1-1-2011

The effects of story performance on fourth and fifth grade students' comprehension and oral reading fluency of narrative and expository texts

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THE EFFECTS OF STORY PERFORMANCE ON FOURTH AND FIFTH GRADE STUDENTS' COMPREHENSION AND ORAL READING FLUENCY OF NARRATIVE AND EXPOSITORY TEXTS

by

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DISSERTATION

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

in partial fulfillment of the requirements

for the degree of

DOCTOR OF EDUCATION

2011

MAJOR: CURRICULUM & INSTRUCTION

Approved by:

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Advisor Date

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DEDICATION

This dissertation is dedicated to my father, Claude P. Wightman, and mother, Kaye R. Wightman. Thank you for all your unconditional love, support, and guidance.

ACKNOWLEDGEMENTS

I vividly remember the day when I had my Ed.D. interview with the College of Education at Wayne State University. I was young, ambitious, and very anxious to do well. Because of this, I failed to realize that I was chewing a piece of gum. Needless to say, I entered the interview and endeavored to do my best. Now, I don't really recall what was specifically asked, what I said, or how well I did (due to the fact that this occurred many years ago), but I do recall that the interview panel noticed that I was chewing a piece of gum. When this occurred, one of the panel members asked me, "What would you think if a person showed up to an interview chewing gum?" With great embarrassment, I immediately stopped chewing the piece of gum, swallowed it whole, and responded by saying, "I would probably think that the person was very nervous and didn't realize he or she was chewing gum." Everyone in the room paused for a moment and then suddenly began to laugh hysterically. Just then, Dr. Roney said, "We all know how you feel..."

To Dr. Roney, my advisor, thank you for having a sense of humor and not giving up on me. Likewise, thank you for your encouragement, patience, and constant supervision throughout the time it has taken me to complete this study.

To Dr. Addonizio, my cognate advisor, thank you for your knowledge, integrity, and level of professionalism. You have not only influenced me as an administrator, but also as a person. Much appreciation is also extended to Dr. Fahoome and Dr. Arya, committee members who provided me with valuable recommendations and advice for the completion of this study.

To Dr. Sawilowsky, thank you for taking the time to review my work, offering me helpful suggestions, and affording me with the opportunity to gain a better understanding of the Blair-Sawilowsky Salter-Fawcett Adjusted Rank Transformation Test (ART).

To Dr. Ozkan, thank you for sharing with me your knowledge and expertise in statistics. Additional gratitude is extended to John R. Kment and Faye Bucci, thank you for permitting me to do my research.

Finally, thank you to all my family, friends, and colleagues; I certainly wouldn't have completed this study without all of you!

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CHAPTER 1

INTRODUCTION

Since the beginning of humankind, storytelling has been one of the primary ways people have learned (Bransford, Brown, & Cocking, 1999; Cherry-Cruz, 2001; R. Collins & Cooper, 1997; Haven, 2007; Mello, August 30-September 1, 2001; Polkinghorne, 1988; Reed, 1987; Roney, 1988). Moreover, through word of mouth, civilizations have come to understand the many intricacies of life, customs of their own people, and plain eternal truths which link one generation to the next (R. Collins & Cooper, 1997; Colwell, 1991; Cothern, 1992; Doll et al., 2001; Haven, 2009; Mallan, 1996; Phillips, 1996; Reed, 1987; Roney, 1988; Ross, 1980; Schaafsma, 1989).

At present, the tradition of storytelling continues to be a way of learning in many countries. However, in ours, storytelling isn't as prevalent and has been eradicated by more favorable means of communication (i.e., books, newspapers, magazines, television, movies, technology, etc.) (Mello, 2001a; Roney, 1988). Not surprising, from an educational standpoint, many classroom teachers prefer to read aloud from books instead of telling stories to children. This practice is also supported by substantial research which indicates that reading aloud to children has academic value. Unfortunately, for storytelling, a paucity of research dramatically linking it to students' academic achievement has yet to be well established.

Value of Reading Aloud

As a teaching/learning strategy, there is an abundance of empirical data supporting the efficacy of reading aloud to children as compared to storytelling (Barton, 1986; Cambourne, 1995; Chesin, 1966; Kroeber, 1992; Roney, 1988, 1989, 1996, 2001,

2005, 2009; Sampson, Rasinski, & Sampson, 2002; Short, 1995; Snow, Burns, & Griffin, 1998). To be specific, many researchers have presented support linking reading aloud by parents and teachers to children's oral language development and reading achievement (Anderson, Hiebert, Scott, & Wilkinson, 1985; Flood, Jensen, Lapp, & Squire, 2003; Hall & Moats, 2000; Hoffman, Roser, & Battle, 1993; McCormick, 1977; Roney, 2005; Short, 1995; Whitehurst, 1988). Short (1995) also offers a plethora of studies that link reading aloud to children's academic achievement (i.e., comprehension, vocabulary development, writing, speaking/listening skills, etc.).

Other research supporting the use of reading aloud with children is substantiated by Hall & Moats (2000), Flood, Jensen, Lapp, and Squire (2003), and Whitehurst (1988). Likewise, research conducted by Feitelson, Kita, and Goldstein (1986), identifies the decisive value of reading aloud to underprivileged or "at risk" children as an aid to mastering reading comprehension and serves as the source for current recommendations to read aloud to children for at least twenty minutes a day (Feitelson, Kita, & Goldstein, 1986; Roney, 2005). In brief, Anderson, Hiebert, Scott, and Wilkinson (1985) report that the Commission on Reading concluded that "the single most important activity for building the knowledge required for eventual success in reading is reading aloud to children." (p. 23)

A good number of teachers would likely agree that the primary goal of reading aloud is to help children comprehend printed material (Brenner, 1997; Cross & Paris, 1987; Feathers, 1994; Isabel & Margaret, 2001; Isbell, Sobol, Lindauer, & Lowrance, 2004; Lehr, 2005; Maria, 1998; Roney, 2005; Sue, 2008; Trostle & Hicks, 1998; Walker, 2001). However, developing the learner's background knowledge is perhaps the most

important ingredient in reaching this goal. Since all children have limited knowledge of the world around them, teachers endeavor to build upon their schema of things through meaningful activities which promote the development of essential literacy skills (e.g., reading aloud, listening centers, comprehension skills/strategies, guided reading, literature circles, etc.) (Bear & Barone, 1998; Cambourne, 1988; J. D. Cooper, 1997, 2000; Fillmore & Snow, 2000; McNamee, McLane, Cooper, & Kerwin, 1985; Roney, 2005; Sampson, et al., 2002; Sulzby, 1998; Templeton, 1995). Because of this, children are able to indirectly experience much of life through literature and teachers can effortlessly provide this experience in the classroom by reading aloud from a variety of texts (i.e., poems, historical fiction, folktales, biographies, fantasy, etc.) on a daily basis (Roney, 2005, p. 46).

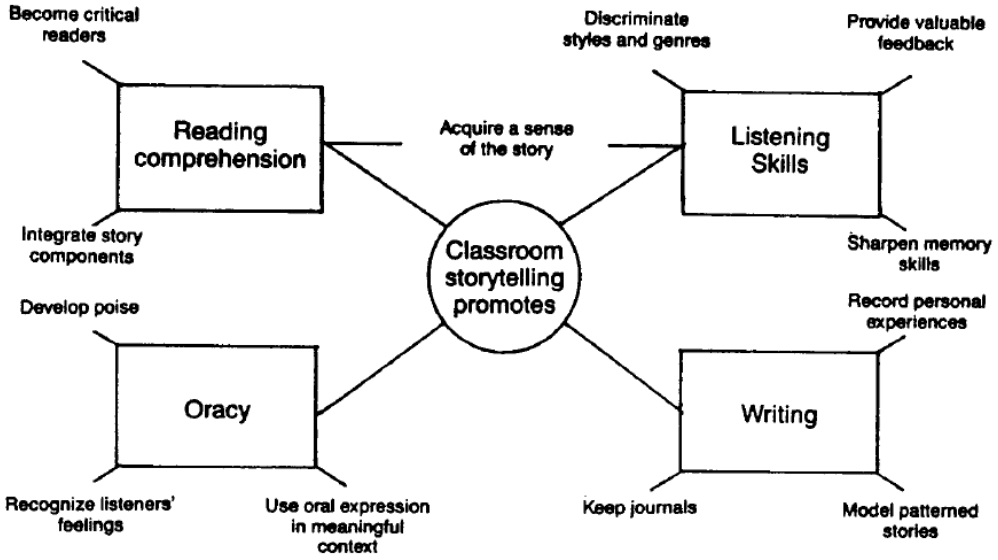
Research has shown that during the beginning stages of reading development, the practice of reading aloud by the teacher introduces children to the basic properties of the English writing system—properties which are essential in gaining meaning from print (Anderson, et al., 1985; Bear & Barone, 1998; J. D. Cooper, 1997, 2000; Feathers, 1994; Fillmore & Snow, 2000; Lehr, 2005; Roney, 2005; Sampson, et al., 2002; Snow, et al., 1998; Sulzby, 1998; Templeton, 1995). It also helps children move toward the task of learning to read in a manner that is consistent with the way in which they learn to speak. Theoretical support for this notion is provided by Bear and Barone (1998), Cambourne (1988, 1995), Chomsky (1972), J. D. Cooper (1997, 2000), Haven (2007), Roney (2005), Skinner (1957), Templeton (1995), and Vygotsky (1986).

Value of Storytelling

Although there is a limited amount of research supporting the use of storytelling in the classroom, many theorists believe that it has the same ability to foster children's literacy skills in ways similar to reading aloud (e.g., oral language/vocabulary development, writing skills, memory/recall, reading abilities, feelings/emotions, imaginations/visualization abilities, listening abilities, understanding of story structure, etc.) (Barton, 1986; Bransford, et al., 1999; Breneman & Breneman, 1983; Bruchac, 1997; Bryen, 1982; Cabral & Manduca, 1997; Carroll, March13-16, 1999; R. Collins & Cooper, 1997; Colwell, 1991; J. D. Cooper, 1997, 2000; Dailey, 1994; Dailey & Weaver, 1994; Danoff, 2006; de Vos, 2003; Egan, 1986; Engel, 1995; Farrell & Nessel, 1982; Gillard, 1996; Greene, 1996; Haven, 2007; Haven & Ducey, 2007; Lehrman, 2005; Livo & Rietz, 1986; Mason, 1996; Mellon, 1998; Roney, 1988, 1989, 1996, 2001, 2009; Rooks, 1998). For example, Peck (1989), a former classroom teacher and professional storyteller, suggests that classroom storytelling promotes reading comprehension, oral language development, and writing and listening skills in children (see Figure 1.1). In her opinion, as well as that of many other theorists, storytelling is underutilized by teachers in the classroom (Abilock, 2008; Aina, 1999; Bustamante, 2002; Butterworth & Lo Cicero, 2001; Cahill, 2004; Carolyn, 2007; Casey, Kersh, & Young, 2004; Cherry-Cruz, 2001; F. Collins, 1999; Colon-Vila, 1997; Craig, Hull, Haggart, & Crowder, 2001; Davis, 1982; Doll, et al., 2001; Dolores, 2002; Ellis, 1997; Farnsworth, 1981; Frick, 1986; Friedberg, 1994; Genishi, 1988; Golden, 1984; Hamilton & Weiss, 1991; Hanson, 2004; Harper & Decker, 1984; Haven, 2009; Helen, 2008; Sasser & Zorena, 1991; Shannon, 1979; Sherman, 1979; Smardo, 1984; Speaker, Taylor, & Kamen, 2004;

Strickland & Morrow, 1989; Sturm, 2008; Sue, 2008; T. M. Turner, 2006; Wason-Ellam, 1986; Wendelin, 1991).

Figure 1.1
Benefits of Classroom Storytelling (Peck, 1989, p. 140)



The primary cause for the aforesaid quandary is that storytelling is a more difficult skill to master than reading aloud (R. Collins & Cooper, 1997; Dailey & Weaver, 1994; Danoff, 2006; de Vos, 2003; Egan, 1986; Hanson, 2004; Haven & Ducey, 2007; Mello, 1997; Peck, 1989; Roney, 1988, 1989, 1996, 2001, 2005, 2009; Yawney, 2008). Thus teachers ask: Why bother taking the extra time needed to learn to tell stories, rather than learning to read stories aloud, when reading aloud is already a proven teaching/learning strategy and takes less time to master? On the other hand, Roney (1988) maintains that

> Children attend more closely to a teller than to a reader because storytelling is a more direct, personal, enjoyable, creative and therefore, more powerful medium than reading aloud. With storytelling there is no book to come between the teller and audience; nothing to divert the children's or teller's attention away from the story and the communication process. The teller is free to share his (or her) own story, not another's tale; free to sustain eye contact with the audience, to monitor

> and relish their reaction to a story, and to continually alter and personalize the telling to meet their immediate needs and moods. (p. 16)

Likewise, unlike reading aloud, storytelling involves the dynamic process of give and take between teller and his or her audience. The audience enthusiastically participates as co-creators in the sharing of the tale; this sharing is mutually pleasing to both teller and audience alike (Roney, 1988). Roney (1988) goes on to say that that both telling stories and reading them aloud to children are viable teaching methods and he recommends that teachers incorporate both techniques into their literacy programs. Nevertheless, in his own professional judgment, storytelling is likely to have much more of an impact than reading aloud on children's desires and abilities to learn how to read and write. He also indicates

> Literacy begins with motivation, a personal desire to read and write. Children, the young ones in particular, are consummate pragmatists. They will do what the teachers ask of them…learn to read and write under certain conditions. (Roney, 1988, p. 15)

Statement of the Problem

This study was designed to consider the following problem: Does storytelling and/or reading aloud influence fourth and fifth grade children's comprehension and oral reading fluency of both narrative and expository texts?

Purpose of the Study

The purpose of the study was to generate causal probability statements about the following questions:

(a) Does a teacher's story performance of telling stories or reading stories aloud influence fourth and fifth grade students' comprehension of narrative and expository texts?

(b) Does a teacher's story performance of telling stories or reading stories aloud influence fourth and fifth grade students' oral reading fluency of narrative and expository texts?

(c) Is one method of story performance, storytelling or reading aloud, more effective than another in influencing fourth and fifth grade students' comprehension of narrative and expository texts?

(d) Is one method of story performance, storytelling or reading aloud, more effective than another in influencing fourth and fifth grade students' oral reading fluency of narrative and expository text?

(e) Are the effects of the two story performance strategies constant across the factor of gender?

Delimitations of the Study

The study was confined to heterogeneously grouped fourth and fifth grade students from self-contained classrooms attending a K-6 public school located in Macomb County, Michigan. Several considerations made fourth and fifth grade students the most desirable school sample population for this study. First, there was a fair distribution of boys to girls. Second, the principal investigator is unaware of any other studies that combine these two distinct grade levels together to formulate treatment/comparison groups.

