fantasy?

Appendix E

Reading Comprehension Tests

Name _____

A Firefighter Is Talking

Pretend you are a firefighter. You
are being asked questions on a
TV show.
Write your answers on the lines.

1. What kind of gear
   do firefighters
   wear?

2. Why is there a
   pole in a
   firehouse?

3. What happens in
   the dispatch room
   in a firehouse?

4. Why is it important
   to make sure all the
   equipment works?

1. _____
   _____
   _____
   _____

2. _____
   _____
   _____
   _____

3. _____
   _____
   _____
   _____

4. _____
   _____
   _____
   _____

Name _____

True or Not True?

Print the word *True* or *Not true* after each sentence.

1. Ricky was happy that he looked like his mother. _____

2. Mrs. Cortez asked the children to leave their costumes in their desks. _____

3. Ricky looked older with his mustache on. _____

4. Ricky told his father all about the lost mustache. _____

5. Ricky tried to make his own mustache. _____

6. Ricky's father shaved his mustache so he would look more like Ricky. _____

7. Ricky's new mustache was a special gift from his father. _____

Find each sentence that was *Not true*. On the lines below, rewrite each sentence to make it true.

8. _____

9. _____

_____

10. _____

_____

Jamaica Louise James

Comprehension Check

How Does It Feel?

Read each sentence. Choose the word that best completes the sentence. Write the word on the line.

Word Bank

| worried | mad | excited | proud | happy | scared |

1. Grammy and Mama are _____ about their birthday present for Jamaica. They want her to open it quickly.

2. Jamaica is _____ about how much the present cost.

3. Grammy is not _____ to work at night, but Jamaica is afraid of the night.

4. The grown-ups in the subway always look so _____.

5. Grammy is very _____ when she sees Jamaica's paintings.

6. Now the people in the subway seem _____. They like Jamaica's presents.

Name _____

Check It Out

Each sentence has more than one ending. Read each ending. Put a ✔ next to the ending that tells what happened in the story.

1. When Officer Buckle gave his talks about safety,

   _____ children fell asleep.

   _____ everyone cheered.

2. The principal of Napville School wasn't listening when Officer Buckle said,

   _____ "Always stick with your buddy."

   _____ "Never stand on a swivel chair."

3. While watching television, Officer Buckle saw that

   _____ Gloria sat very still.

   _____ Gloria was the star.

4. Students loved Officer Buckle and Gloria

   _____ because they were a good team.

   _____ they told funny jokes.

Theme 4: **Amazing Animals** 11

Comprehension Check

Name _____

About the Story

Look at the picture. Then finish the sentence beside the picture.

1. When you see an anthill, you know that

_____

_____

2. An ant uses its antennae to

_____

_____
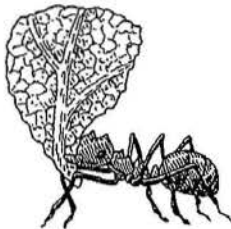
3. The ant carries leaves because

_____

_____
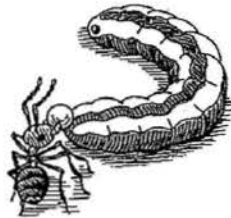
4. The ant is "milking" the caterpillar because

_____

_____

34 🐛 Theme 4: **Amazing Animals**

The Great Ball Game

Comprehension Check

Name _____

Ball Game Clues

Use the clues to complete the puzzle.

1. The Animals and the Birds had a big _____.
2. The _____ thought they were better because they had teeth.
3. The Birds thought they were better because they had _____.
4. They decided to play a ball _____ to decide who was better.
5. Little _____ had both wings and teeth.
6. Bat made the winning _____.
7. The Birds had to fly _____ each winter because they had lost.
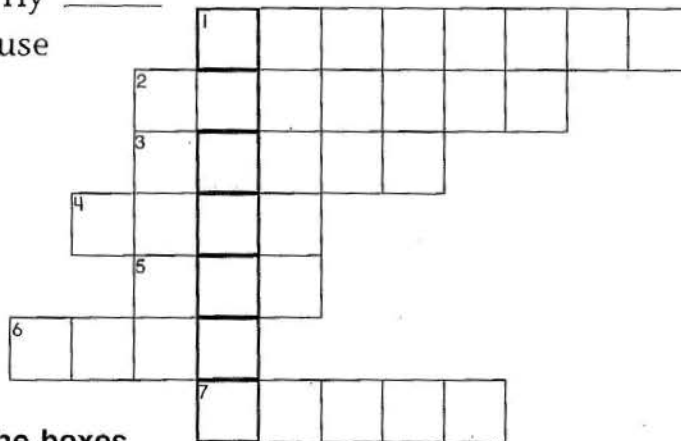
Write the letters from the boxes in dark print to answer this question.

8. Which team won the ball game?

____ ____ ____ ____ ____ ____ ____

Name _____

Talk It Out

Complete the sentences so that they tell what children from the story said about having brothers and sisters.

Ben: I have to share my mom. When she is busy

with the baby, _____

Valerie: I get tired of hearing about how cute the

baby is because _____

_____

Juanita: I help with my baby sister by _____

_____

Will: My father and uncle are different now than

they were when they were young because _____

_____

Sujathi: Laura and Emma are like Jessica and me

because _____

_____

Name _____

Baking Story Ideas

1. Pablo helps make chango bars by

   _____.

2. When Papa makes bagels he uses a family recipe

   that belonged _____.

3. Three recipes that most likely come from

   Mamá's Mexican culture are _____

   _____.

4. The treat that Pablo decides to take to
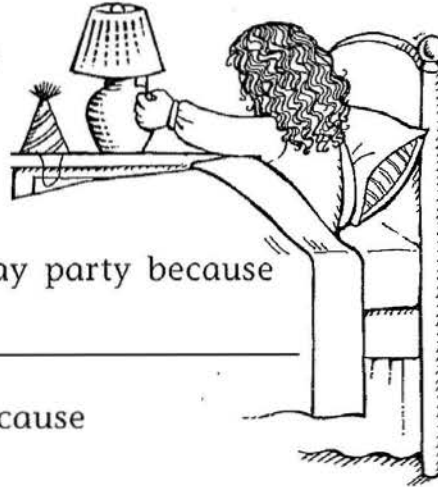
   International Day is _____

   _____.

Carousel
_____

Comprehension Check

Name _____

Birthday Blues

Finish each sentence so that it tells what
happened in *Carousel*.