Significance of the Study

Given that constructing meaning is the ultimate goal of all literacy instruction, the source of significance in this study involves the value of storytelling as a teaching/learning strategy that improves students' comprehension and oral reading fluency over and above what we already know about reading aloud. According to Cooper (1997), "…research in literacy learning, emergent literacy, and language acquisition clearly shows that all aspects of the language arts develop together as learners become literate." (p. 17) Consequently, the major focus of instruction by teachers should be on developing a repertoire of activities that promote the authentic use of reading, writing, speaking, listening, viewing, and thinking as a basis for learning (Bear & Barone, 1998; Bransford, et al., 1999; Bryen, 1982; J. D. Cooper, 1997, 2000; Fillmore & Snow, 2000; Holzman, 1983; Lehr, 2005; Maria, 1998; Marzano, Pickering, & Pollock, 2001; Orlich, Harder, Callahan, & Gibson, 1998; Sampson, et al., 2002; Snow, et al., 1998; Sulzby, 1998; Templeton, 1995; Wood, 1999). Unlike reading aloud, validation for the theories about and the efficacy of storytelling as a viable teaching/learning strategy has yet to be established in the areas of reading comprehension and oral reading fluency.

Definitions of Terms

Story Performance - Act of either telling a story orally or reading a story aloud to an audience

Storytelling - Process whereby a person (the teller), using mental imagery, narrative structure, and vocalization or signing, communicates with other humans (the audience) who also use mental imagery and, in turn, communicate back to the teller primarily via

body language and facial expressions, resulting in the co-creation of a story (Roney, 1996, p. 7)

Reading Aloud - Oral reading of a story from a desired text to an audience

Silent Reading - Independent reading by a student without using his or her voice

Narrative Text - Tells a story; usually found in short stories and novels (Cooper, 1997, p. 14)

Expository Text - Provides information and facts; usually found in textbooks, informational books, and directions or instructions for doing something (Cooper, 1997, p. 14)

Differentiated Instruction - Process of teaching students using different methods so that they may learn content

Reading Comprehension - Understanding text after it has been read

Oral Reading Fluency - Number of words in the passage multiplied by sixty and then divided by the number of seconds it takes to read a passage (Leslie & Caldwell, 2001)

Treatment Levels

The independent variable for this study involves two strategies for introducing stories to children (storytelling and story reading) and a comparison (silent reading). For the purposes of this study, each strategy is used, in part, to differentiate literacy instruction.

Treatment 1 - Twenty-eight teacher-storytelling performances of narrative (14) and expository (14) texts were employed with fourth and fifth grade students with the purpose of influencing students' reading comprehension and oral reading fluency.

Treatment 2 - Twenty-eight teacher-story reading aloud performances of narrative (14) and expository (14) texts were employed with fourth and fifth grade students with the purpose of influencing students' reading comprehension and oral reading fluency.

Treatment 3 - The comparison group; no narrative/expository text storytellings or story readings were employed. Students silently read each of the same narrative and expository texts employed in Treatments 1 and 2.

Statement of Hypotheses

The hypotheses tested by this study are stated in the null form as follows:

H_1 - There is no difference in fourth and fifth grade students' reading comprehension of narrative and expository texts as a result of employing two story performance techniques.

H_2 - There is no difference in fourth and fifth grade students' oral reading fluency of narrative and expository texts as a result of employing two story performance techniques.

H_3 - There is no difference in fourth and fifth grade students' reading comprehension of narrative and expository texts due to the effects of:

(a) A teacher's telling twenty-eight stories to the students.

(b) A teacher's reading aloud of twenty-eight stories to the students.

H_4 - There is no difference in fourth and fifth grade students' oral reading fluency of narrative and expository texts due to the effects of:

(a) A teacher's telling twenty-eight stories to the students.

(b) A teacher's reading aloud of twenty-eight stories to the students.

H_5 - There is no significant interaction among two story performance techniques held constant across the factor of gender.

CHAPTER 2

REVIEW OF LITERATURE

The purpose of the following review is to introduce two constructs that establish a rational basis for incorporating storytelling as a teaching/learning strategy to differentiate instruction. The first construct endeavors to define/describe storytelling and to shed some light on the many diverging educational issues, positions, and quandaries that theorists, researchers, teachers, and administrators have about storytelling. The second construct discloses relevant theoretical and empirical information on storytelling as it relates to students' cognitive/affective learning. Finally, a summary of findings highlights conclusions made by various theorists, researchers, and educators on the effects storytelling has on students' cognitive/affective learning.

What is Storytelling?

In order to study the effects storytelling has on student achievement, it is necessary that it be properly defined first. Clearly, if it is not suitably defined, it cannot be appropriately studied. What's more, the lack of professional acceptance that ensues from an unclear, undefined, and unproven teaching/learning strategy involves serious consequences for advancing storytelling as a practice in the field of K-12 education (Abilock, 2008; Boone, 2005; Butterworth & Lo Cicero, 2001; P. M. Cooper, 2005; P. M. Cooper, Capo, Mathes, & Gray, 2007; Diaw, 2009; Egan, 1986; Hanson, 2004; Haven, 2007, 2009; Haven & Ducey, 2007; Mallan, 1997; Mello, 1997, 2000, 2001b, August 30-September 1, 2001; Peck, 1989; Roney, 1988, 1989, 1996, 2001, 2009; Rooks, 1998; Speaker, et al., 2004; Williams & Myers, 2001; Yawney, 2008; Young, 1988). For this reason, an examination of numerous storytelling related texts/manuscripts was

reviewed for the purposes of this study (Barton, 1986; Breneman & Breneman, 1983; Bruchac, 1997; Cabral & Manduca, 1997; R. Collins & Cooper, 1997; Colwell, 1991; Dailey & Weaver, 1994; Danoff, 2006; de Vos, 2003; de Vos, Harris, & Lottridge, 2003; Farrell & Nessel, 1982; Gillard, 1996; Greene, 1996; Haven & Ducey, 2007; Kroeber, 1992; Langellier & Peterson, 2004; Lehrman, 2005; Livo & Rietz, 1986; Maguire, 1985; Mason, 1996; Mellon, 1998; Painter, 1994; Paley, 1990; Pelowski, 1977; Roney, 1996, 2001; Rosen, 1988; Rubright, 1996; Rydell, 2003; Schimmel, 1992; Teaching storytelling: A position statement from the Committee on Storytelling, 2000; Trostle-Brand & Donato, 2000; Trousdale, Woestehoff, & Schwartz, 1994; Wilson, 2006; Zipes, 1995, 2004). Unfortunately, many of these works fall short of providing a formal definition of storytelling. As a matter of fact, many texts/manuscripts, at best, define storytelling in a generic way (Breneman & Breneman, 1983; Chesin, 1966; R. Collins & Cooper, 1997; R. B. Collins, 1993; Cothern, 1992; Craig, et al., 2001; de Vos, 2003; Haven & Ducey, 2007; Livo & Rietz, 1986; Mellon, 1998; Pelowski, 1977; Trousdale, et al., 1994; Zipes, 1995). Furthermore, some authors only go as far as describing what one does as they tell stories or how to prepare for a telling (Barton, 1986; Bruchac, 1997; Cabral & Manduca, 1997; Colwell, 1991; Dailey & Weaver, 1994; de Vos, et al., 2003; Ellis, 1997; Greene, 1996; Hamilton & Weiss, 1991; Haven & Ducey, 2007; Helen, 2008; Higgins, 2008; Lehrman, 2005; Livo & Rietz, 1986; Magee, 1983; Maguire, 1985; Mason, 1996; Mellon, 1998; Millstone, 1997; Lesley Mandel Morrow, 1979; Painter, 1994; Phillips, 1995; Rydell, 2003; Schimmel, 1992; Shalhoub, 1991; Shannon, 1979; Sherman, 1979; Trousdale, et al., 1994; Wilson, 2006). This is evident by the

position statement made by the National Council of Teachers of English (2000) from the Committee on Storytelling. They define/describe storytelling as

> …relating a tale to one or more listeners through voice and gesture. It is not the same as reading a story aloud or reciting a piece from memory or acting out a drama—though it shares common characteristics with these arts. The storyteller looks into the eyes of the audience and together they compose a tale. The storyteller begins to see and re-create, through voice and gesture, a series of mental images; the audience, from the first moment of listening, squints, stares, smiles, leans forward, or falls asleep, letting the teller know whether to slow down, speed up, elaborate, or just finish. Each listener, as well as each teller, actually composes a unique set of story images derived from meanings associated with words, gestures, and sounds. The experience can be profound, exercising the thinking and touching the emotions of both teller and listener. (p. 4)

Another instance comes from Mello (2000); she explains storytelling as

> …the art and craft of relating a cultural or traditional text to an audience without the use of memorized scripts, books, or other literary devices. The function of the storyteller is to tell a tale orally. Storytellers rely upon their manipulation of language in order to relate an anecdote and often make use of dramatic skills such as short and long range gesture, narration, characterization, vocalization, and mimetic action. (p. 37)

Despite numerous attempts at defining or describing storytelling, one notable explanation that seems to systematically clarify storytelling in its most “basic” form is Roney’s (1996). He distinguishes storytelling as

> …a process whereby a person (the teller), using mental imagery, narrative structure, and vocalization or signing, communicates with other humans (the audience) who also use mental imagery and, in turn, communicate back to the teller primarily via body language and facial expressions, resulting in the co-creation of a story. (Roney, 1996, p. 7)

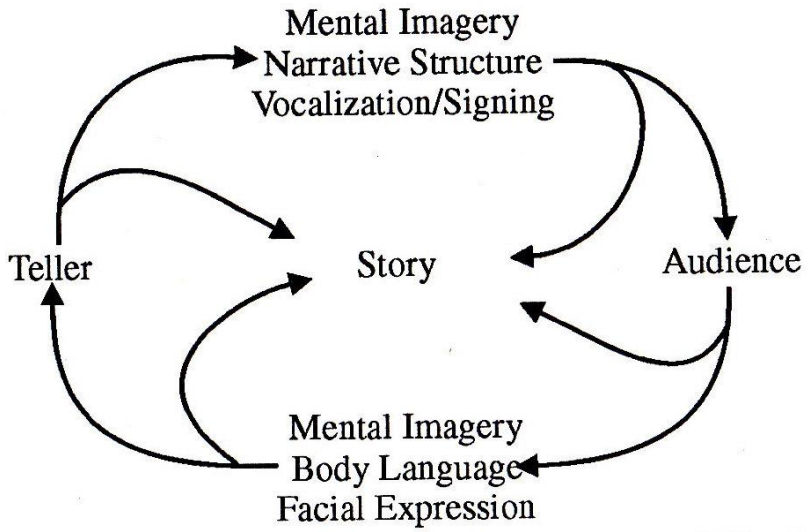
Roney (2001) further expounds upon his explanation of storytelling through the use of a diagram (see Figure 2.1). According to him, the arrows represent both the artistic and communicative spirit of storytelling. The discourse (vocalization and gesturing) used by the teller stimulates a response from the audience, who then express back to the teller

their reactions via body language, facial expression, and from time to time, unequivocal verbal feedback Roney, 1996, 2001). In consideration of the above mentioned process, the "story" suddenly becomes

> …a product of the continual co-creative interaction of both the teller and audience, who communicate with one another in recurring fashion throughout the experience. As such, storytelling is an immediate and personal endeavor were each telling of the story is unique—a creation in this time and this place with this teller and this audience, never to be duplicated in precisely the same way again. (Roney, 2001, p.114)

Roney (2001) concludes by stating that the strength and exclusivity of storytelling as an art form rests in its co-creative, interactive, immediate, and personal nature, which renders it uniquely distinct from acting, singing, dancing, reading aloud, and related communication art forms.

Figure 2.1
Model of the Storytelling Process (Roney, 2001, p.114)



Storytelling's Quandary…

Since the early '70s, storytelling, as a creative art form and teaching/learning strategy, has shown a slow, steady renaissance (Abilock, 2008; de Vos, 2003; de Vos, et al., 2003; Haven, 2007, 2009; Haven & Ducey, 2007; Isbell, et al., 2004; Mello,

August 30-September 1, 2001; Roney, 2009; Speaker, et al., 2004; Teaching storytelling: A position statement from the Committee on Storytelling, 2000). Similarly, there also seems to be an abundance of published curriculum resources available for educator-storytellers to use with students and audiences (i.e., “How to” guides, instructional units/programs, videos, sound recordings, internet websites, etc.). This present accumulation of information and storytelling’s reawakening has led some theorists and researchers to believe that storytelling’s edifying value is finally being recognized by K-12 teachers and administrators as a powerful teaching/learning method to differentiate instruction; but to what extent (Abilock, 2008; Boone, 2005; Carolyn, 2007; P. M. Cooper, 2005; Danoff, 2006; de Vos, 2003; de Vos, et al., 2003; Diaw, 2009; Haven, 2007, 2009; Haven & Ducey, 2007; Helen, 2008; Lehrman, 2005; Lisenbee, 2009; Rydell, 2003; Sturm, 2008; Wilson, 2006; Zipes, 2004)?

In the same amount of time that storytelling has become more prevalent, overwhelmed K-12 teachers and administrators have struggled to keep up with repressive educational reform policies (e.g., Title I of the Elementary and Secondary Education Act of 1965, No Child Left Behind Act of 2001, American Recovery Reinvestment Act of 2009, Race to the Top Fund, etc.). As a result, much of their attention has shifted from teaching/learning to frantic grant writing, obeying stringent Federal/state regulations/guidelines, standardized achievement testing, and hopefully, making Adequate Yearly Progress (Addonizio, 2000; Bracey, 2009; Bushaw & Gallup, 2008; Gibboney, 2008; Kohn, 2000; Meier, Kohn, Darling-Hammond, & Wood, 2004).

Due to the above mentioned state of affairs, it is unlikely that storytelling or any other unconventional teaching\learning strategy will likely be used to differentiate

instruction in classrooms by K-12 teachers and administrators any time soon. This is mainly attributed to a limited amount of empirical evidence that clearly demonstrates a valid causal link between storytelling and some aspect of student achievement (i.e., reading, writing, speaking, listening, viewing, etc.) (J. D. Cooper, 1997, 2000; Doll, Benedetti, Carmody, Reynolds, Brantigan, & Wilson-Lingbloom, 2001; Isbell, et al., 2004; Koehnecke, 2000; Mallan, 1997; Marsden & O'Callahan, 1980; Marzano, Pickering, & Pollock, 2001; Paley, 1990; Peck, 1989; Reed, 1987; Roney, 1989, 1996, 2001, 2009; Rosen, 1988; Shannon, 1979, Trostle & Hicks, 1998; Trousdale, Woestehoff, & Schwartz, 1994; Yawney, 2008). In contrast to this reality, there is a substantial amount of theoretical and empirical research that supports reading aloud to students (Allison, 1994; Feitelson, et al., 1986; Flood, et al., 2003; Hall & Moats, 2000; Harkness, 1981; Hoffman, et al., 1993; McCormick, 1977; Roney, 2005; Short, 1995; Snow, et al., 1998; Walker, 2001; Whitehurst, 1988). Nowadays, this practice is considered to be a fundamental aspect of literature-based reading programs, which requires teachers to read aloud to their students on a regular basis (Hoffman, et al., 1993; Roney, 2005; Short, 1995). To further complicate matters, reading aloud from a book requires less time and preparation as compared to formulating and orchestrating an oral storytelling. In other words, teachers and school administrators will ask, “Why even bother with storytelling at all?” Certainly, in the eyes of educators, adopting an unverified practice would not only be “precarious,” but also time consuming and labor intensive (Caulfield, 2000; P. M. Cooper, et al., 2007; Cothern, 1992; Groce, 2001; Mello, August 30-September 1, 2001; Nessel, 1985; Rosen, 1991; Speaker, 2000; Trousdale, et al., 1994; Williams & Myers, 2001). Unfortunately, this narrow point of

view creates a slight dilemma for storytelling theorists and researchers. To further exemplify this matter, professional storyteller, author, and educator, R. Craig Roney (2009) acknowledges

> …educator-storytellers cannot hope to promote the regular and sustained use of storytelling in our schools without some validation that storytelling is more valuable to children than simply entertainment. At present, there is a dearth of significant research on this subject. (p. 45)

Unquestionably, most storytelling theorists and researchers would have to agree with the aforementioned assertion. Without a doubt, there are a limited amount of qualitative/quantitative studies out there that verify storytelling as a viable teaching/learning strategy (Abilock, 2008; Greene, 1996; Isabel & Margaret, 2001; Mello, 1997, 2000, August 30-September 1, 2001; Trostle & Hicks, 1998; Yawney, 2008; Zeece, 1997). To make matters worse, other studies involving storytelling report inconclusive results or suggest that it does not make a difference in student performance (Amato, Emans, & Ziegler, 1973; Doll, et al., 2001; Farrell & Nessel, 1982; Hanson, 2004; L. M. Morrow, 1985; Myers, 1990; Smardo, 1984; Young, 1988). Regardless of the end result, this lack of internal validity is likely due to meager research design and statistical analysis. For instance, the vast majority of research to date on storytelling reflects qualitative designs that attempt to establish relationships between storytelling and other dependent variables (e.g., comprehension, oral language development, writing ability, memory/recall, story structure, critical thinking, feelings/emotions, etc.) (Brenner, 1997; Diaw, 2009; Gerbracht, 1994; Levy, 2007; Lisenbee, 2009; Loyce, 2006; McCabe, 1997; Mello, 1997, August 30-September 1,

2001; Mona Leigh, Allison, Jaime, Gene, & Allison, 2007; Nelson, 1990; Speaker, et al., 2004; Yawney, 2008). All fall short of establishing causality, which spawns scientifically unsubstantiated theory or opinion. Consequently, more quantitative research is needed to authenticate storytelling as a useful teaching/learning strategy to differentiate instruction (Abilock, 2008; Amato, et al., 1973; Baumgartner, 1996; Boone, 2005; Butterworth & Lo Cicero, 2001; Carroll, March13-16, 1999; Caulfield, 2000; P. M. Cooper, 2005; P. M. Cooper, et al., 2007; Diaw, 2009; Doll, et al., 2001; Egan, 1986; Froyen, 1987; Groce, 2001; Hanson, 2004; Haven, 2009; Lisenbee, 2009; Mallan, 1997; Marzano, et al., 2001; Morgan, 2002; Munn, 1999; Page, 1983; Roney, 2009; Rooks, 1998; Rosman, 1992; Schuller, 2001; Smardo, 1984; Williams & Myers, 2001; Young, 1988).

On the contrary to the aforesaid predicament, professional storyteller and author, Kendall Haven, believes that there is sufficient research out there that substantiates the use of story in the classroom; part of which involves his belief regarding the value of delivery strategies such as storytelling (Haven, 2007, 2009; Haven & Ducey, 2007). To verify this claim, Haven (2007) maintains that he has personally reviewed over 100,000 pages of research from fifteen fields of study and each, in one way or another, reveal how the brain obtains, processes, and responds to stories (e.g., neural biology, cognitive science, education, developmental psychology, etc.). He also points out that his sources consisted of over 350 books and qualitative/quantitative studies, plus over seventy articles that reviewed/evaluated other studies including an analysis of over 1,500 studies and descriptive articles. From his findings, Haven (2007) deduces

> …that each and every one of these thousands of independent sources agrees with the premise that stories work, that they are effective and efficient. I could not find one shred of evidence to suggest that stories aren't effective vehicles to teach, to inspire, to inform, and to educate. (p. 7)

In deliberation of all the diverging educational issues, positions and quandaries that theorists, researchers, educator-storytellers, teachers and administrators have about storytelling, one thing is certain. Storytelling's ability to endure over the course of time implies that it is already an established teaching/learning method and, consequently, should be used by K-12 teachers to differentiate instruction in classrooms (R. Collins & Cooper, 1997; P. M. Cooper, 2005; Dailey & Weaver, 1994; Doll, et al., 2001; Farrell & Nessel, 1982; Mallan, 1997; Roney, 2009). To substantiate this argument, Haven (2007) acknowledges that

> Humans have told, used, and relied on stories for over 100,000 years. Written communication began only 6,000 to 7,000 years ago. Modern expository forms of argument, persuasion, and logic developed well after that. Most Western cultures began, en masse, to read and write only a few hundred years ago. Before that, oral stories were the dominant form through which history, news, values, cultural heritage, and attitudes were passed from person to person and from generation to generation. Current research indicates that stories even predate language. In the beginning there were stories. Then came language to express story concepts. Then came written language with its grammar and syntax. Only much later did other narrative and expository forms emerge. Evolutionary biologists confirm that 100,000 years of reliance on stories have evolutionary hardwired a predisposition into human brains to think in story terms. We are programmed to prefer stories and to think in story structure. (p. 4)

Storytelling & Cognitive/Affective Learning

A common misconception that many people have about storytelling is that no real observable learning takes place, which makes it little more than an entertaining diversion (Roney, 1988, 1989, 1996, 2001, 2009). The truth of the matter is, there is a

great deal of cognitive/affective learning taking place, much of which is unobservable to the naked eye (Haven, 2007, 2009; Haven & Ducey, 2007; Kaplan, 1986; Krathwohl, Bloom, & Masia, 1964; McNamee, et al., 1985; Roney, 1988, 1989, 1996, 2001, 2009). To better illustrate this point, a number of educators, theorists, and researchers have concluded that children do gain educationally during storytelling experiences (Allison, 1994; Baumgartner, 1996; Boone, 2005; Brenner, 1997; Caulfield, 2000; Diaw, 2009; Gerbracht, 1994; Gordon, 1991; Isbell, et al., 2004; Lisenbee, 2009; Maguire, 1985; Morgan, 2002; Nelson, 1990; Palmer, Harshbarger, & Koch, 2001; Rosman, 1992; Schuller, 2001; Speaker, et al., 2004; Yawney, 2008). Essentially all describe, in one way or another, desirable outcomes related to improved student achievement (e.g., listening skills, vocabulary development, story structure, comprehension, memory/recall, writing, etc.).

As a case in point, in a quantitative study of thirty-two primary school students, ranging in age from seven to eleven years, Trostle & Hicks (1998) evaluated the effects of story reading versus storytelling on story line comprehension and vocabulary acquisition. Upon conclusion of their study, they found that children who witnessed storytelling in “Character Imagery” form (the storyteller wears a costume assuming the role of a character in the tale) scored significantly higher on story line comprehension and vocabulary acquisition measures than did children who listened to story book reading (Trostle & Hicks, 1998). Similar findings were made by Brenner (1997) and Page (1983). Each acknowledged improvement in students’ comprehension abilities and other areas of literacy development (i.e., vocabulary acquisition, memory/recall, writing, story structure, etc.).

Despite the promising outcomes from the previously mentioned studies, results should be viewed with caution because each contain a series of design flaws and, consequently, cannot be considered "true" experiments. To be more specific, Brenner (1997), Page (1983), and Trostle & Hicks (1998) all fall short of establishing a control group; this diminishes each of their studies' scientific value since each study involves a violation of a valid experimental design (Bracht & Glass, 1969; Keppel & Wickens, 2004). Likewise, both Brenner (1997) and Trostle & Hicks (1998) fail to randomly assign their students to each of their treatment groups. This constitutes an immediate threat of internal validity and sample selection bias (Keppel & Wickens, 2004). Moreover, Page (1983) and Trostle & Hicks (1998) did not employ a factorial design in their studies. By doing so, they would have been able to determine the separate and joint effects of each of the treatments upon the dependent variable. The fact that Page (1983) and Trostle & Hicks (1998) did not employ a factorial design, but did employ multiple treatments, poses a serious threat to both the internal and external validity of their studies. In discussing the multiple treatment threat, Bracht & Glass (1969) state

> When two or more treatments are administered consecutively to the same persons within the same or different studies, it is difficult and sometimes impossible to ascertain the cause of the experimental results or to generalize the results to settings in which only one treatment is present. (pp. 1-2)

Likewise, it is equally impossible to determine which activity or combination of activities produced the treatment effect.

An additional concern with Trostle & Hicks' (1998) is their method of delivery. They engaged their students in "mediated" storytelling, a type of storytelling that

involves the use of costumes, props, and other novel items. This method of storytelling is impractical, unnecessary, and rather gimmicky. True storytelling should be as uninhibited and natural as possible; free from attention-grabbing items or costumes that tend to distract the audience. Besides, it is unlikely that teachers would even consider using such a method because it involves too much additional time and preparation on their behalf.

Another educational benefit to storytelling is that it promotes expressive (e.g., writing, speaking, singing, gesturing, body language, vocal inflections, etc.) and receptive language development (i.e., reading, comprehension, memory/recall, viewing, listening, etc.) in children (Friedberg, 1994). Peck (1989) also holds the same opinion and advocates that storytelling offers two separate learning opportunities for students.

First, as they listen to stories, students gain a better understanding of narrative structure (i.e., setting, characters, initiating event, plot resolution, etc.). This, in turn, enhances their imaginations, improves memory and comprehension, heightens their abilities to listen, and to think more critically (Brenner, 1997; Peck, 1989; Roney, 1988; Rooks, 1998; Trousdale, et al., 1994; Young, 1988). Many researchers, theorists, and educators also infer that listening to stories sharpens a child's awareness of the storytelling process as they provide feedback to the teller (i.e., smiles, laughing, looks of surprise, covering of ears/eyes, etc.). This, in turn, offers visible evidence to the storyteller that the audience members understand what is being said (Bauer, 1977; Breneman & Breneman, 1983; Bruchac, 1997; Bryant, 1973; Cabral & Manduca, 1997; R. Collins & Cooper, 1997; de Vos, 2003; Egan, 1986; Gordon, 1991; Greene, 1996;

Livo & Rietz, 1986; MacDonald, 1993; Mellon, 1998; Roney, 1988, 1989, 1996, 2001; Rosen, 1988; Ross, 1980; Rydell, 2003; Schank, 1990; Schimmel, 1992).

Second, while they tell stories themselves, students develop their oral and written expression abilities. Various researchers, theorists, and educators have found that this enables students to understand that reading and writing are "sense-making" experiences instead of isolated activities that involve meaningless worksheets, workbooks, and other tedious assignments (Allison, 1994; Chesin, 1966; Cliatt & Shaw, 1988; Diaw, 2009; Gerbracht, 1994; Peck, 1989). Storytelling also motivates children to read, especially after hearing a tale told to them from a book (Koehnecke, 2000; Kroeber, 1992; Millstone, 1997; Munn, 1999; Nessel, 1985; Peck, 1989; Roney, 1988). It seems that children who are exposed to numerous storytelling experiences develop an insatiable desire to read because they eventually come to the conclusion that it is an enjoyable experience (Cliatt & Shaw, 1988; R. Collins & Cooper, 1997; Peck, 1989; Roney, 1988, 1996, 2001).

Many theorists believe that all of the above facilitates literacy development in children (Bear & Barone, 1998; R. Collins & Cooper, 1997; Colwell, 1991; P. M. Cooper, 2005; Mallan, 1997; Peck, 1989; Templeton, 1995). However, according to Cambourne (1988, 1995) this is only made possible when certain learning conditions are established.

At a very early age, roughly four or five, ordinary children develop into oral language experts and acquire the ability to communicate at a practical level (Bear & Barone, 1998; Bryen, 1982; Cambourne, 1988, 1995; Chomsky, 1972; J. D. Cooper, 1997, 2000; Piaget, 1955; Roney, 1988, 1989, 1996, 2001, 2005, 2009; Schwartz,

1987; Skinner, 1957; Templeton, 1995; Vygotsky, 1986). Cambourne (1988, 1995) attributes this phenomenon to eight environmental factors (i.e., Immersion, Demonstration, Engagement, Expectation, Responsibility, Approximation, Employment, and Response). Each factor contributes to children's oral language development, which is later calculatingly exploited by educators in order to foster other valued literacy skills (e.g., reading, writing, vocabulary development, comprehension, speaking, listening, etc.). This, in turn, theoretically suggests that storytelling has the inherent ability to advance children's literacy skills, because it is solely based on oral language (Aina, 1999; Bryen, 1982; P. M. Cooper, 2005; Engel, 1995; Koehnecke, 2000; Roney, 1988, 1989, 1996, 2001, 2005, 2009).

Taking Cambourne's Conditions for Literacy Development (1988, 1995) into consideration may likely clarify why so many ordinary children struggle to learn how to read and write; because essential conditions to learn how to read and write are not properly being established by many educators (Roney, 1988, 1989, 1996, 2001, 2009). The prime inference here is that teachers ought to imitate in reading and writing curriculum/instruction the same types of conditions that children experience as they learn how to speak; hence the practical use of storytelling (Cambourne, 1988, 1995; R. Collins & Cooper, 1997; Egan, 1986; Malo & Bullard, 2000; Roney, 1988, 1989, 2009). In Cambourne's view (1988, 1995) this can be consummated by immersing students in rich storytelling experiences, reading aloud to them on a regular basis, playing language games, singing, and dancing to generate lively engagement in language, literacy, and stories (Lilly & Green, 2004). Moreover, teachers ought to demonstrate or model storytelling, reading, and writing for children. This creates the expectation that they

(children) will become skilled speakers, readers, and writers within time (Lilly & Green, 2004). Furthermore, it should be the responsibility of students to make their own decisions about what literacy techniques they will choose to engage in and which they will not (i.e., storytelling, reading, writing, listening, literature, etc.) (Cambourne, 1988, 1995). By accepting children's mistakes as they approximate their abilities to tell stories, read, or write, teachers can cultivate a positive learning environment that encourages children to employ or practice their emerging literacy skills. Consequently, teachers will have the opportunity to respond to their students' needs by offering valuable feedback or information that will, in turn, refine their literacy abilities (Cambourne, 1988, 1995).

Roney (2009) affirms the above notions and avows that immersing students in storytelling emulates what reading aloud does to prepare children to be successful readers and writers. He offers that

> Storytelling, like reading to them, provides children with extensive background knowledge, but its unique impact on children may prove to be more potent than reading to them because storytelling works off of the young child's strength as a functional oral language expert and is inherently more powerful than reading aloud due to its immediate, interactive, personal, and co-creative nature. (p. 50)

In support of Cambourne (1988, 1995) and Roney's line of reasoning (2009), Williams & Myers (2001) conducted a special training designed to assist undergraduate pre-service teachers in discovering the value of storytelling during language arts instruction. Their underlying principle was that pre-service teachers needed a collection of language arts learning strategies to enhance and develop the literacy skills in children. By employing storytelling strategies as a tool to differentiate literacy instruction, pre-service teachers were able to come to the realization that storytelling

has the ability to develop oral language acquisition in children and can, subsequently, be used as a medium to advance reading and writing abilities (Williams & Myers, 2001).