1. Alex was unhappy at her birthday party because

   _____

2. Alex's mother sent her to bed because

   _____

3. Alex whispered, "I'm sorry" to the zebra because

   _____

4. Alex's father missed the party because

   _____

5. Her father couldn't stay angry about not
   getting home on time because

   _____

6. When Alex's mother winked at Alex and said,

   "It got a bit windy in here last night," she

   _____

Theme 5: **Family Time**   145

Thunder Cake

Comprehension Check

Name _____

Letter Home

Here is a letter the girl in *Thunder Cake* might have written. Fill in the missing parts of her letter.

Dear Mama,

Yesterday was a special day. It began to thunder, and I was so scared that I _____.

Grandma told me we had to _____.
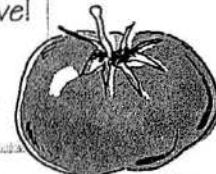
She taught me how to tell _____.

First you see the lightning. Then you _____

_____.

We got eggs and _____ from the barn. Then we got chocolate, sugar, and flour from the _____.

Last we got tomatoes and _____. Then we made the cake.

Grandma told me I was brave because I _____

_____. I really did feel brave!

I miss you,
Your daughter

Theme 5: **Family Time** 163

Appendix F

Theme Skills Tests

1 Name _____

High-Frequency Words

Read the sentences, and think about which word might go in each blank. Then fill in the circle next to the best answer.

1. Maya's mom said, "You can work with me at the bake shop
   ____ your week off from school."
   - ○ **A.** quiet
   - ○ **B.** during
   - ○ **C.** across
   - ○ **D.** busy

2. "Great!" said Maya. "I had so much fun there last summer.
   I had fun last ____, too."
   - ○ **F.** winter
   - ○ **G.** even
   - ○ **H.** soldier
   - ○ **J.** lady

3. "Will I wear something over my ____ again?" asked Maya.
   Her mom said, "Yes."
   - ○ **A.** floor
   - ○ **B.** kitchen
   - ○ **C.** surprise
   - ○ **D.** clothes

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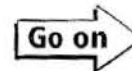
4. "May I stand _____ the case with the cakes?" asked Maya. Her mom nodded.
   ○ **F.** behind
   ○ **G.** roll
   ○ **H.** different
   ○ **J.** important

5. "May I help you get the food people _____?" asked Maya. Her mom said, "Yes."
   ○ **A.** stand
   ○ **B.** believe
   ○ **C.** across
   ○ **D.** order

6. "Will the baker tell me a _____ again?" asked Maya. Her mom nodded.
   ○ **F.** story
   ○ **G.** soldier
   ○ **H.** chicken
   ○ **J.** brother

7. "I hope I haven't _____ his tale before," Maya said.
   ○ **A.** stamped
   ○ **B.** brought
   ○ **C.** heard
   ○ **D.** helped

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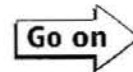
8. "May I eat a _____ loaf of bread again?" asked Maya. Her mom laughed and shook her head.
   - ○ **F.** year
   - ○ **G.** later
   - ○ **H.** whole
   - ○ **J.** young

9. "If you're good, I _____ you can have an animal cookie," Maya's mom said to her.
   - ○ **A.** quiet
   - ○ **B.** guess
   - ○ **C.** play
   - ○ **D.** give

10. "Wow! I want one in the shape of a _____," Maya said.
    - ○ **F.** swing
    - ○ **G.** young
    - ○ **H.** later
    - ○ **J.** lion

STOP

Name _____

Making Judgments

Read this story. Then read each question, and fill in the circle next to the best answer.

A Job to Do

People on Bloom Street worked together in a huge garden at the end of the street. They grew pretty flowers and good things to eat. Everyone took turns doing different jobs.

One day, Mrs. Garza asked her son Pablo and his friends Bobby and Lily to help weed the garden.

"I don't want to weed," said Bobby. "That's no fun. It's a hard job, and I'm hot."

"I don't want to work if Bobby won't help," added Lily.

"Well, I'm going to weed," said Pablo. "Everyone enjoys things from the garden, so everyone should help to make things grow. I plan to do my part."

Pablo began pulling weeds. "This isn't so bad," said Pablo. "It's almost like doing toe touches in gym."

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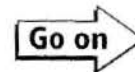
Lily looked at Bobby. "Pablo's right," Lily said. "We enjoy fresh garden things, so we should help weed. Besides, toe touches are fun." So Lily and Bobby began pulling weeds too.

1. What reason did Bobby give for not wanting to do the weeding job?
   - ○ **A.** Mrs. Garza didn't ask him to help.
   - ○ **B.** Lily didn't want to do it.
   - ○ **C.** Weeding was a hard job.
   - ○ **D.** Bobby didn't eat any food from the garden.

2. What reason did Lily give for not wanting to do the weeding job?
   - ○ **F.** It was too hot.
   - ○ **G.** Bobby wasn't going to help.
   - ○ **H.** Lily wanted to help pick peaches.
   - ○ **J.** Pablo was mad at her.

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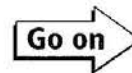
3. Why do you think Pablo decided to do the job?

   ○ **A.** Pablo thought that weeding and watering the
      garden were fun, so he wanted to do them.

   ○ **B.** Pablo said that everyone enjoyed food from the
      garden, so everyone should help grow it.

   ○ **C.** Pablo liked to do everything his mother asked him
      to do.

   ○ **D.** Pablo didn't want his friends to work in the hot sun.

4. What did Pablo's actions show about him?

   ○ **F.** He knew all about growing food gardens.

   ○ **G.** He was a good friend to Lily and Bobby.

   ○ **H.** He only wanted to do the easy jobs.

   ○ **J.** He was willing to do his fair share of work.

5. At the end of the story, why do you think Lily and Bobby
   joined Pablo?

   ○ **A.** Mrs. Garza kept asking them to help.

   ○ **B.** Pablo said that they could not eat any more garden
      food unless they helped.

   ○ **C.** Lily said that they enjoyed the garden food, so they
      should help weed.

   ○ **D.** Bobby said that toe touches were what he liked best
      about gym class.

STOP

K

Name _____

Topic, Main Idea, and Supporting Details

Read this story. Then read each question, and fill in the circle next to the best answer.

Animal Doctors

Some doctors take care of people. Some doctors take care of animals. Doctors who care for animals are called **veterinarians** (veht•ur•uh•NAIR•ee•uhnz), or **vets** for short. Vets help cure sick animals. They also help animals stay well.

Vets do many of the same things people doctors do. Vets give shots to animals to help them stay well. If animals are sick or hurt, vets treat them with bandages, pills, and other special care.

Vets tell people how they can take care of their animals. Vets tell what each kind of animal needs to have a long, happy life.

Vets may have offices or clinics where people bring their pets for care. Some vets may visit farms to treat any farm animals in need. A few vets even work with the animals at zoos or wildlife parks.

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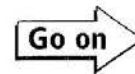
1. What is the story mostly about?
   - ○ **A.** pets
   - ○ **B.** zoos and wildlife parks
   - ○ **C.** how to care for sick animals
   - ○ **D.** vets

2. What does a vet do?
   - ○ **F.** visits a city zoo
   - ○ **G.** makes sure people are safe
   - ○ **H.** takes care of animals
   - ○ **J.** grows plants for food

3. Which of these is **not** a place where a vet would go to work?
   - ○ **A.** flower shop
   - ○ **B.** vet clinic
   - ○ **C.** farm
   - ○ **D.** zoo

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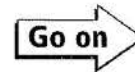
4. In the story, what is one way vets help animals stay well?

   ○ **F.** They give baths to animals.

   ○ **G.** They give shots.

   ○ **H.** They cut animals' fur.

   ○ **J.** They clean animals' teeth.

5. How do vets help people?

   ○ **A.** Vets give people shots that will help them stay well.

   ○ **B.** Vets milk cows and do other farm work.

   ○ **C.** Vets tell people how to care for their animals.

   ○ **D.** Vets help keep cars running well.

(STOP)

L

Name _____

Problem Solving

Read this story. Then read each question, and fill in the circle next to the best answer.

Lemonade Stand

Alex wanted to open a lemonade stand. His mom said it was fine. She helped him make an ad for the front of his stand. She helped him make a jug of fresh lemonade. She even gave him cups and ice.

The first day, Alex's stand wasn't very busy. He had lots of lemonade left. "What can you do next time?" asked Alex's mom.

"I'll take lemons and sugar to the stand and make lemonade by the cup as people come," said Alex. "That way, I won't have too much lemonade left."

The next day, many more people came to the stand. They had to wait for Alex to make each cup. No one liked having to wait. Some people left before they bought any lemonade.

"One day, I had too much lemonade," said Alex. "The next day, I didn't have enough. What can I do?"

Go on ▷

"Well, let's think about your problem," said his mom. "What do the firefighters do when they have their pancake suppers?"

"They sell tickets," Alex said. "I can sell tickets, too. That way, I'll know how much lemonade to make the next day. Thanks, Mom!"

1. What is Alex's problem?
   - ○ **A.** keeping the ice from melting
   - ○ **B.** forgetting how to cut up the lemons
   - ○ **C.** having just enough lemonade
   - ○ **D.** wanting the firefighters to visit his stand

2. Which of these is a way Alex tries to solve his problem?
   - ○ **F.** He moves his stand to a busier place.
   - ○ **G.** He makes lemonade by the cup as people come.
   - ○ **H.** He sells milk in place of lemonade.
   - ○ **J.** He asks his mother to sell the lemonade for him.

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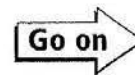
3. What happens when Alex tries to make lemonade by the cup?
   - ○ **A.** The ice melts too quickly to use.
   - ○ **B.** People are happy, and Alex sells more lemonade.
   - ○ **C.** Alex spills the ice and water.
   - ○ **D.** Some people leave without buying lemonade.

4. At the end of the story, what does Alex decide to do to solve his problem?
   - ○ **F.** sell lemons, water, and ice so that people can make their own lemonade
   - ○ **G.** close his stand for good
   - ○ **H.** sell tickets so he will know how much lemonade to make
   - ○ **J.** use a jug of lemonade until it is all gone

5. How did Alex get the idea that solved his problem?
   - ○ **A.** He asked someone at his lemonade stand.
   - ○ **B.** He read a book about lemonade stands.
   - ○ **C.** His mom asked him to think of what the firefighters do for pancake suppers.
   - ○ **D.** His friend told him what she had done last year to solve a problem like this one.

STOP

M

Name _____

Making Inferences

Read this story. Then read each question, and fill in the circle next to the best answer.

At the Gas Station

Mrs. Browning and her little girl Beth took their van to Kerry's gas station every week for gas. They also brought their van there whenever it had to be fixed.

"Hello, Mrs. Browning! Hello, Beth!" Kerry called out every time. "How are you? What can I do for you today?"

"This van needs to be fixed, Kerry. It needs new oil," said Mrs. Browning one day. "Will you please put clean oil in it for me?"

Kerry nodded and smiled. Then he said, "Sure I will, Mrs. Browning. My helper and I can do that for you now. You and Beth can go inside. You can have a snack while you wait."

Then Kerry and his helper went to work. Kerry drained out the old oil and put new oil into the van. The helper washed the windows and cleaned the van seats.

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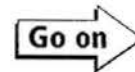
When the work was done, Kerry went inside to tell Mrs. Browning. She paid Kerry and said, "Thank you for doing such a good job. I know our van will run well now!"

Kerry smiled and waved. He winked at Beth as he always did. Then he said, "See you next week!"

1. Which of these is something you can tell about Kerry from the story?
    ○ **A.** He opens the gas station at seven each day.
    ○ **B.** He rides a bicycle to work.
    ○ **C.** He likes to see Mrs. Browning and Beth.
    ○ **D.** He often frowns at his helper.

2. Which of these is a clue that tells how Kerry feels about Mrs. Browning and Beth?
    ○ **F.** He puts gas in their van.
    ○ **G.** He greets them in a happy way.
    ○ **H.** He works at a gas station where they go every week.
    ○ **J.** He tells them when their van is done.

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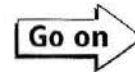
3. From what you know about Kerry, which of these would he be most likely to say?
   ○ A. "I'm so glad to see you today."
   ○ B. "I don't know how to fix your van."
   ○ C. "Please buy more gas today, Mrs. Browning."
   ○ D. "We don't have time to put new oil into your van this week."