The previous realization and judgment made by Williams & Myers (2001) was verified by an action research project conducted by Rooks (1998), which compared oral and written development of grade three (ages 7-8) and four (ages 8-9) children. At the beginning of her project, Rooks (1998) had her students write an initial story, and over a period of six months, her students wrote three more different narratives. During this time, regular storytelling sessions took place where children would first tell their story to a storytelling partner and then to the entire class. Upon conclusion of her project, Rooks (1998) found that students gained a better understanding for story structure and were more likely to try different openings, use connectives more frequently, experiment with language, and attempt to use different tenses while writing and telling their stories. Furthermore, Rooks (1998) goes on to indicate that students often tried something someone else had tried and, in interviews, students told her that working together helped them become better writers and storytellers. For Rooks (1998), this confirmed the notion that without an opportunity for oral storytelling and discussion, students would be prohibited from participating in their most natural way of learning (Jones, 1990; as cited by Rooks, 1998). Rooks (1998) also indicates that telling and discussing stories with other classmates before writing them down seemed to be particularly useful for students who found it difficult to write. She suggests that oral storytelling can be used as a tool to foster ideas from children who find writing difficult and who may never realize their true potential of writing stories the traditional way. As a result, Rooks

(1998) found that sometimes releasing a student from the burden of writing a story can bring about a sense of fulfillment and accomplishment.

Although Rooks (1998) offers some insightful thoughts on storytelling, they cannot be considered as valid proof that a causal connection between storytelling and children's academic achievement is evident (e.g., speaking, listening, writing, story structure, etc.) because she doesn't employ typical experimental research methods that give experimental studies their power (e.g., control group, matching or random assignment, etc.) (Keppel & Wickens, 2004). Likewise, another negative aspect is that her research is limited to only one classroom, which means that her results cannot be generalized to other classroom environments or schools. Therefore, Rooks' (1998) action research lacks both internal and external validity.

Mello (2001b) conducted another storytelling study, which was designed to explore how non-gifted or "average" fourth grade students learn from traditional tales (i.e., myths, legends, folktales, etc.). For approximately a year, data was collected monthly, focusing on students' reactions to storytelling performances of twenty-six hero/heroine stories from world cultures. Results from Mello's (2001b) qualitative study paralleled findings from Rooks (1998) and Williams and Myers (2001) and signified that the process of listening to and reflecting on traditional stories enriches students' linguistic abilities, influences classroom discussions, encourages critical thinking/reflection, and the development of expressive language skills. Moreover, Mello (2001b) concludes her study by pointing out that a combination of storytelling and post-performance discussions, as well as other follow-up activities (i.e., drawing, writing, etc.), enhanced students' abilities to clarify and examine their own values. Her data

also suggests that students responded genuinely through varying points of view by expressing their own attitudes and opinions. Similarly, students interacted with each other on a more personable and equitable level; possibly because they were encouraged to reflect, speak, and listen to other perspectives themselves (Mello, 2001a). Dailey and Weaver (1994) believe these types of "language-rich" storytelling experiences draw children into subject matter more deeply. They profess that

> Hearing a wide range of stories from an early age in both the classroom and home confers a treasure upon a child. The early stories take root in a child's inner life and grow, giving it structure and meaning. The person blessed enough to have a lifetime of hearing stories is like a well-watered tree: The roots go deep; the branches reach to the sky. (p. 38)

Various other qualitative/quantitative storytelling studies have explored how story reading and storytelling influence story comprehension and oral language development (Allison, 1994; Bower, 1969; L. M. Morrow, 1985; Palmer, et al., 2001; Rosen, 1988; Schuller, 2001; Speaker, 2000; Speaker, et al., 2004; Strickland & Morrow, 1989). For example, Isbell, Sobol, Lindauer, and Lowrance (2004) studied thirty-eight three- and four-year-old participants during a twelve week long investigation to find out how story reading and storytelling influence story comprehension and oral language development. The researchers subdivided their participants into two clusters of children. The first group, which consisted of one four- and one three-year-old class, had all their stories told to them, while the second bunch, which also consisted of one four- and one three-year-old group of students, had all their stories read to them. During the study, two story presenters, comprised of a professor of Early Childhood Education and a graduate student in the storytelling program, told twenty-four stories, twice a week, for twelve consecutive weeks, with the exception of the first and last tellings.

Upon conclusion of their study, Isbell, Sobol, Lindauer, and Lowrance (2004) found that each group of children performed equally when presenting the story in the same medium used with them over the duration of the study. Furthermore, when compared to the story reading group, the storytelling group performed better on their retellings. Conversely, however, the story reading group outperformed the storytelling group when creating their wordless picture book stories. Isbell, Sobol, Lindauer, and Lowrance (2004) eventually go on to say that story reading and storytelling are both useful methods to develop story comprehension and oral language complexity in young children. They also suggest that it would be beneficial to add a storytelling component to early childhood literacy programs because story reading is frequently used by educators in the classroom. In their opinion, this would aid children in increasing story comprehension, oral retelling, and recognizing the fundamentals of a story structure. Likewise, merging these two teaching strategies may very well influence the oral language development and story comprehension of young children (Isbell, et al., 2004). These findings are consistent with other theorists and researchers and are overtly associated with improving receptive/expressive language development in children (F. Collins, 1999; Colon-Vila, 1997; Farrell & Nessel, 1982; Genishi, 1988; Harper & Decker, 1984; Kim, 1999; L. M. Morrow, 1985; Nessel, 1985; Palmer, et al., 2001; Peck, 1989; Strickland & Morrow, 1989). Nonetheless, many contain similar design flaws characteristic of Brenner (1997), Page (1983), Rooks (1998), and Trostle and Hicks (1998) (e.g., failure to establish a control group, randomization of treatment groups, lack of factorial research designs, etc.). As a result, they too, fall short of establishing

causality and substantiate a need for more quantitative research to authenticate storytelling as a useful teaching/learning strategy to differentiate instruction.

Morrow (1985), through the use of pre- and posttest comprehension assessments, conducted a quantitative study to find out how the process of retelling read aloud stories enhances kindergarteners' abilities to answer structural questions about a story (e.g., setting, theme, plot episodes, resolution, etc.) and how the process of retelling enhances their abilities to answer literal, inferential, and critical questions. The sample consisted of four kindergarten classrooms with an average class size of fifteen students. The ability levels of these children ranged from above to below average in all classrooms. From this student population, children were randomly assigned to either "experimental" (retell the story) or "control" (draw a picture) group. During the study, eight stories were used. Upon conclusion of each session, students in the control group were asked to draw a picture about the story for ten minutes, while students in the experimental group were given a maximum of ten minutes to retell the story to a researcher on a one-on-one basis. Upon conclusion of her study, Morrow (1985) found that there were no significant differences between either experimental (story retelling) or control (story drawing) groups. Morrow (1985) suggests in her findings that many children in the experimental group did not know how to approach the retelling task. From her perspective, they had difficulty beginning stories, left out important details, and had sequencing problems. What's more, Morrow (1985) indicated that the children needed frequent practice in retelling and also guidance to help them learn how to retell.

In a follow-up study to the one mentioned above, Morrow (1985) provided kindergarten students from seventeen classrooms with frequent practice in retellings. Students were guided in their retellings by adults who focused on the structural framework of stories (e.g., setting, theme, plot episodes, resolution, etc.). Stories were read once a week for eight consecutive weeks and quantitative data was collected in a series of assessments (e.g., comprehension, story retelling, and language complexity). Upon conclusion of the study, Morrow (1985) analyzed pre- and posttest assessments and found that students in her experimental group scored significantly better in their abilities to comprehend, story retelling, and language complexity. Based upon her results, Morrow (1985) admits that improved scores in her second investigation were due to the frequent practice and guidance in retelling rather than simply to review or rehearsal of a particular story from which comprehension was tested. She also indicates that the guidance and practice offered during the frequent retellings emphasized structural elements of a story and sequential ordering. Each time a child retold a story, they were actively involved. Likewise, children also interacted with adults who offered guidance and encouragement.

In spite of Morrow's (1985) findings in her follow-up study, her research suffers from the same technical flaw that both Page (1983) and Trostle and Hicks (1998) experience—the prudent use of the factorial design. As a matter of fact, all of Morrow's (1985) data was submitted for analysis of covariance for statistical findings. According to author and researcher, Kenneth D. Hopkins, quasi-experimental studies using analysis of covariance as the tool of data analysis are subject to difficulties of interpretation from which true experiments are free (Hopkins, 1973). He states

> Although covariance has been skillfully applied, we can never be sure that bias may not be present from some disturbing variable that was overlooked. (p. 2)

In relation to Morrow's studies, there is a possibility that some other undetected variable besides frequent practice and guidance in retelling caused students in the experimental group to comprehend more than their control group counterparts. As a result, the conclusions reached by Morrow (1985) cannot be accepted with as much certainty as if the study had been a true experiment.

The major implication of the previously mentioned studies (Isbell, Sobol, Lindauer, & Lowrance, 2004; Morrow, 1985) is that storytelling is a promising teaching/learning strategy to differentiate instruction. Abilock (2008) has the same opinion and recommends using storytelling as a differentiated instructional tool to improve literacy development in older students. This uncharacteristic combination focuses upon students and their individual needs and builds upon their prior knowledge. Likewise, storytelling can also be used to modify existing curriculum content (e.g., open-ended activities, varied journal prompts, discussion groups, individual performances, simulations/role-playing, oral retellings, etc.) so that teachers can remediate student learning (Abilock, 2008).

It has been said that memory plays a key role in the cognitive development of attention, perception, problem solving, thinking, and reasoning (Haven, 2007, 2009; Murdock, 1995). In an experiment requiring college students to memorize and later recall a number of unrelated word sets, Bower and Clark (1969) found that subjects in the story group recalled virtually five times as many vocabulary words in a delayed recall task as compared to their counterparts in the control group. The study's design

was straightforward; the control group was expected to memorize the word sets in whatever manner they preferred, while the story group had to construct a narrative to assist them in recalling the information. In final analysis, organizing the word sets in story form provided the story group with an advantage over the control group because using an organizational structure, like creating a story, naturally aids in information recall and memory (Bower, 1969; Haven, 2007, 2009).

Mallan (1996) theorizes that storytelling and young children's play often reaches into the realm of fantasy and make believe (e.g., pretending to be someone else, imagining other worlds, inventing new uses for everyday objects, etc.) (Mallan, 1996). This viewpoint is substantiated by Kim's (1999) quantitative study designed to explore and demonstrate the effects of storytelling and pretend play on short-term and long-term narrative recall in four- and five-year-old children. A total of thirty-two children (thirteen girls and nineteen boys) attending preschool and kindergarten participated in the study and were randomly assigned to one of two groups; storytelling with pictures and storytelling with dolls. The study had three different phases. The first phase involved storytelling with pictures and dolls; students in the picture group were shown seven pictures, while students in the dolls group were presented with seven doll-like figures of the animals in the story. Each group was asked to retell the story using the pictures or the dolls to assist them. Immediately following these activities, eight questions were asked involving the content of the story. One week later, both groups repeated the same procedures as the first phase using the same pictures and dolls. Finally, during phase three, three days after phase two, no pictures or dolls were used to retell the story, even as the same eight questions followed.

Upon conclusion of her study, Kim (1999) found that storytelling and pretend play facilitate narrative recall. This was consummated through chi-square statistical procedures. According to Kim (1999), this suggests that storytelling and pretend play provide a motivating context for literate behavior, as children communicate through narration to themselves in solitary play and to their peers in social play. Furthermore, linguistic activities also permitted children to create and share imaginary worlds and participate in the beginning of narratives. Kim (1999) goes on to suggest that storytelling makes collaboration in play with others possible and facilitates the development of friendships, which enhances the complexity of play by deepening, lengthening, and diversifying play forms.

Analogous to Kim's findings (1999), Paley's (1990) qualitative study documented her kindergarten students' use of storytelling during dramatic play. To her amazement, students used their stories to create classroom plays. According to Paley (1990), they even chose actors, rehearsed parts, and made their own revisions. Through this process, Paley (1990) witnessed her children beginning to understand the purpose of revising and the power of storytelling. Furthermore, her approach also gave her students an opportunity to see their words transformed into print. Likewise, they proceeded to recognize how speech and print interrelate and how the power of their words, as enacted in a play, have value and meaning (Bear & Barone, 1998; Paley, 1990). Comparable findings have been made by Benson (1993), Lyytinen (1995), Mellon (1998), Turner and Oaks (1997), and Werebe and Baudonniere (1991). Each also expresses, in one way or another, that storytelling and pretend play promotes cooperation between children, heightens listening skills, improves verbal expression,

deepens comprehension, and stimulates mental imagery. For young children, these greater purposes all provide the necessary motivation and framework for later literacy development (Benson, 1993; Cambourne, 1988, 1995; Lyytinen, 1995; Mellon, 1998; T. N. Turner & Oaks, 1997; Vygotsky, 1986; Werebe & Baudonniere, 1991).

In hindsight of the aforesaid studies, de Vos (2003) asserts that storytelling facilitates the growth of children's imaginations. She states that

> One of the chief attractions of storytelling is that it is a participatory, rather than passive, activity. In television programs, movies, and video games, the concrete characters, the setting, and the action are all products of someone else's vision. While listening to a story, however, the audience has to imagine every scene, action, and character, all while listening intently to what the teller is saying and how he or she is saying it. Television is a one-way means of communication, but in storytelling there is interaction between the teller and the audience; listeners are active participants, working with the teller to create images. The basis of creative imagination is the ability to visualize and fantasize. (p. 7)

Likewise, Collins and Cooper (1997) theorize that, "The ability to visualize, to create images in the mind, is at the very heart of storytelling…" (p. 11). To better illustrate each insights, Mello (1997) conducted a qualitative study designed to look at reactions to storytelling by nine, ten, and eleven year old special education students. Her study found that students responded positively to storytelling because it was an influential and imaginative experience; one that was viewed as inclusive, dynamic, and enjoyable. According to Mello (1997), many student participants felt that they had as much control over the story as the storyteller. This perception of imagery was validated by student comments like, "I saw," "I went," "I felt," "I acted," or "I pictured it in my mind." To further expound upon this phenomenon, Mello (1997) acknowledges that her participants were conscious that they were partaking in an action of "co-creation" and making meaning in the midst of the storyteller. She professes that students detected

that listening to stories forced them to visualize the action and that storytelling makes things “come alive” in their minds. Mello (1997) goes on to say that her student participants also viewed their role of the “listener” as a powerful and active one. Many believed they could control the storyteller’s tale through their thoughts. In addition, students felt that they were connected to the teller because both teller and listeners go through the storytelling process together. Mello (1997) summarizes her findings by stating that tellers, as well as teachers and students, connect to each other through the storytelling process and co-create a shared world that is visualized as well as heard (Mello, 1997).