4. What can you tell about Mrs. Browning?
   ○ F. She likes to take Beth for rides in the van.
   ○ G. She is pleased with Kerry's work.
   ○ H. She has other children who are in school.
   ○ J. She used to work at the gas station with Kerry.

5. Which clue tells you how Mrs. Browning feels about Kerry?
   ○ A. She takes Beth inside to have a snack, just as he says to do.
   ○ B. She tells him that her van needs a good cleaning.
   ○ C. She says he has done a nice job and thanks him.
   ○ D. She asks if there is someone else who can fix the van.

STOP

P Name _____

Vocabulary

Read each question. Then fill in the circle next to the best answer.

1. Which of these words comes **first** in ABC order?
   - ○ **A.** sweet
   - ○ **B.** subway
   - ○ **C.** sunshine
   - ○ **D.** swing

2. Which of these words comes **last** in ABC order?
   - ○ **F.** paddle
   - ○ **G.** post office
   - ○ **H.** pilot
   - ○ **J.** pound

3. Which of these words comes **first** in ABC order?
   - ○ **A.** fleet
   - ○ **B.** flower
   - ○ **C.** fluff
   - ○ **D.** flight

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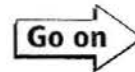
4. Where in a dictionary would you look to find the word **village?**

    ○ **F.** at the beginning

    ○ **G.** in the middle

    ○ **H.** at the end

    ○ **J.** on the title page

5. Where in a dictionary would you look to find the word **nurse?**

    ○ **A.** at the beginning

    ○ **B.** in the middle

    ○ **C.** at the end

    ○ **D.** in the table of contents

6. Which of these words would be on a dictionary page with the guide words **dress** and **drip?**

    ○ **F.** drain

    ○ **G.** dive

    ○ **H.** drift

    ○ **J.** dust

Go on

7. Which of these words would be on a dictionary page with the guide words **mistake** and **mix?**

○ **A.** mend
○ **B.** mitten
○ **C.** march
○ **D.** Monday

Read the following sentences, and think about which word might go in the blank. Then fill in the circle next to the best answer.

8. Do you want to send someone a card or letter through the ____?

○ **F.** ink
○ **G.** kind
○ **H.** road
○ **J.** mail

9. To do this, you must buy a ____ at the post office and put it on the letter.

○ **A.** pen
○ **B.** house
○ **C.** stamp
○ **D.** bill

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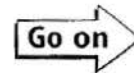
10. Then drop the letter into any ____, and soon it will be on its way.

○ **F.** mailbox

○ **G.** firecracker

○ **H.** store

○ **J.** garden

STOP

F Name _____

High-Frequency Words

Read each sentence. Think about which word might go in the blank. Then fill in the circle next to the best answer.

1. Bobby was unhappy. He was too short to tack his paper to his bulletin _____ without Grandpa's help.
   - ○ **A.** block
   - ○ **B.** board
   - ○ **C.** busy
   - ○ **D.** brother

2. "Bobby, sit and _____. I want to tell you a story," Grandpa said.
   - ○ **F.** sunshine
   - ○ **G.** listen
   - ○ **H.** fresher
   - ○ **J.** behind

3. "Have you ever heard of the animal tug of _____?" Grandpa asked. Bobby shook his head.
   - ○ **A.** ago
   - ○ **B.** sand
   - ○ **C.** war
   - ○ **D.** boat

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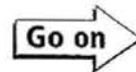
4. "It happened a long time ____," Grandpa began.
   - ○ **F.** start
   - ○ **G.** after
   - ○ **H.** ago
   - ○ **J.** there

5. "Lion and Bear teased Fox because he didn't ____ very much."
   - ○ **A.** case
   - ○ **B.** story
   - ○ **C.** buy
   - ○ **D.** weigh

6. Bobby said, "That happens at a baseball game. When I bat, the players in the ____ tease me."
   - ○ **F.** warm
   - ○ **G.** field
   - ○ **H.** guess
   - ○ **J.** move

7. "Fox sent Lion far into the forest with one end of a rope," Grandpa said. "Fox ____ Lion to pull when he yelled."
   - ○ **A.** told
   - ○ **B.** heard
   - ○ **C.** believe
   - ○ **D.** whole

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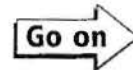
8. "Fox said the same thing to Bear but sent him the other way. When Fox yelled, each one pulled hard on his _____ of the rope."
   ○ **F.** field
   ○ **G.** half
   ○ **H.** straight
   ○ **J.** help

9. "Both Lion and Bear thought Fox was very strong. But the rope pull game was really _____ Lion and Bear."
   ○ **A.** behind
   ○ **B.** during
   ○ **C.** between
   ○ **D.** order

10. "Fox didn't need to be big and strong," said Bobby. "He took _____ of his problem by being smart!"
    ○ **F.** great
    ○ **G.** care
    ○ **H.** guess
    ○ **J.** roll

STOP

G

Name _____

Drawing Conclusions

Read the passage. Then read each question. Fill in the circle next to the best answer.

Proud Papas

In most animal families, the mother does all the work with the babies. But in others, the father helps out, too.

Deer mice fathers stay with the babies after they are born. The mother goes off to find food. Sometimes large animals come near. Then the father hides the babies with leaves.

Sea horses live in salt water. The sea horse dad carries the eggs in his pouch. When the eggs hatch, tiny sea horses swim from his pouch.

A spotted sandpiper dad sits on the nest until the eggs hatch. He even stays with the babies for three weeks after they are born. This bird dad takes better care of the babies than their mom!

The red fox dad is very helpful with the young pups. He shows them how to hunt. He even plays games with them. The games help the pups learn how to stay alive.

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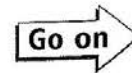
1. What is the passage about?
    ○ **A.** birds
    ○ **B.** sea animals
    ○ **C.** animal fathers
    ○ **D.** spotted sandpipers

2. Why do deer mice dads hide their babies?
    ○ **F.** to keep them warm
    ○ **G.** to give them food
    ○ **H.** to play a game
    ○ **J.** to keep them safe

3. Which kind of dad keeps his babies safe from ocean fish?
    ○ **A.** animal dad
    ○ **B.** sea horse dad
    ○ **C.** spotted sandpiper dad
    ○ **D.** red fox dad

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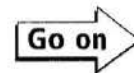
4. What might a red fox teach his pups to help them stay alive?