Although Mello’s findings are rather astounding and have great depth, they cannot establish causality because the nature of her research is qualitative. Nonetheless, some theorists believe that storytelling is a developmentally sensitive tool that has the power to create a more ordered sense of the world (Friedberg, 1994; Speaker, et al., 2004). To a certain degree, storytelling does have this innate ability, but it also has an emotional and psychological effect on listeners as well (Bustamante, 2002; Chesin, 1966; Coles, 1989; Reed, 1987; Roney, 1988; Smith, 1986; Sturm, 2008).

Rooks (1998) revealed that her third grade students’ excitement and enthusiasm in contributing to storytelling sessions were unmatched in any other academic areas. According to her, storytelling offered more opportunities for students to express themselves clearly and confidently, to an audience, by telling interesting, exciting, or funny stories; even if certain students were not fluent readers. Likewise, storytelling clearly made a valuable contribution to the way students felt about themselves in

helping them take on a positive attitude, pride in themselves, and developing a sense of personal ability (Rooks, 1998). In the final analysis, Rooks (1998) concludes that, storytelling is not only instrumental in the development of story writing, but is also encourages cooperation, while increasing motivation, confidence, and self-esteem in children. Comparable deductions were made by Baumgartner (1996), Carroll (1999), and Schwartz (1987). All acknowledged the positive impact storytelling has on self-esteem and social growth.

In a document presented at the Annual Meeting of the Michigan Reading Association in 1999, Sheila Dailey Carroll disclosed the effectiveness of using storytelling to facilitate literacy learning. Her six month project involved a three month investigation of English as a Second Language (ESL) students and an additional three month study of developmentally impaired adults in a reading class. In both groups, Carroll (1999) observed an increase in participant self-confidence while speaking, greater mastery of language skills, and improved comprehension during story retellings. She also noted that the participants' self-esteem and interpersonal relationships improved as a result of communicating their personal values to the group.

In contrast to the latter studies mentioned, Doll, Benedetti, Carmody, Reynolds, Brantigan, and Wilson-Lingbloom (2001) conducted a quantitative study which investigated the outcomes of storytelling on teenage self-esteem. The study sought to demonstrate that storytelling had a positive effect on self-esteem in young adults. Although results from the study failed to divulge any considerable increases or variations in self-perception and global self-worth of teenage participants, anecdotal records revealed that teenagers who usually chose not to speak in class, suddenly

wanted to tell stories (Doll, et al., 2001). Furthermore, regardless of cultural background, students had stories to share and seemed to gain greater acceptance from their peers after telling them (Doll, et al., 2001).

A few studies have demonstrated that storytelling improves students' writing abilities (Diaw, 2009; Gordon, 1991; Haven, 2007; Haven & Ducey, 2007; Kurstedt & Koutras, 2000; Sasser & Zorena, 1991; Turner-Bisset, 2001; Yawney, 2008). For instance, in a recent study, Yawney (2008) endeavored to establish whether or not storytelling could be used to assist fourth grade students through the research process. The investigation consisted of nine meetings and was rendered to twenty-five students in a fourth grade class. However, only twenty-one of these students opted to be research participants.

Yawney's storytelling program took place at the beginning of the school year and was implemented over a six-week period. During each storytelling gathering, Yawney told approximately one to four stories about the Lost Lemon Mine in Alberta, CA, which is a legend about lost treasure. Upon conclusion of all the storytelling sessions, students were expected to ponder, research, and write a one-page persuasive paper proving whether or not the Lost Lemon Mine exists and where it could be located. During this time, data was collected for three weeks (Yawney, 2008). Yawney (2008) recorded her personal observations of the twenty-one student participants (i.e., where individual students went in the library, what resources they looked at and how long they looked at them, facial expressions while students were looking at their books, etc.). Likewise, she conducted random student interviews, held focus groups sessions (e.g., all girls, all boys, etc.), and analyzed student papers.

Upon conclusion of her qualitative study, Yawney (2008) deemed that storytelling was an effective learning strategy and goes on to say that all her data collection resources signify that students became more critical in their way of thinking (e.g., numerous contradictory facts were offered during storytelling sessions that shaped a mind-set of questioning). Many students adopted the position of solving a mystery, evaluated facts and ideas, and posed questions. Yawney suggests that students were also psychologically drawn into the storytelling program because they were

> …engaged in the stories, but this engagement also carried over into their research process. As a metaphor for searching for gold, the research process echoed the stories of the miners. This provided a stimulus for the students' imaginations. As a result, many students became involved in the process on multiple levels. Some students' comments indicate that they were visually engaged in the program, claiming that the pictures they could see in their minds as the stories were told contributed to their research. Others indicated that they found their role as detectives in a mystery exciting and engaging. (p. 13)

Finally, Yawney (2008) concludes by stating that the occurrence of listening to stories had an immense effect on the students. Since the students found the stories stimulating, they looked forward to her visits and connected associated positive feelings with the project as a whole. Similarly, students' commitment and enthusiasm in the program was heightened and sustained because of the effects of the stories (Yawney, 2008).

Albeit Yawney's (2008) results appear to demonstrate that storytelling can be used to assist fourth grade students through the research process, her study cannot establish causality because only a small number of subjects participated in her study. This issue is a common setback for many researchers using qualitative designs. Nonetheless, it is necessary because data collection methods are so labor intensive and difficult to analyze. Other factors plaguing Yawney's (2008) findings are an inability

to reproduce or replicate her study, possible researcher bias, and the likelihood that her study's results cannot be generalized to other subjects or settings.

In contrast to Yawney (2008), Hanson's (2004) quantitative study endeavored to use oral storytelling to develop writing skills in fourth grade students. Her study was grounded in the belief that using oral storytelling activities to facilitate writing skills would prepare fourth grade students for the state-mandated writing test. Hanson's (2004) sample consisted of twenty-one students, nine girls and twelve boys, ranging between the ages of nine and ten years.

During her investigation, Hanson (2004) managed to conduct nine one-hour instructional sessions on Friday afternoons. During these sessions, Hanson (2004) told a story and utilized three graduate students to facilitate storytelling group activities. In addition, every storytelling gathering consisted of the same progression of events

> (a) The researcher began the session by telling a story (10 minutes), (b) Students met in their storytelling clubs with a graduate assistant who served as facilitator, (c) In their storytelling clubs, students participated in an oral storytelling or oral reading activity (20 minutes), (d) Drawing upon the storytelling/oral reading activity, the students completed a writing assignment in their journals (20 minutes), and (e) Selected students from each storytelling club shared what they had written with the entire class (10 minutes). (Hanson, 2004, p. 80)

Hanson (2004) goes on to articulate that each of the nine sessions were designed to include stories that reflected the four types of writing assessed by the Texas Assessment of Academic Skills (TAAS) (e.g., persuasive, descriptive, classificatory, and narrative). An evaluation of TAAS student scores involved in the storytelling project were compared to those not involved using a t-test for both scale and essay scores. Eighty-two percent of the students tested in the storytelling group passed the written portion of the TAAS, while only eighty percent passed in the other fourth

grade classes. However, t-test and scale scores revealed no significant difference between each group.

Not surprisingly, Hanson's results revealed no significant difference in essay composition scores between students who participated in the storytelling project and those who did not. In addition, the other problem with her study is that you can't separate the effects of the storytelling alone from the storytelling plus follow-up activities. Perhaps if she were to have employed a factorial design or conducted a "true" experiment, her results might have turned out differently.

In an eight month qualitative study designed to assess the effects of storytelling on eleven fourth grade students' writing, Mello (2000) concluded that storytelling encouraged participants to develop their understanding of narrative components (e.g., character, plot development, etc.) as well as improving story comprehension. For example, Mello's analysis of post writing samples revealed that listening to stories, particularly ones that centered on gender roles and relationships, started to have an impact on the way males wrote about relationships (i.e., saving/rescuing people, making friends, having daughters, etc.). Furthermore, their female counterparts, tended to focus their writing more on action, description, and elements of fantasy. Because of her findings, Mello recommends that educators use storytelling as a model for teaching children literacy skills (Mello, 2000). Schaafsma (1989) assents

> We who teach often dismiss stories as a primitive form, a form for children, something students need to move "beyond" for the learning they will have to do in schools. However, stories, grounded as they are in students' lives and concerns, are one important means students have for making sense of their worlds, an important tool for learning. (p. 89)

Summary

The following section highlights theoretical/empirical judgments made by theorists, researchers, and educators on the effects storytelling has on students' cognitive/affective learning.

1. Storytelling experiences improve students' comprehension (Allison, 1994; Benson, 1993; Bower, 1969; Brenner, 1997; Carroll, March13-16, 1999; F. Collins, 1999; Colon-Vila, 1997; Friedberg, 1994; Genishi, 1988; Harper & Decker, 1984; Haven, 2007, 2009; Isbell, et al., 2004; Kim, 1999; Lyytinen, 1995; Maguire, 1985; Mello, 2000; Mellon, 1998; L. M. Morrow, 1985; Nessel, 1985; Paley, 1990; Palmer, et al., 2001; Peck, 1989; Roney, 1988; Rooks, 1998; Rosen, 1988; Schaafsma, 1989; Schuller, 2001; Speaker, et al., 2004; Strickland & Morrow, 1989; Trostle & Hicks, 1998; Trousdale, et al., 1994; T. N. Turner & Oaks, 1997; Werebe & Baudonniere, 1991)
2. Storytelling experiences increase students' oral language development (Aina, 1999; Allison, 1994; Barton, 1986; Baumgartner, 1996; Bear & Barone, 1998; Benson, 1993; Breneman & Breneman, 1983; Bruchac, 1997; Bryen, 1982; Cambourne, 1988, 1995; Carroll, March13-16, 1999; Chesin, 1966; Chomsky, 1972; Cliatt & Shaw, 1988; F. Collins, 1999; R. Collins & Cooper, 1997; Colon-Vila, 1997; Colwell, 1991; J. D. Cooper, 1997, 2000; P. M. Cooper, 2005; Diaw, 2009; Doll, et al., 2001; Engel, 1995; Friedberg, 1994; Genishi, 1988; Gerbracht, 1994; Harper & Decker, 1984; Haven, 2007, 2009; Isbell, et al., 2004; Jones, 1990; Kim, 1999; Koehnecke, 2000; Lyytinen, 1995; Mallan, 1996, 1997; Malo & Bullard, 2000; Mello, 2001a; Mellon, 1998; L. M. Morrow,

1985; Nessel, 1985; Paley, 1990; Palmer, et al., 2001; Peck, 1989; Piaget, 1955; Roney, 1988, 1989, 1996, 2001, 2009; Rooks, 1998; Rosen, 1988; Schwartz, 1987; Skinner, 1957; Speaker, et al., 2004; Strickland & Morrow, 1989; Templeton, 1995; T. N. Turner & Oaks, 1997; Vygotsky, 1986; Werebe & Baudonniere, 1991; Williams & Myers, 2001; Yawney, 2008)

3. Storytelling experiences expand students' vocabulary development (Bower, 1969; Haven, 2007, 2009; Maguire, 1985; Palmer, et al., 2001; Trostle & Hicks, 1998; T. N. Turner & Oaks, 1997)
4. Storytelling experiences enhance students' writing abilities (Allison, 1994; Barton, 1986; Baumgartner, 1996; Bear & Barone, 1998; Benson, 1993; Breneman & Breneman, 1983; Bruchac, 1997; Bryen, 1982; Carroll, March13-16, 1999; Chesin, 1966; Cliatt & Shaw, 1988; R. Collins & Cooper, 1997; Colwell, 1991; P. M. Cooper, 2005; Diaw, 2009; Egan, 1986; Friedberg, 1994; Gerbracht, 1994; Gordon, 1991; Hanson, 2004; Haven, 2007, 2009; Haven & Ducey, 2007; Kurstedt & Koutras, 2000; Lyytinen, 1995; Mallan, 1997; Malo & Bullard, 2000; Mello, 2000, 2001a; Mellon, 1998; Paley, 1990; Peck, 1989; Roney, 1988, 1989, 1996, 2001, 2009; Rooks, 1998; Rosen, 1988; Sasser & Zorena, 1991; Schwartz, 1987; Templeton, 1995; Turner-Bisset, 2001; T. N. Turner & Oaks, 1997; Williams & Myers, 2001; Yawney, 2008)
5. Storytelling experiences help students to remember/recall information (Bower, 1969; Brenner, 1997; Friedberg, 1994; Haven, 2007, 2009; Kim, 1999; Lyytinen, 1995; Maguire, 1985; Mallan, 1996; Mellon, 1998; L. M. Morrow, 1985; Murdock, 1995; Paley, 1990; Peck, 1989; Roney, 1988; Rooks, 1998;

Trousdale, et al., 1994; T. N. Turner & Oaks, 1997; Werebe & Baudonniere, 1991; Young, 1988)

6. Storytelling experiences inspire students to read (Allison, 1994; Barton, 1986; Bear & Barone, 1998; Breneman & Breneman, 1983; Bruchac, 1997; Bryen, 1982; Chesin, 1966; Cliatt & Shaw, 1988; R. Collins & Cooper, 1997; Colwell, 1991; P. M. Cooper, 2005; Diaw, 2009; Egan, 1986; Friedberg, 1994; Gerbracht, 1994; Haven, 2007, 2009; Koehnecke, 2000; Kroeber, 1992; Mallan, 1997; Malo & Bullard, 2000; Millstone, 1997; L. M. Morrow, 1985; Munn, 1999; Nessel, 1985; Palmer, et al., 2001; Peck, 1989; Roney, 1988, 1989, 1996, 2001, 2009; Rooks, 1998; Rosen, 1988; Schuller, 2001; Speaker, et al., 2004; Strickland & Morrow, 1989; Templeton, 1995; Trousdale, et al., 1994; T. N. Turner & Oaks, 1997; Williams & Myers, 2001)
7. Storytelling experiences evoke feelings/emotions in students and enhance their self-esteem (Baumgartner, 1996; Bustamante, 2002; Carroll, March13-16, 1999; Chesin, 1966; Coles, 1989; Doll, et al., 2001; Friedberg, 1994; Haven, 2007, 2009; Reed, 1987; Roney, 1988; Schwartz, 1987; Smith, 1986; Sturm, 2008; T. N. Turner & Oaks, 1997; Yawney, 2008)
8. Storytelling experiences stimulate students' imaginations and visualization abilities (Benson, 1993; Brenner, 1997; de Vos, 2003; Friedberg, 1994; Haven, 2007, 2009; Kim, 1999; Lyytinen, 1995; Mallan, 1996; Mello, 1997; Mellon, 1998; Paley, 1990; Peck, 1989; Roney, 1988; Rooks, 1998; Trousdale, et al., 1994; T. N. Turner & Oaks, 1997; Werebe & Baudonniere, 1991; Yawney, 2008; Young, 1988)