    ○ **F.** ways to carry eggs in a pouch

    ○ **G.** the rules to a fun game

    ○ **H.** how to sniff out their next meal

    ○ **J.** ways to live in salt water

5. Which is true?

    ○ **A.** Animal mothers always do all the work.

    ○ **B.** All animal babies do not get help from their moms and dads.

    ○ **C.** Some animal fathers help care for their babies.

    ○ **D.** Animal mothers always carry the eggs.

STOP

H

Name _____

Text Organization

Read the selection. Then read each question. Fill in the circle next to the best answer.

The Frilled Lizard

A frilled lizard does something most other lizards cannot do. When it is in danger, the lizard stands. It faces the animal who wants to eat it. Then it puts on a show, trying to scare the animal away.

Luckily, the frilled lizard has the looks to put on a scary show. Part of the lizard's show is its frill. The lizard has a large flap of loose skin on its neck. Most of the time, the flap lies flat. But when the lizard is afraid, it pushes up its frill. The frill looks like a huge collar, so the lizard looks much bigger.

Frilled lizards live in rain forests and other wooded areas. They spend much of their time in trees.

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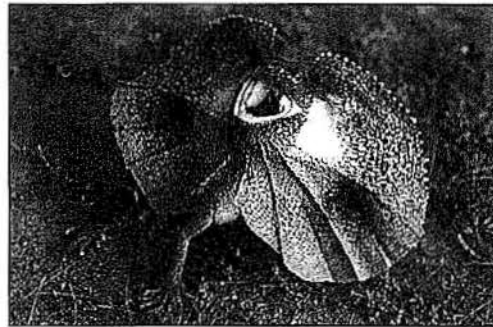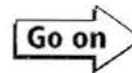
Another part of the show is the way the lizard acts. It opens its mouth very wide and hisses. Then it might move its head very quickly. Also, it might whip its tail around or stand up on its back legs. This makes the lizard look taller. Sometimes it even runs on two legs. At this point, the other animal usually goes away.

1. Which part of the selection tells where frilled lizards live?
- ○ **A.** title
- ○ **B.** first part of text
- ○ **C.** caption
- ○ **D.** last part of text

2. Which of these tells an important idea about the frilled lizard's show?
- ○ **F.** It tries to scare other animals with its looks.
- ○ **G.** Most of the time, the frilled lizard's flap lies flat.
- ○ **H.** It can be found in rain forests.
- ○ **J.** It eats bugs.

3. What is one detail about the lizard's frill?
- ○ **A.** The lizard can run on just two legs.
- ○ **B.** The frill looks like a big collar.
- ○ **C.** The lizard also whips its tail around.
- ○ **D.** The lizard opens its mouth wide and hisses.

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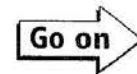
4. Which of these may be part of the lizard's show?

- ○ **F.** shutting its frill
- ○ **G.** closing its mouth
- ○ **H.** standing up on its back legs
- ○ **J.** spending most of its time in trees

5. Which important idea does this detail support?

The lizard whips its tail around.

- ○ **A.** Part of the lizard's show is the frill.
- ○ **B.** The frilled lizard lives in rain forests.
- ○ **C.** Another part of the show is how the lizard acts.
- ○ **D.** The lizard makes quick movements with its head.

STOP

Name _____

Cause and Effect

**Read this passage. Then read each question.
Fill in the circle next to the best answer.**

The Warthog

Warthogs may look like cartoon creatures, but they are real animals that live in Africa. Warthogs got their name from the many warts on their faces. The males have more warts than the females. These warts help protect the animals' faces during fights.

A warthog sleeps in a burrow, or a small hole dug in the ground. Whenever it goes into the burrow, the warthog backs in. This allows it to look outside for hungry lions and other animals that might eat it. When a warthog leaves its burrow, it runs out as fast as it can. That way, it is ready for any animal waiting to attack.

Sometimes a warthog lets a bird stand on its back. The bird eats pests that live on the warthog's body. This helps the bird by giving it food. This helps the warthog rid itself of insect pests.

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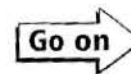
Warthogs often dig in the dirt. They do this because they eat grasses, roots, berries, and bark. Their digging breaks up the dirt and mixes it with air. This helps plants grow.

1. Why do warthogs back into their burrows?
   - ○ **A.** to rid themselves of pests
   - ○ **B.** to look for food
   - ○ **C.** to find a new home
   - ○ **D.** to look out for a lion

2. Why do warthogs run out of their burrows as fast as they can?
   - ○ **F.** because another animal is chasing them
   - ○ **G.** to get a start at digging up dirt
   - ○ **H.** to be ready in case of attack
   - ○ **J.** because they are always hungry

3. What happens when a bird eats pests from a warthog's body?
   - ○ **A.** The bird gets sick, and the warthog gets more warts.
   - ○ **B.** The bird gets food, and the warthog gets rid of pests.
   - ○ **C.** The bird gets warts, and the warthog goes to sleep.
   - ○ **D.** The bird sings, and the warthog digs in the dirt.

Go on
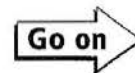
4. Why do warthogs dig up the dirt?

○ **F.** to get food

○ **G.** because they are mad at birds

○ **H.** to protect their faces

○ **J.** to make their teeth sharp

5. What happens because warthogs dig up the dirt?

○ **A.** Plants are helped to grow.

○ **B.** The warthogs get more warts.

○ **C.** Other animals will chase them.

○ **D.** It rains.

(STOP)

J Name _____

Information and Study Skills

Read the glossary entry. Then read each question.
Fill in the circle next to the best answer.

> **den**
>
> A place where wild animals sleep:
> *The fox napped in its* **den.**

1. In the glossary, what does the word **den** mean?
   - ○ **A.** a way that animals move
   - ○ **B.** a part of an animal's body
   - ○ **C.** a place where wild animals sleep
   - ○ **D.** a group of scouts

2. Which entry word would you find **before** the entry word **den?**
   - ○ **F.** ram   ○ **H.** stork
   - ○ **G.** eel   ○ **J.** cub

3. Which entry word would you find **after** the entry word **den?**
   - ○ **A.** snake   ○ **C.** barn owl
   - ○ **B.** clam   ○ **D.** beehive

Go on ⇨
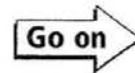
> **stable**
>
> A building where farm animals live and sleep:
> *The horses and cows shared a stable.*

4. In the glossary, what is a **stable**?
   - ○ **F.** a special kind of horse
   - ○ **G.** a part of an animal's body
   - ○ **H.** a group of cows
   - ○ **J.** a building for farm animals

5. From the meaning in the glossary, where would you be most likely to find a **stable**?
   - ○ **A.** under a bus
   - ○ **B.** on a farm
   - ○ **C.** in a pond
   - ○ **D.** at the post office

STOP

L

Name _____

Vocabulary

Read the thesaurus entries. Then read each question, and fill in the circle next to the best answer.