9. Storytelling experiences improve students listening abilities (Aina, 1999; Allison, 1994; Bauer, 1977; Benson, 1993; Breneman & Breneman, 1983; Brenner, 1997; Bruchac, 1997; Bryant, 1973; Bryen, 1982; Cabral & Manduca, 1997; Cambourne, 1988, 1995; Carroll, March13-16, 1999; Chomsky, 1972; R. Collins & Cooper, 1997; P. M. Cooper, 2005; de Vos, 2003; de Vos, et al., 2003; Egan, 1986; Engel, 1995; Friedberg, 1994; Gordon, 1991; Greene, 1996; Haven, 2007, 2009; Kim, 1999; Koehnecke, 2000; Livo & Rietz, 1986; Lyytinen, 1995; MacDonald, 1993; Mallan, 1996; Mello, 1997, 2001a; Mellon, 1998; L. M. Morrow, 1985; Paley, 1990; Palmer, et al., 2001; Peck, 1989; Piaget, 1955; Roney, 1988, 1989, 1996, 2001, 2009; Rooks, 1998; Rosen, 1988, 1991; Ross, 1980; Rydell, 2003; Schank, 1990; Schimmel, 1992; Schuller, 2001; Schwartz, 1987; Skinner, 1957; Speaker, et al., 2004; Strickland & Morrow, 1989; Templeton, 1995; Trousdale, et al., 1994; T. N. Turner & Oaks, 1997; Vygotsky, 1986; Werebe & Baudonniere, 1991; Yawney, 2008; Young, 1988; Zeece, 1997; Zipes, 2004)
10. Storytelling experiences intensify students' understanding of story structure (Bauer, 1977; Benson, 1993; Bower, 1969; Breneman & Breneman, 1983; Brenner, 1997; Bruchac, 1997; Bryant, 1973; Cabral & Manduca, 1997; F. Collins, 1999; R. Collins & Cooper, 1997; Colon-Vila, 1997; de Vos, 2003; Egan, 1986; Genishi, 1988; Gordon, 1991; Greene, 1996; Harper & Decker, 1984; Haven, 2007, 2009; Isbell, et al., 2004; Kim, 1999; Livo & Rietz, 1986; Lyytinen, 1995; MacDonald, 1993; Mallan, 1996; Mello, 1997, 2000; Mellon, 1998; L. M. Morrow, 1985; Nessel, 1985; Paley, 1990; Palmer, et al., 2001;

Peck, 1989; Roney, 1989, 1996, 2001; Rooks, 1998; Rosen, 1991; Ross, 1980; Rydell, 2003; Schank, 1990; Schimmel, 1992; Strickland & Morrow, 1989; Trousdale, et al., 1994; T. N. Turner & Oaks, 1997; Werebe & Baudonniere, 1991)

11. Storytelling experiences develop students' critical thinking skills (Brenner, 1997; Haven, 2007, 2009; Mello, 2001a; Peck, 1989; Rooks, 1998; Trousdale, et al., 1994; T. N. Turner & Oaks, 1997; Yawney, 2008; Young, 1988)
12. Storytelling experiences motivate students to learn (Barton, 1986; Baumgartner, 1996; Bear & Barone, 1998; Benson, 1993; Breneman & Breneman, 1983; Bruchac, 1997; Bryen, 1982; Carroll, March13-16, 1999; R. Collins & Cooper, 1997; Colwell, 1991; P. M. Cooper, 2005; Haven, 2007, 2009; Kim, 1999; Koehnecke, 2000; Kroeber, 1992; Mallan, 1996, 1997; Mellon, 1998; Millstone, 1997; Munn, 1999; Nessel, 1985; Paley, 1990; Peck, 1989; Roney, 1988, 2009; Rooks, 1998; Schwartz, 1987; Templeton, 1995; T. N. Turner & Oaks, 1997; Werebe & Baudonniere, 1991; Yawney, 2008)
13. Storytelling experiences foster cooperative learning (Baumgartner, 1996; Benson, 1993; Carroll, March13-16, 1999; Doll, et al., 2001; Haven, 2007, 2009; Kim, 1999; Lyytinen, 1995; Mallan, 1996; Mellon, 1998; Rooks, 1998; Schwartz, 1987; T. N. Turner & Oaks, 1997; Werebe & Baudonniere, 1991)
14. Storytelling is a viable teaching/learning strategy to differentiate instruction (Abilock, 2008; F. Collins, 1999; Colon-Vila, 1997; Genishi, 1988; Harper &

Decker, 1984; Haven, 2007, 2009; Isbell, et al., 2004; Kim, 1999; Palmer, et al., 2001; Peck, 1989; Strickland & Morrow, 1989).

Few storytelling studies have been carried out which have a direct bearing on the current study. Of those that do, most are highly subjective, devoid of any statistical strength/objectivity, and fail to establish causality (Allison, 1994; Bower, 1969; Brenner, 1997; Cliatt & Shaw, 1988; Isbell, et al., 2004; Mello, 2001a, August 30-September 1, 2001; L. M. Morrow, 1985; Page, 1983; Palmer, et al., 2001; Peck, 1989; Rooks, 1998; Rosen, 1988; Schuller, 2001; Speaker, 2000; Speaker, et al., 2004; Strickland & Morrow, 1989; Trostle & Hicks, 1998; Trousdale, et al., 1994; Williams & Myers, 2001; Yawney, 2008; Young, 1988). Nonetheless, based upon the results of these studies and multiple perspectives espoused by numerous theorists (Cambourne, 1988, 1995; Chomsky, 1972; de Vos, 2003; Egan, 1986; Friedberg, 1994; Gardner, 1993; Haven, 2007, 2009; Haven & Ducey, 2007; Jones, 1990; Kaplan, 1986; Krathwohl, et al., 1964; Roney, 1988, 1989, 1996, 2001, 2009; Vygotsky, 1986), some evidence does exist, which indicates that storytelling may be a viable teaching/learning strategy that can be used to differentiate instruction by educators (Abilock, 2008; Greene, 1996; Isabel & Margaret, 2001; Mello, 1997, 2000, August 30-September 1, 2001; Trostle & Hicks, 1998; Yawney, 2008; Zeece, 1997). Conversely, however, more than a few studies involving storytelling report inconclusive results or suggest that it does not make a difference in student performance (Amato, et al., 1973; Doll, et al., 2001; Farrell & Nessel, 1982; Hanson, 2004; L. M. Morrow, 1985; Myers, 1990; Smardo, 1984; Young, 1988).

In any case, the validity of nearly all storytelling studies cited in support of either view is questionable. For that reason, more quantitative research employing a valid experimental design is needed to authenticate storytelling as a useful teaching/learning strategy to differentiate instruction (Abilock, 2008; Amato, et al., 1973; Baumgartner, 1996; Boone, 2005; Butterworth & Lo Cicero, 2001; Carroll, March13-16, 1999; Caulfield, 2000; P. M. Cooper, 2005; P. M. Cooper, et al., 2007; Diaw, 2009; Doll, et al., 2001; Egan, 1986; Froyen, 1987; Groce, 2001; Hanson, 2004; Haven, 2009; Lisenbee, 2009; Mallan, 1997; Marzano, et al., 2001; Morgan, 2002; Munn, 1999; Page, 1983; Roney, 2009; Rooks, 1998; Rosman, 1992; Schuller, 2001; Smardo, 1984; Williams & Myers, 2001; Young, 1988).

CHAPTER 3

METHODOLOGY

This section presents the methodology used to collect and analyze data needed to address the research questions and associated hypotheses for this study. The topics included in this section are a Restatement of the Problem, Research Design, Setting for the Study, School Demographics, Sample, Materials, Treatment Procedures, Instruments, Reliability and Validity, Data Collection, Data Analysis, Hypotheses, and Decision-Making Strategy.

Restatement of the Problem

The purpose of this study was to examine the influence of storytelling and/or reading aloud on fourth and fifth grade children's comprehension and oral reading fluency of both narrative and expository texts.

Research Design

The design selected to study the problem under consideration was a true experiment due to random assignment of students to treatments. Note, however, for generalization purposes, random selection was not invoked. The framework for this investigation was a 2×3 factorial design. The student variable consisted of gender and the treatment variable was divided into three factors: Storytelling (Treatment 1), reading aloud (Treatment 2), and silent reading (Comparison).

Figures 3.1 and 3.2 illustrate the multivariate factorial design. Since the outcome measures for grades four and five were based on different QRI-3 competencies, students' raw scores from each grade level were assessed via separate MANOVAS.

Figure 3.1: Multivariate Factorial Design for Grade 4

GRADE	GENDER	TREATMENT 1 Storytelling	TREATMENT 2 Reading Aloud	TREATMENT 3 Silent Reading (Comparison)
4	Male			
	Female			

Figure 3.2: Multivariate Factorial Design for Grade 5

GRADE	GENDER	TREATMENT 1 Storytelling	TREATMENT 2 Reading Aloud	TREATMENT 3 Silent Reading (Comparison)
5	Male			
	Female			

The above mentioned layout is called the Posttest-Only Comparison Group design (Sawilowsky, 2000). It is diagrammed in the following way using Campbell and Stanley's (1963) factorial design notation format:

$$\begin{array}{lllll} & R\rightarrow & X_1 & - & O_{1(a,\,b,\,c,\,d)} \\ NR\rightarrow & R\rightarrow & X_2 & - & O_{1(a,\,b,\,c,\,d)} \\ & R\rightarrow & - & - & O_{1(a,\,b,\,c,\,d)} \end{array} ,$$

Where levels of the treatment variable are X_1: Teacher-Storytelling Performance, X_2: Teacher-Story Reading Performance, X_0: Comparison Level (Silent Reading); and criterion measures yielding the criterion variables were a = Comprehension of narrative text, b = Comprehension of expository text, c = Oral reading fluency of narrative text, and d = Oral reading fluency of expository text.

Setting for the Study

The setting for the study is an elementary school located in Macomb County, Michigan. The city's population is roughly 48,000 people and is considered to be an established community within the growing county of Macomb, Michigan. Home ownership is at 70%, with industrial and retail corridors. Roseville is a predominately blue-collar community. Based on data from the U.S. Census 2000 Demographic Profile,

93% of the population self-identifies their race as white, while 23% of this population, age 25 years or older, do not hold a high school diploma. Only 7% have obtained a Bachelor's degree or greater. The median income is below the state average ($68,000).

The school district currently consists of seven elementary schools, two middle schools, one high school, one administration building, and an early childhood program. The district serves approximately 5,500 students. The community is very supportive of education and recently passed a bond proposal to update, improve, and/or replace dilapidated district facilities. At present, four elementary schools have been replaced by two new buildings, and the district's ninth-grade has moved into a new wing of the high school. Furthermore, due to declining enrollment, some redistricting of students has taken place. As a result, several schools, including the one used for this study, has absorbed a portion of the population from another elementary school in the district.

School Demographics

The sample in this study were randomly assigned from fourth and fifth grade students in a building with three-hundred-ninety-six students consisting of kindergarten through sixth grade at a public elementary school located in Macomb County, Michigan (see Table 3.1). Within this school population, 78.7% of all students were Caucasian, 15.4% African American, 1.3% Asian American, 1.3% Hispanic or Latino, 2.3% multi-racial, and 1.0% American Indian or Alaska Native. Of the two largest student populations (Caucasian and African American), 54.8% were male, while only 45.2% were female students. According to district data, 62% of all students attending the

school qualify for Federal free and reduced-price meal benefits; as a result, the school is a Title I Schoolwide school.

Table 3.1: Enrollment Summary

Grade Level	TOTAL IN GRADE	American Indian or Alaska Native	Asian American	African American	Caucasian	Hispanic or Latino	Multi-Racial
K	47 28 / 19	0 0 / 0	1 0 / 1	10 5 / 5	36 23 / 13	0 0 / 0	0 0 / 0
1	57 30 / 27	2 1 / 1	0 0 / 0	12 6 / 6	42 23 / 19	0 0 / 0	1 0 / 1
2	66 36 / 30	1 1 / 0	1 0 / 1	12 8 / 4	49 25 / 24	1 1 / 0	2 1 / 1
3	46 20 / 26	1 0 / 1	0 0 / 0	4 1 / 3	40 19 / 21	1 0 / 1	0 0 / 0
4	62 31 / 31	0 0 / 0	3 2 / 1	6 2 / 4	51 26 / 25	0 0 / 0	2 1 / 1
5	72 41 / 31	0 0 / 0	0 0 / 0	10 3 / 7	59 37 / 22	1 0 / 1	2 1 / 1
6	46 27 / 19	0 0 / 0	0 0 / 0	7 6 / 1	35 19 / 16	2 1 / 1	2 1 / 1
TOTAL	396 213 / 183	4 2 / 2	5 2 / 3	61 31 / 30	312 172 / 140	5 2 / 3	9 4 / 5

Note. Male / Female

Sample

The sample for the study consisted of one-hundred-twenty-six fourth and fifth grade students from the same elementary school located in Macomb County, Michigan. Within this sample, there were sixty-six male (52.4%) and sixty female participants (47.6%) (see Table 3.2). With regard to grade level, sixty-two students were from fourth grade (49.2%), while sixty-four were from fifth grade (50.8%). According to school personnel, the socioeconomic status of these children ranged from lower- to upper-middle class. Likewise, ability levels of the children ranged from below to above average throughout each grade level.

Table 3.2
All Fourth and Fifth Grade Students

GRADE	MALE	FEMALE	TOTAL
Grade 4	31	31	62
Grade 5	35	29	64
TOTAL	66	60	126

This study employed random stratified sampling with the stratification based on student gender and grade level. Before the process of randomization, student names, by gender and grade level, were first alphabetized by last name. For example, all fourth grade boys' names were alphabetized by last name and randomly assigned to each treatment group using a table of random numbers (see Tables 3.3 and 3.4). This process was carried out with each additional group until all students were assigned to a treatment level.