> **run**—bolt, dash, race, rush, speed
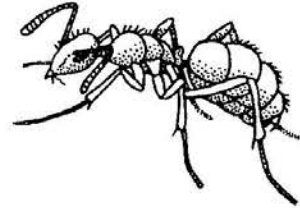> **jump**—bound, hop, leap, spring
> **swim**—dive, float, skim, wade

1. Which of these words can be used in place of **run**?
   - ○ **A.** spring
   - ○ **B.** rush
   - ○ **C.** leap
   - ○ **D.** wade

2. Which of these words can be used in place of **jump**?
   - ○ **F.** bolt
   - ○ **G.** skim
   - ○ **H.** dash
   - ○ **J.** bound

3. Which of these words can be used in place of **swim**?
   - ○ **A.** float
   - ○ **B.** leap
   - ○ **C.** bound
   - ○ **D.** race

Go on
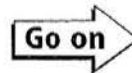
**Look at this page from a dictionary. Then read each
question, and fill in the circle next to the best answer.**

> **ant**
> A small black or red insect that
> lives in groups: *Ants live in nests
> they make in the ground.*
>
> **any**
> 1. One or some of many, no matter which one:
> *Pick up **any** paper you see.* 2. As much as you need:
> *Does he want **any** dinner?*
>
> **anybody**
> Anyone; any one person: *Ask **anybody** in a red cap.*

4. Which of these words comes after the entry word **anybody?**

- ○ **F.** arm
- ○ **G.** animal
- ○ **H.** afternoon
- ○ **J.** add

Go on ▷

5. Which of the following is **not** an entry word on the dictionary page that is shown?
   ○ **A.** anybody
   ○ **B.** ant
   ○ **C.** any
   ○ **D.** animal

6. Which entry word means **any one person?**
   ○ **F.** ant
   ○ **G.** anybody
   ○ **H.** any
   ○ **J.** anyway

7. Which of these is the sample sentence for the word **anybody?**
   ○ **A.** Ants live in nests they make in the ground.
   ○ **B.** As much as you need.
   ○ **C.** Ask anybody in a red cap.
   ○ **D.** Does he want any dinner?

8. Which entry word also has a picture?
   ○ **F.** ant
   ○ **G.** any
   ○ **H.** anybody
   ○ **J.** anything

Go on

9. Which of these can you find out by looking at a dictionary entry?
   ○ **A.** how to say the word in Spanish
   ○ **B.** what the word means
   ○ **C.** words that mean the opposite of the word
   ○ **D.** how many times the word shows up on a book page

10. Why do some dictionary entries also have pictures?
    ○ **F.** to help readers spell the word
    ○ **G.** to help readers understand the word's meaning
    ○ **H.** to help readers see how the word is used in a sentence
    ○ **J.** to help readers say the word

STOP

H Name _____

High-Frequency Words

Read each sentence, and think about which word might go in the blank. Then fill in the circle next to the best answer.

1. Betsy's dad had a sister named Lisa. Lisa was Betsy's _____.
   - ○ **A.** aunt
   - ○ **B.** million
   - ○ **C.** board
   - ○ **D.** year

2. Betsy was the only _____ who was asked to be in Lisa's wedding.
   - ○ **F.** floor
   - ○ **G.** guess
   - ○ **H.** clothes
   - ○ **J.** child

3. As the flower girl, Betsy was going to wear a long dress and a ribbon in her _____.
   - ○ **A.** care
   - ○ **B.** hair
   - ○ **C.** half
   - ○ **D.** field

Go on ⟩
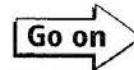
4. Her mom even bought her a new _____ of shoes.

 ○ **F.** surprise

 ○ **G.** air

 ○ **H.** pair

 ○ **J.** elbow

5. On the wedding day, Betsy got dressed _____ in the morning.

 ○ **A.** straight

 ○ **B.** early

 ○ **C.** between

 ○ **D.** trouble

6. An _____ before the wedding, the family took pictures of everyone.

 ○ **F.** ago

 ○ **G.** other

 ○ **H.** order

 ○ **J.** hour

7. Betsy stood in the _____ of one picture between her father and grandfather.

 ○ **A.** middle

 ○ **B.** mother

 ○ **C.** giggling

 ○ **D.** during

Go on ⇒

8. Just as the wedding started, Betsy was given a _____ basket of flowers to carry.
   ○ **F.** lady
   ○ **G.** heavy
   ○ **H.** sadly
   ○ **J.** story

9. Later, Betsy asked if Lisa would still be part of their family. Lisa answered, "Yes, and now you have an _____ too."
   ○ **A.** air
   ○ **B.** important
   ○ **C.** uncle
   ○ **D.** unstuck

10. "I was afraid that my family would be getting smaller, but it's getting bigger _____!" Betsy said.
    ○ **F.** instead
    ○ **G.** under
    ○ **H.** inside
    ○ **J.** special

STOP

❶

Name _____

Making Generalizations

Read this story. Then read each question, and fill in the circle next to the best answer.

Families Learn Together

What has your family taught you to do? What have you taught your family to do?

Part One

Roland learned to ride a bike with his dad's help. At first, his dad ran beside the bike. When Roland was ready, his dad let go. Roland took off on his own!

Rebecca learned to bake special muffins with help from her grandma. In no time, Rebecca was able to bake them on her own.

Making kites seemed hard. Then John's older brother showed him how to fix the frame and tail. Now they spend many hours together building kites.

Part Two

Carmela learned to speak English at school. Now she helps her mom with English at home. They practice words from English class every day.

Go on ➤

Theme Skills Tests, Level 2   Theme 5: Family Time   **175**
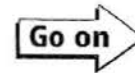
Habeeb shares school art projects with his little brothers and sisters. He shows them how to make their own art so they can have fun on rainy days.

Marcy learned some dances in music class. Marcy's aunt watches Marcy and then follows her steps. Soon they are doing the steps in time to the beat.

1. Which of these is a general statement you can make about families from Part One?
   - ○ **A.** Every family teaches children to ride bikes, bake muffins, and make kites.
   - ○ **B.** Older family members teach younger ones how to do things.
   - ○ **C.** All families have a sister and a brother.
   - ○ **D.** Most families live near the school.

2. Which of these is a general statement?
   - ○ **F.** Carmela helps her mom with English.
   - ○ **G.** Older brothers are a big help in a family.
   - ○ **H.** Marcy shows her aunt dance steps.
   - ○ **J.** Habeeb shares school art projects with his little brothers and sisters.

Go on
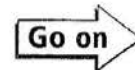
3. Which of these is a general statement you can make about families from Part Two?

○ **A.** Younger family members teach older ones how to do things.

○ **B.** Art projects are as much fun as dancing.

○ **C.** At school, children learn everything families need to know.

○ **D.** Children should always do their homework.

4. Which of these is a general statement?

○ **F.** Rebecca learns how to bake muffins.

○ **G.** Roland's dad helps him ride a bike.

○ **H.** John and his brother fly kites together.

○ **J.** Every member is an important part of the family.

5. Which of these is a general statement you can make about **all** of the story?

○ **A.** Grownups teach children how to ride bikes, bake muffins, and make kites.

○ **B.** Children help family members learn English, do art projects, and dance.

○ **C.** Family members learn from one another.

○ **D.** Family members have jobs to do at home.

Name _____

Following Directions

Read this story. Then read each question, and fill in the circle next to the best answer.

A Family Picture Book

Families change and grow. Pictures are a way to keep track of a family. They help families think back to past times and places. Make a special picture book for your family pictures.

To make the book, first get two sheets of stiff paper. These will be the front and back covers. Put other sheets of paper in between. Carefully punch holes in all the paper. Tie yarn through the holes to bind the book. Draw and write on the front cover to show how special your picture book is.

Next, choose some family pictures you like. Put the pictures in groups if they were taken at the same time or in the same place. Paste each group of pictures to a book page. Then write something about the pictures on the page.

Go on ⟹

Finally, share your picture book with your family. As time goes on, add more pages to add other pictures of special times and places.

1. What do you need to make this family picture book?
   ○ **A.** rocks, sand, water, seeds, a jar
   ○ **B.** wood, nails, hammer, paints
   ○ **C.** milk, eggs, butter, peaches, sugar, crust
   ○ **D.** sheets of paper, yarn, paste, pictures

2. What do the directions say to do **first** when you make this family picture book?
   ○ **F.** Share the book with your family.
   ○ **G.** Get two sheets of stiff paper.
   ○ **H.** Group the pictures.
   ○ **J.** Paste the pictures to the pages.

3. What do the directions say to do **after** you paste the pictures to the pages?
   ○ **A.** Write something about the pictures on each page.
   ○ **B.** Punch holes in the covers and pages.
   ○ **C.** Choose some family pictures you like to put in the book.
   ○ **D.** Tie yarn to bind the book.

Go on ▷
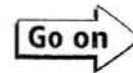
4. What do the directions say you can do **after** all the pictures are pasted in?

○ **F.** Punch holes in the covers and pages.

○ **G.** Draw and write on the cover.

○ **H.** Get two sheets of stiff paper.

○ **J.** Add more pages as time goes on.

5. Why should you group the pictures **before** you start pasting them to the pages?

○ **A.** The pictures won't stick to the pages if you don't group them first.

○ **B.** You might find out that you don't have stiff paper for the covers.

○ **C.** If you change your mind about where a picture goes, the page would have paste on it.

○ **D.** The pages and cover might come apart if you waited to group the pictures.

STOP

K

Name _____

Making Judgments

Read this story. Then read each question and fill in the circle next to the best answer.

Cleanup Time

Mandy and her brothers Bert and James put sheets over the dining room chairs to make a big tent. Then they brought toys and pillows inside. Bert sat in the tent reading a book. Mandy and James played with the toys. Just before dinner, their dad asked them to clean up.

"Let's put the toys away first, then the pillows and sheets," said Mandy.

"I'm not putting anything away," said Bert. "I was only reading in here."

"Making the tent was your idea, Mandy. You put all the stuff away," said James.

"It doesn't matter whose idea it was," said Mandy. "All of us played in the tent, so all of us should help clean up. That's only fair. And anyway, I help you when you have work to do."

"Well, I guess I did use the pillows, so I'll put them away," mumbled Bert.

Go on ➤
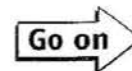
"Thanks, Bert," said Mandy. "Now James, what about you?"

"If Bert can help, I can too!" he said. "Let's see how quickly we can get things put away."

1. Why did Bert think he should not have to help pick up?
    ○ **A.** He didn't want to build the tent in the first place.
    ○ **B.** He was in another room playing a game.
    ○ **C.** He didn't like the toys they were playing with.
    ○ **D.** He only read and didn't play.

2. What reason did James give for not being willing to help?
    ○ **F.** He knew that Mandy never helped him.
    ○ **G.** It was Mandy's idea to make the tent, so she should clean up.
    ○ **H.** Their dad asked him not to help.
    ○ **J.** He was waiting to help their dad make bread to eat with dinner.

Go on
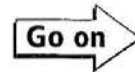
3. What was bad about James's reason for not helping?
   - ○ **A.** It was unfair to use the things but not clean them up.
   - ○ **B.** It was better for Mandy to wait until after dinner.
   - ○ **C.** It was unsafe for Mandy to clean up on her own.
   - ○ **D.** It would get Mandy in trouble with their dad.

4. Why did Mandy say that she helped her brothers when they had work to do?
   - ○ **F.** She didn't want her brother to get in trouble.
   - ○ **G.** She thought her ideas were not important.
   - ○ **H.** She wanted to make them change their minds.
   - ○ **J.** She wanted them to do all the cleaning up.

5. Why do you think Bert chose to help in the end?
   - ○ **A.** Their dad told him he had to help.
   - ○ **B.** He was afraid the toys would get lost.
   - ○ **C.** He knew Mandy was right when she said that he'd used the tent, too.
   - ○ **D.** His brother said that Mandy would not ask them to play anymore.