Table 3.3
Fourth Grade Students

TREATMENT	MALE	FEMALE	TOTAL
Storytelling	10	11	21
Reading Aloud	10	10	20
Silent Reading	11	10	21
TOTAL	31	31	62

Table 3.4
Fifth Grade Students

TREATMENT	MALE	FEMALE	TOTAL
Storytelling	11	9	20
Reading Aloud	13	10	23
Silent Reading	11	10	21
TOTAL	35	29	64

Materials

The materials used in this study were Michigan Educational Assessment Program (MEAP) released narrative/expository reading selections from grades 3-8. These selections were acquired from the Michigan Department of Education for the

years of 2005, 2006, 2007, and 2008. A total of fourteen narrative fiction and fourteen expository biography selections were chosen for this study. Each selection was reviewed and approved by an expert storyteller/educator for their appropriateness. Figure 3.3 depicts a listing of MEAP story selections used for this study:

Figure 3.3
MEAP Released Items Reading Selections

Year	Title	Author	Grade	Text
2008	Adding Up Clues	Courtney Earley	4	Narrative
2008	The Flying V	Sue Corbett	5	Narrative
2008	King Midas	Pamela Oldfield	8	Narrative
2007	Alice Evans' Quest for Safe Milk	Gail Jarrow	7	Expository
2007	New Heights: The Courage of Alice Eastwood	Jean L. S. Patrick	8	Expository
2006	The Hill	Laura Richards	3	Narrative
2006	A Birthday Riddle	Lana Renetzky	4	Narrative
2006	Nellie Bly	Margo McLoone	4	Expository
2006	Rosa Parks	David A. Adler	5	Expository
2006	Under the Shade of a Tree	Anna Levine	5	Narrative
2006	The Snake in the Bottle	Brent Ashabranner & Russell Davis	6	Narrative
2006	The Wise King	Nina Jaffe & Steve Zeitlin	6	Narrative
2006	Beth Rodden: Rock Climber	Beth Rodden	7	Expository
2006	Song of Masefield	Michelle DiVito	8	Narrative
2006	The Daisy	Hans Christian Andersen	8	Narrative
2005	Eric's Lizard	Dave Griswold	3	Narrative
2005	My Life with Bears	Spencer Pelton	4	Expository
2005	Hannah	Gloria Whelan	4	Narrative
2005	Alvin Ailey, Modern Dancer	Carlotta Hacker	4	Expository
2005	Pioneer Doctor of the Prairie	Karen Blumhagen	5	Expository
2005	Joy Ride	American Girl, LLC	6	Expository
2005	Lessons in Baseball	Chick Moorman	6	Expository
2005	Sarah Bagley: Fighter for Rights	Cobblestone	6	Expository
2005	Allen Jay: Conductor of the Underground Railroad	Kathleen M. Muldoon	7	Expository
2005	Hisako: The Girl Who Would be Beautiful	Anna Salyers Miller	7	Narrative
2005	Sir Douglas Bader	Deborah Kent & Kathryn A. Quinlan	7	Expository
2005	A Special Gift-The Legacy of "Snowflake" Bentley	Barbara Eaglesham	8	Expository
2005	King Alfred and the Cakes	James Baldwin	8	Narrative

Treatment Procedures

Prior to the study, the principal investigator met with the school's fourth and fifth grade teachers, Literacy Coach, principal, and district's Superintendent to explain the study to them. During this meeting, the principal investigator discussed all aspects of the investigation (i.e., Purpose of the Study, Significance of the Study, Treatment Levels, Hypotheses, etc.), how many weeks/days it would take, and what their roles would be if they chose to involve themselves in the study. Upon conclusion of the meeting, one fourth grade teacher volunteered to manage Treatment 2 (Reading Aloud), as well as one fifth grade teacher, whom opted to direct Treatment 3 (Silent Reading). Each are certified teachers by the State of Michigan and are considered to be Highly Qualified as outlined by the Michigan Department of Education. Another fourth grade teacher, also certified by the State of Michigan, agreed to monitor and document observations, via anecdotal records, while overseeing each treatment group (see Appendix A); this information will be used to verify that all participants (e.g., students, certified teachers, and principal investigator) were conducting the study as originally intended. Finally, the school's Literacy Coach opted to administer all Qualitative Reading Inventory-3 (QRI-3) posttests to each student participant immediately following the seven week study.

The treatment levels briefly described in Chapter 1 are described here in further detail.

Treatment 1 (Storytelling): Over the course of seven weeks, twenty-eight teacher-storytelling performances of narrative and expository texts (fourteen narrative and fourteen expository) were employed by the principal investigator with fourth and fifth

grade students. All of the narratives told were fiction, while the rest of the selections were fictionalized biographies that were basically fictional in nature. Each week's story selections consisted of two narratives and two expository texts from grades 3-8 MEAP Released Items Reading Selections (see Figures 3.3 and 3.4). In order to hold the storytelling process constant, each story category alternated every other day (i.e., Day 1 = Narrative, Day 2 = Expository, Day 3 = Narrative, etc.).

During the treatment's timeframe, fourth and fifth grade students from each grade level (assigned to Treatment 1) were combined in a cluster and told one single story per day—four times a week. These storytelling sessions occurred in the same classroom environment for each telling, which were scheduled to last for approximately thirty to forty-five minutes. No student discussions ensued upon conclusion of each storytelling performance and a multiple-choice assessment was given to students at the end of each telling. Each assessment consisted of only eight questions and was recorded on a DataDirector bubble-sheet, which was turned into the principal investigator by the students at the end of each session. These answer documents were then scanned into a DataDirector database by the principal investigator using a Fujitsu fi-6130 Sheet-Fed TWAIN scanner.

Figure 3.4
Weekly Story Schedule

Week 1		
Day	Title	Text
Day 1	Adding Up Clues	Narrative
Day 2	Alice Evans' Quest for Safe Milk	Expository
Day 3	The Flying V	Narrative
Day 4	New Heights: The Courage of Alice Eastwood	Expository
Week 2		
Day	Title	Text
Day 1	King Midas	Narrative
Day 2	Nellie Bly	Expository
Day 3	The Hill	Narrative
Day 4	Rosa Parks	Expository
Week 3		
Day	Title	Text
Day 1	A Birthday Riddle	Narrative
Day 2	Beth Rodden: Rock Climber	Expository
Day 3	Under the Shade of a Tree	Narrative
Day 4	Joy Ride	Expository
Week 4		
Day	Title	Text
Day 1	The Snake in the Bottle	Narrative
Day 2	My Life with Bears	Expository
Day 3	The Wise King	Narrative
Day 4	Alvin Ailey, Modern Dancer	Expository
Week 5		
Day	Title	Text
Day 1	The Daisy	Narrative
Day 2	Pioneer Doctor of the Prairie	Expository
Day 3	Eric's Lizard	Narrative
Day 4	Lessons in Baseball	Expository
Week 6		
Day	Title	Text
Day 1	Hannah	Narrative
Day 2	Sarah Bagley: Fighter for Rights	Expository
Day 3	Song of Masefield	Narrative
Day 4	Allen Jay: Conductor of the Underground Railroad	Expository
Week 7		
Day	Title	Text
Day 1	Hisako: The Girl Who Would be Beautiful	Narrative
Day 2	Sir Douglas Bader	Expository
Day 3	King Alfred and the Cakes	Narrative
Day 4	A Special Gift-The Legacy of "Snowflake" Bentley	Expository

Treatment 2 (Reading Aloud): In the same manner as Treatment 1, twenty-eight teacher-story reading aloud performances of narrative and expository texts (fourteen narrative and fourteen expository) were employed by a certified teacher with a group of fourth and fifth grade students (assigned to Treatment 2) over the course of seven weeks. Before the onset of the study, the principal investigator met with the fourth grade certified teacher who volunteered to administer Treatment 2 so as to discuss her role in the study. During this meeting, the principal investigator exposed all of the study's materials to the fourth grade teacher (i.e., MEAP story selections, story schedule, multiple-choice assessments, students' answer sheets, etc.) and explained that she would be required to read aloud each selection only once per session to Treatment 2. The principal investigator also explained to the certified teacher that each week's story selections would consist of two narrative and two expository passages from MEAP 2005, 2006, 2007, and 2008 released item reading selections (see Figures 3.3 and 3.4). In order to hold the story reading aloud performance process constant, each story category alternated every other day (i.e., Day 1 = Narrative, Day 2 = Expository, Day 3 = Narrative, etc.) and followed the same story selection schedule as Treatments 1 and 3 (see Figures 3.3 and 3.4). Likewise, all of the narratives used were fiction, while the rest of the selections were biographies.

On a daily basis, during the treatment's timeframe, fourth and fifth grade participants were combined to form a cluster and were read the same story that was told by the principal investigator in Treatment 1 or read silently by students in the comparison group (Treatment 3). Likewise, each session occurred simultaneously, while Treatment 1 and Treatment 3 were being administered, students in Treatment 2

listened to a story being read aloud to them by the fourth grade certified teacher. Each story scheduled for each day was read only once. This process occurred four times a week. Unlike Treatment 1, where student participants were expected to visualize/comprehend all aspects of the story, student participants in Treatment 2 were exposed to all illustrations provided in each selection. As a result, pictures from each selection were revealed to student participants by the fourth grade certified teacher during each reading; this made each read aloud as natural as possible. Moreover, all story reading aloud sessions for Treatment 2 occurred in the same classroom environment for each reading and were scheduled to last for approximately thirty to forty-five minutes. No student discussions ensued upon conclusion of each story reading aloud performance. Finally, a multiple-choice assessment was given to student participants at the end of each reading. Each assessment consisted of the same eight questions answered by students assigned to Treatment levels 1 and 3. These documents were also recorded on a DataDirector bubble-sheet, which was eventually turned into the fourth grade certified teacher by the students. Answer documents were subsequently given to the principal investigator, who ultimately scanned them into a DataDirector database using a Fujitsu fi-6130 Sheet-Fed TWAIN scanner.

Treatment 3 (Silent Reading): The comparison group; no narrative/expository text storytelling or story reading aloud performances were employed. Students read silently each scheduled selection. Within the contents of each story selection, pictures were left inside for students to view. Upon conclusion of reading each selection independently, students answered eight multiple-choice questions. Each assessment consisted of the same eight questions answered by students assigned to Treatment levels 1 and 2. In

addition, these documents were recorded on a DataDirector bubble-sheet, which was turned into the fifth grade certified teacher by the students at the end of each session. Answer documents were then scanned into a DataDirector database by the principal investigator using a Fujitsu fi-6130 Sheet-Fed TWAIN scanner. Incidentally, prior to the study, the principal investigator met with the fifth grade certified teacher who volunteered to oversee the administration of Treatment 3. For the duration of the meeting, the principal investigator revealed all of the study's materials to the certified teacher (i.e., length of the study, MEAP story selections, story schedule, multiple-choice assessments, students' answer sheets, etc.) and explained to him that he would supervise students as they silently read/answered eight multiple-choice questions.

Instruments

The instrument used to assess students' reading comprehension and oral reading fluency rate was the QRI-3. According Leslie and Caldwell (2001), this instrument has many practical uses (e.g., find student's instructional level of expository/narrative text, word identification accuracy, contrast oral and silent reading comprehension, etc.), is commonly used by educators today as a tool to assess students' literacy development, and have been analyzed for reliability and validity. For the purposes of this study, two aspects of the QRI-3 were used to collect data for each posttest assessment.

First, an oral reading fluency reading rate, as measured in words-per-minute (WPM), was determined by the Literacy Coach using fourth and fifth grade narrative and expository reading passages from the QRI-3. Students' scores were determined by the number of words in the passage multiplied by sixty and then divided by the number of

seconds it took participants to read each passage (i.e., 256 × 60 = 15,360; 15,360 ÷ 120 seconds = 128 WPM) (Leslie & Caldwell, 2001). This calculation process was used to gauge all students' oral reading fluency reading rates or WPM scores and was computed immediately following the study.

Second, a measure of comprehension was carried out by the Literacy Coach using the same narrative and expository reading passages used to calculate students' oral reading fluency rates for each posttest. During this time, the Literacy Coach asked two types of questions: Explicit and implicit. Explicit questions required students' to recall factual information stated in the passage. In order to correctly answer implicit questions, students were required to make inferences from clues inside the passage (Leslie & Caldwell, 2001). Finally, both explicit and implicit responses to questions were combined to formulate a total comprehension score.

Reliability and Validity

Leslie and Caldwell (2001) assessed the complexity of QRI-3 passages by comparing the performances of students reading passages of increasing readability. This was achieved through a multivariate analysis of variance with readability as the within-subjects factor and with total comprehension, retelling, and reading rate as the dependent measures. Leslie and Caldwell (2001) also designated total oral reading accuracy and acceptable accuracy as dependent measures in analyses through sixth-grade. Separate analyses for narrative and expository text types were done because data indicated differences in comprehension among text types. Likewise, sets of analyses on contiguous levels (i.e., 3-4, 4-5, 5-6, etc.) were completed. Results showed significant differences at each level. For example, on the 4-5 narratives,

comprehension of fourth grade passages was higher than that of fifth grade passages. With regard to 4-5 exposition, total oral reading accuracy, acceptable accuracy, and comprehension were higher on fourth than on fifth grade materials. Additionally, 5-6 narrative and expository passages found no significant differences; means illustrated higher comprehension on fifth than on sixth ($p<.10$) (Leslie & Caldwell, 2001).

As a result of the above mentioned comparisons, and numerous others not mentioned, Leslie and Caldwell (2001) stated that there is sufficient data indicating that the passages are of increasing difficulty. In all passage comparisons, the comprehension of the lower passage was one to two questions higher than that of the higher passage. In addition, expository passage comparisons of levels 3-4 and 4-5, students read with greater accuracy and greater acceptable accuracy on the lower passage (Leslie & Caldwell, 2001).

Leslie and Caldwell (2001) stated that, “Consistency is a reliability property of a test that refers to the replicability of scores for a single individual. A score is consistent if, in the absence of growth or learning, an individual repeatedly obtains the same score.” (Leslie & Caldwell, 2001, p. 435) In the direction of establishing consistency, QRI-3 scores were measured in three ways: Inter-scorer reliability, internal consistency reliability, and alternate-form reliability. An analysis of inter-scorer reliability of the QRI-3 demonstrated evidence that it was consistent across examiners (i.e., total percentage of miscues, percent of meaning-change miscues, prior-knowledge concept score, total explicit/explicit comprehension scores, and the propositional analysis of recall). For example, in forty-nine oral reading observations across all readability levels using both types of text (narrative and expository), Leslie and Caldwell (2001) report alpha

reliability estimates of inter-scorer reliability using Cronbach's alpha (Cronbach, 1951). Estimates revealed prominent degrees of consistency between scorers' results (e.g., .99 = total miscues, .99 = meaning-change miscues, .98 = explicit comprehension, and .98 = implicit comprehension).

Internal consistency reliability of the QRI-3 was used to establish how reliable students' total comprehension scores were as estimates of true comprehension (Leslie & Caldwell, 2001). To determine this, standard error of measurement of total comprehension scores was estimated through an analysis of variance using comprehension question items as the within-subject factor and subjects as the between-subjects factor (Leslie & Caldwell, 2001). Leslie and Caldwell (2001) rationalized their decision to perform such an analysis by citing Crocker and Algina (1986), who suggested the use of the standard error of measurement rather than a correlational estimate of reliability for criterion-referenced tests where there is reduced variability in subject's performance (Crocker & Algina, 1986; Leslie & Caldwell, 2001). Because correlation is based, in part, on variability, QRI-3 pilot study scorers for Leslie and Caldwell (2001) did not give harder passages to student participants who scored as frustrated on easier material, which reduced variability. As a result, a customary, "correlational measure of reliability would not accurately reflect the reliability of the scores. Similarly, because the alpha coefficient is based on variability, it is subject to the same restrictions." (Leslie & Caldwell, 2001, p. 436) Leslie and Caldwell (2001) cite Crocker and Algina (1986) who expressed, "that the standard error of a criterion-referenced test can be very low (such as .001), indicating a highly reliable score, yet the reliability, expressed as a generalizability coefficient, could be very low (.00). This

happens when there is no variability in the data." Since Leslie and Caldwell (2001) restricted variability, standard error of measurement was used to estimate QRI-3 total comprehension scores of "true" comprehension. Table 3.5 represents the mean, standard deviation, and standard error of measurement (SEM) of the proportion-correct total comprehension score for all fourth and fifth grade QRI-3 passages.