L

Name _____

Sequence of Events

**Read this story. Then read each question, and fill in the circle next to the best answer.**

Rosa's Boat Ride

Rosa's family went on vacation to the beach. After a long trip, Rosa's dad stopped the car in front of their motel room. "Our room has a view of the sea," he said. The family took their things into the room. It was too late for a swim, but they went to see the beach anyway.

Rosa and her family walked along the shore, looking for seashells. Cool waves washed over their feet. "When are we going for our boat ride?" Rosa asked.

"On the last day we're here," answered Rosa's dad. "Look at this sand dollar."

For the next two days, Rosa and her family had fun at the beach, swimming in the sea and building sandcastles. They also went fishing from the boat dock. But Rosa kept thinking about the boat ride to come.

Go on ➡
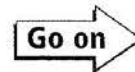
On the last day, the family went back to the boat dock. "Sorry folks! The boat isn't running today," the man said. Rosa looked as if she might cry.

"That's too bad," said Rosa's dad. "But I have an idea! Instead of crossing the bridge on the way home, we can take a ferryboat across the water. That way, you'll still get your boat ride, Rosa!"

Rosa's face got brighter. "Thanks, Dad," she said.

1. Which of these happens at the **beginning** of the story?
   ○ **A.** Rosa's family goes on a boat ride.
   ○ **B.** Rosa's family goes fishing.
   ○ **C.** Rosa's family builds a sandcastle.
   ○ **D.** Rosa's family gets to their motel.

2. What is the first thing the family does at the beach?
   ○ **F.** The family builds a sandcastle.
   ○ **G.** The family looks for seashells.
   ○ **H.** The family goes fishing.
   ○ **J.** The family goes on a boat ride.

Go on ⟹
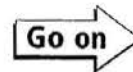
3. Which of these happens in the **middle** of the story?
   - ○ **A.** The family swims in the sea.
   - ○ **B.** The family goes to the ferryboat.
   - ○ **C.** The family goes home.
   - ○ **D.** The family takes their things to their room.

4. Which of these happens at the **end** of the story?
   - ○ **F.** Rosa's dad tells her to look at a sand dollar.
   - ○ **G.** Rosa's dad says their room has a view of the sea.
   - ○ **H.** Rosa's dad tells her she must learn how to swim.
   - ○ **J.** Rosa's dad says they can ride a ferryboat.

5. What does Rosa learn at the end of the story?
   - ○ **A.** Never pick up a sand dollar.
   - ○ **B.** It is important to be a good friend.
   - ○ **C.** There can be more than one way to do something.
   - ○ **D.** It can be fun to try to do something that has never been done before.

STOP

M Name _____

Information and Study Skills

Study the title page and table of contents. Then read each question. Fill in the circle next to the best answer.

All About Families by R. Kindred Full House Publishing Company 2001	**Contents** **Chapter 1** What Makes a Family . . . . .3 **Chapter 2** Where Families Live . . . . . .8 **Chapter 3** Families Work Together . . . .13 **Chapter 4** Special Family Times 18

1. What is the title of the book?
- ○ **A.** What Makes a Family
- ○ **B.** Special Family Times
- ○ **C.** Full House
- ○ **D.** All About Families

Go on ▷
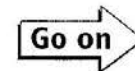
2. Who is the author?

○ **F.** Full House
○ **G.** Special Family Times
○ **H.** R. Kindred
○ **J.** M. Brother

3. On which page does Chapter 4 begin?

○ **A.** 3
○ **B.** 8
○ **C.** 13
○ **D.** 18

4. In which chapter would you look for information about the homes families live in?

○ **F.** Chapter 3
○ **G.** Chapter 2
○ **H.** Chapter 4
○ **J.** Chapter 1

5. What is the title of the chapter where you might find information about jobs that families do?

○ **A.** What Makes a Family
○ **B.** Where Families Live
○ **C.** Families Work Together
○ **D.** Special Family Times

STOP

O Name _____

Vocabulary

Read each question. Fill in the circle next to the best answer.

1. Which of these is **not** part of the word family for **learn?**
   - ○ **A.** learner
   - ○ **B.** teacher
   - ○ **C.** learning
   - ○ **D.** learned

2. What is the base word for the word family of **harmed, harmful,** and **harming?**
   - ○ **F.** harmed
   - ○ **G.** harmful
   - ○ **H.** harming
   - ○ **J.** harm

Read each sentence. Look at the underlined word and think about its meaning. Fill in the circle that tells the meaning of the underlined word.

3. Dad was filling a big pail with berries.
   - ○ **A.** a bucket
   - ○ **B.** light in color
   - ○ **C.** not dark
   - ○ **D.** a small house

Go on ⟩
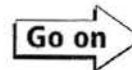
4. Then a bee stung Dad on his <u>nose</u>.

○ **F.** a loud sound

○ **G.** be friends with

○ **H.** a part of the face

○ **J.** understands

5. He didn't <u>hear</u> the bee's angry buzz until it was too late.

○ **A.** belonging to him

○ **B.** in this place

○ **C.** a rabbit with long ears and legs

○ **D.** listen to sounds with the ears

Go on ⟩

Study the dictionary entry below. Then read each question. Fill in the circle next to the best answer.

> **on** 1. Opposite of off. *Turn the lamp on at night.* 2. Where a thing is found. *The dishes are on the table.* 3. About. *The show is on wild animals.* 4. At the day or time that something happens. *We go to the game on Mondays.*

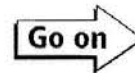6. Which meaning of **on** is used in this sentence?

   Her family eats out <u>on</u> Fridays.

   ○ **F.** meaning number one
   ○ **G.** meaning number two
   ○ **H.** meaning number three
   ○ **J.** meaning number four

7. Which meaning of **on** is used in this sentence?

   Your hat is <u>on</u> the hook.

   ○ **A.** meaning number one
   ○ **B.** meaning number two
   ○ **C.** meaning number three
   ○ **D.** meaning number four

Go on ⟩

8. Which meaning of **on** is used in this sentence?

Grandpa saw a TV show <u>on</u> trains.

○ **F.** meaning number one

○ **G.** meaning number two

○ **H.** meaning number three

○ **J.** meaning number four

9. Which entry word would you look up to find the meaning of **zipped?**

○ **A.** zippy

○ **B.** zipping

○ **C.** zip

○ **D.** zipper

10. Which entry word would you look up to find the meaning of **working?**

○ **F.** work

○ **G.** worked

○ **H.** working

○ **J.** works

(STOP)