Table 3.5
Standard Error of Measurement (Portion Correct) for Total Comprehension Scores for Passages
(Leslie & Caldwell, 2001, p. 439)

Passage Title	Grade	Text Type	*M*	*SD*	*N*	SEM
Johnny Appleseed	4	Narrative	.81	.22	9	.13
Amelia Earhart	4	Narrative	.67	.15	11	.17
Sequoyah	4	Narrative	.53	.17	9	.18
The Busy Beaver	4	Expository	.71	.13	9	.17
The City of Cahokia	4	Expository	.74	.25	10	.15
Saudi Arabia	4	Expository	.75	.16	10	.15
Martin Luther King, Jr.	5	Narrative	.81	.21	32	.17
Christopher Columbus	5	Narrative	.67	.24	31	.16
Margaret Mead	5	Narrative	.53	.18	23	.16
Getting Rid of Trash	5	Expository	.71	.21	38	.17
The Octopus	5	Expository	.74	.19	32	.16
Laser Light	5	Expository	.75	.20	36	.17

In order to attain the best estimate of alternate-form reliability of QRI-3 student levels (e.g., Level 3, Level 4, Level 5, etc.), Leslie and Caldwell (2001) examined the reliability of the total comprehension score to estimate instructional level across passages of the same type (narrative or expository). The method used to estimate alternate-form reliability of criterion-referenced assessments was Livingston's K^2 (Leslie & Caldwell, 2001). According to Leslie and Caldwell (2001), this index reflects the magnitude of the discrepancy of misclassification in judging the reliability of "How close are the two comprehension scores to the cutoff of 70% for instructional level?" Providentially, all reliabilities of instructional-level decisions based on comprehension

scores were above .80, with 75% being greater than or equal to .90. Furthermore, Leslie and Caldwell (2001) found that the same instructional level was indicated on the basis of the comprehension scores on each passage. Across the readability levels, 71% to 84% of the time, the same readability level would be found on both passages (e.g., fourth=80%, fifth=75%, sixth=77%, etc.).

Through criterion-related validity, Leslie and Caldwell (2001) ascertained significant correlations have demonstrated that instructional levels obtained on standardized reading achievement tests (i.e., California Achievement Test/CAT, Iowa Test of Basic Skills/ITBS, Wisconsin Third Grade Reading Test/WTGRT, etc.) also measure common QRI-3 factors (e.g., word-recognition, recall, etc.), consequently supporting the validity of a student's instructional level in familiar material and Normal Curve Equivalency (NCE) (see Table 3.6).

Table 3.6
Correlations Between Instructional Level in Familiar Material and Standardized Tests of Reading Achievement as a Function of Grade (Leslie & Caldwell, 2001, p. 443)

Test	Grade	*p*	Correlation	*N*
CAT or ITBS	1	*p*<.01	.86	41
CAT or ITBS	2	*p*<.01	.65	32
WTGRT	3	*p*<.05	.48	18
WTGRT	3	*p*<.01	.61	21
CAT or ITBS	4	*p*<.01	.66	31

According to Leslie and Caldwell (2001), oral reading rate (oral reading fluency) can automatically imply word identification. For instance, if a reader reads pretty quickly, it can be assumed that the words being read are no longer being decoded. As a result, the reader processes the words as whole units; words recognized in this

manner are often termed as sight words (Leslie & Caldwell, 2001). Leslie and Caldwell (2001) wrote oral reading rates

> are quite variable. More difficult and/or unfamiliar passages tend to be read more slowly. Reading rate also varies according to reader purpose. If the reader is reading in order to learn or remember text content, this is typically done at a slower rate than pleasure reading. Reading rate also varies across individuals. Some readers are naturally faster than others, a phenomenon that may be attributed to speed of cognitive processing (Carver, 1990). For these reasons, any guidelines for evaluating rate must be interpreted as general in nature. (p. 67)

Consequently, during their pilot study of normal readers reading at their instructional level, Leslie and Caldwell (2001) found that there was a wide variation in oral reading rates in spite of a steady growth in rate as reading level increased (see Table 3.7). As a result, QRI-3 oral reading rates were reported, "…based upon means and standard deviations, as suggestive of the rates of typical readers when processing text at their instructional level." (Leslie & Caldwell, 2001, pp. 67-68)

Table 3.7
Ranges of Oral Reading Rates of Students Reading at Instructional Level (Leslie & Caldwell, 2001, p. 68)

Level	Oral Words per Minute
Pre-Primer	13-35
Primer	28-68
First	31-87
Second	52-102
Third	85-139
Fourth	78-124
Sixth	113-165

Data Collection

After approval from the district's Superintendent and Wayne State University's Behavioral Investigation Committee, a letter was written to inform all fourth and fifth grade parents that their child(ren) would be participating in an educational study by the

principal investigator. The letter described the nature and extent of the investigation. Letters were mailed to the parents at the expense of the principal investigator two weeks prior to the study. Those parents requesting that their child not participate in the study were immediately removed from the sample. Over the course of the study, anecdotal data was recorded by a fourth grade teacher. This information was used to confirm that all participants properly engaged in the study (e.g., students, certified teachers, principal investigator, etc.) and performed their duties as originally planned (i.e., storytelling, reading aloud, silent reading, multiple-choice assessments, no follow-up discussions, etc.).

At the end of the study, QRI-3 posttest assessments were administered to every student participant by the school's Literacy Coach. These assessments were given immediately following the seven week study. Comprehension and oral reading fluency reading scores were taken from a narrative and expository selection. Students' results were recorded by the Literacy Coach and student scores inputted by the principal investigator into a database using PASW Statistics 18 software for Windows. In order to protect the identities of all student participants, a code number was used to identify their documents (e.g., 4M-11 = fourth grade male student #11; 4F-19 = fourth grade female student #19, etc.). These materials were scanned into an electronic database. All original paper documents were then permanently destroyed by a paper shredder. Access to the study's data base was only accessible to the principal investigator and was stored on a secure application server requiring necessary login information and password authentication. Finally, upon conclusion of the study, all data will be deleted

from the principal investigator's application server upon final approval of the dissertation by the committee.

Data Analysis

The multivariate factorial design proposed for this study was designed to assess the influence storytelling and/or reading aloud has on fourth and fifth grade children's comprehension and oral reading fluency of both narrative and expository texts. The outcomes of the research are reported as results from the data analysis on each criterion variable. The data was analyzed for statistical differences among means and also for any significant interaction among combinations of the various factors by using analysis of variance and appropriate multiple comparison techniques. The analysis is reported in relation to the specific set of hypotheses generated about each variable.

Issues with power were also taken into consideration for the data analysis of this study. Power is the probability of rejecting a null hypothesis when the null is in fact false. It is desirable to have the greatest amount of power possible in a study so that one can find real mean differences when they truly exist. There are several ways to increase power or to obtain the maximum power from a study. Increasing the number of subjects in the study will increase power. Similarly, maximum power can be obtained in a study when each of the cells has equal numbers of subjects. However, this does not mean that if an unbalanced layout is obtained observations should be eliminated to make the cells equal. In other words, discarding student data in an effort to achieve a balanced layout will depress statistical power.

During the study, 126 fourth and fifth grade students were distributed over twelve cells. Table 3.8 shows the natural distribution of the 126 students over the twelve treatment cells.

Table 3.8
Distribution of Students by Grade, Gender, and Treatment

GRADE	GENDER	TREATMENT 1 Storytelling	TREATMENT 2 Reading Aloud	TREATMENT 3 Silent Reading (Comparison)
4	Male	10	10	11
	Female	11	10	10
5	Male	11	13	11
	Female	9	10	10

Due to the anticipated small sample sizes, nonparametric tests, which are known to be more powerful if the normality assumption of the parametric MANOVA is violated, will also be conducted. Because there are not good multivariate nonparametric tests available, individual 2×3 ANOVAs will be conducted with the Blair-Sawilowsky Salter-Fawcett (Sawilowsky, 2000) Adjusted Rank Transformation Test (ART) for interactions, and one-way Kruskal-Wallis tests and Wilcoxon Rank-Sum tests for main effects. Further discussions about nonparametric tests used in this study are provided in Chapter 4.

Hypotheses

The following statistical hypothesis relating to the null hypotheses 1, 2, 3, 4, and 5 stated in Chapter 1, was tested for effects due to the treatment H_0: $\boldsymbol{\mu}_1 = \boldsymbol{\mu}_2 = \boldsymbol{\mu}_3$, and the H_1 is at least one $\boldsymbol{\mu}$ is not equal; where $\boldsymbol{\mu}_1$, $\boldsymbol{\mu}_2$, and $\boldsymbol{\mu}_3$ are the means associated with the treatments X_1, X_2, and X_0, respectively.

Decision-Making Strategy

The setting of alpha (α) is an important, but somewhat arbitrary matter. It involves the relative importance of Type I vs. Type II errors, as well as the practical significance of the conclusions. For all interactions, alpha was held to $\alpha = .05$. However, alpha was relaxed to $\alpha = .10$ for all main effects in order to increase statistical power, because the degrees of freedom for the error terms were sometimes too small.

CHAPTER 4

RESEARCH DESIGN AND DATA ANALYSIS

Research Design

The framework for this study was a 2×3 factorial design employing two student variable levels (female and male) and three independent treatment variable levels (Storytelling and Reading Aloud to the students by an adult and Silent Reading by the students). The design was employed independently for each of the two grade levels of students (fourth and fifth grades) involved in this research. This analysis stratification was necessary since the QRI-3 assessments used for narrative and expository comprehension and oral reading fluency that serve as the criterion variable in the study are unique for each grade level; their validity and reliability have been established independent of each other.

In this study, the third treatment, Silent Reading by the students, served as the base-line treatment level to which the other two treatments were compared. In the typical reading program, Silent Reading is a common instructional strategy employed in fourth and fifth grades. As such, it was important to determine if Storytelling and/or Reading Aloud had any significant effect on the narrative and expository comprehension and oral reading fluency of these students as compared to the effect Silent Reading had on these criterion variables.

Data Analysis

The data was analyzed for statistical differences among the means and also for any significant interaction among combinations of the various factors. Parametric tools, including MANOVA, were employed initially. Nonetheless, due to small and unequal

sample sizes, nonparametric tests, which are known to be more statistically powerful if the normality assumption of the parametric MANOVA is violated, were also employed. Sawilowsky (1990) suggests that as soon as several violations of assumptions ensue, the power, and the Type I error, of a parametric test is frequently reduced, and consequently requires a shift towards nonparametric alternatives. Leys and Schumann (2010) also propose a shift towards nonparametric tests when the requirement of a normal distribution is not satisfied and sample sizes are under thirty per experimental condition, or when a non-normal distribution occurs along with heteroscedasticity.

Due to the small sample sizes and unbalanced groups of students, nonparametric tests were conducted to analyze interactions for Narrative and Expository Comprehension and Narrative and Expository Oral Reading Fluency using the Blair-Sawilowsky Salter-Fawcett (Sawilowsky, 2000) adjusted rank transformation test (ART). This type of test provides a vehicle for presenting both the parametric and nonparametric methods in a unified manner (Conover & Iman, 1981). Furthermore, according to Conover and Iman (1981), ART also

> *has the advantage of being easy to conduct, offers an interesting robustness, does not depend on the distribution of the variables and is based on regular F distribution tables. In addition, it can be applied to within-subjects, between-subjects or mixed experimental designs.* (p. 684)

In addition, Leys and Schumann (2010) indicate that there are many alternatives available to study interactions, but either the procedure is too complex or is lacking in power. Because of this, Leys and Schumann (2010) recommend the ART procedure, which is based on the original test of rank transformation (RT) established by Conover

and Iman (1981). The guiding principle is to assign a rank to each given raw data score, which allows the data to be distribution free, and to conduct a regular parametric ANOVA test on those ranks (Leys & Schumann, 2010). With non-normal distributions, this procedure tends to increase statistical power three times higher than that of a factorial ANOVA (.91 instead of .32) (Leys & Schumann, 2010; Sawilowsky, 1990). However, the existence of both the main effects and interactions alter the robustness of the ANOVA test (Leys & Schumann, 2010; Sawilowsky, 1990, 2000). As a result, it is necessary to incorporate an adjustment by removing the main effects from the interactions (Leys & Schumann, 2010; Sawilowsky, 1990, 2000). This alteration can be attained by deducting the respective marginal means from each observation (Conover & Iman, 1981; Leys & Schumann, 2010; Rosnow & Rosenthal, 1995; Sawilowsky, 1990, 2000). Afterwards, data is pooled together so that a rank can be given to each observation and a factorial ANOVA is conducted. The significance of the interaction term is interpreted just like the traditional ANOVA (Leys & Schumann, 2010). Using this process, information regarding the main effects is unavoidably lost. Nonetheless, they can be computed in a subsequent step by deducting the interactions of the raw data, thus retaining only the main effects (Leys & Schumann, 2010).

For main effects, the data is adjusted by excising the average of the three diagonal group means from each relevant observation (Leys & Schumann, 2010). This procedure isolates the main effects by removing the interactions (Leys & Schumann, 2010). Next, adjusted scores are pooled together to form one set so that ranks can be properly assigned to each germane observation. After that, a Kruskal-Wallis H test

follows, where the main effects are calculated without being influenced by the interactions (Leys & Schumann, 2010).

Data Analysis for the Fourth Grade Sample

Fourth Grade Sample

In the study there are an equal number of fourth grade females (*N* = 31) and males (*N* = 31). The distribution of these students across treatment groups is presented in Table 4.1. As can be seen, cell sizes are nearly identical, but they are varied. In addition, sample sizes for each treatment are less than thirty, thus affecting statistical power and making the use of nonparametric statistical analysis plausible.

Table 4.1
Fourth Grade Sample Distribution

	Gender		
Group	Male	Female	*N*
Storytelling	10	11	21
Reading Aloud	10	10	20
Silent Reading	11	10	21
N	31	31	62

Fourth Grade Hypotheses

The results in this study are reported in relation to the specific set of hypotheses generated regarding each variable. These hypotheses, as applied to the fourth grade population, are stated in the null form as follows:

H_1 - There is no difference in fourth grade students' reading comprehension of narrative and expository texts as a result of employing two story performance techniques.

H_2 - There is no difference in fourth grade students' oral reading fluency of narrative and expository texts as a result of employing two story performance techniques.

H_3 - There is no difference in fourth grade students' reading comprehension of narrative and expository texts due to the effects of:

(c) A teacher's telling twenty-eight stories to the students.

(d) A teacher's reading aloud of twenty-eight stories to the students.

H_4 - There is no difference in fourth grade students' oral reading fluency of narrative and expository texts due to the effects of:

(c) A teacher's telling twenty-eight stories to the students.

(d) A teacher's reading aloud of twenty-eight stories to the students.

H_5 - There is no significant interaction among two story performance techniques held constant across the factor of gender.

Parametric Analysis (MANOVA) of Fourth Grade Narrative and Expository Comprehension

Table 4.2 presents descriptive statistics involving students' scores on the Narrative Comprehension sub-test of the QRI-3 including the Mean (*M*), Standard Deviation (*SD*), and number of participants (*N*) organized by treatment group and gender.

Table 4.2
Fourth Grade Descriptive Statistics for Narrative Comprehension

QRI-3 Assessment	Group	Gender	*M*	*SD*	*N*
Narrative Comprehension	Storytelling	Female	5.45	1.368	11
		Male	5.10	1.663	10
		TOTAL	5.29	1.488	21
	Reading Aloud	Female	4.80	1.989	10
		Male	4.70	2.058	10
		TOTAL	4.75	1.970	20
	Silent Reading	Female	4.80	1.989	10
		Male	4.82	1.662	11
		TOTAL	4.81	1.778	21
	TOTAL	Female	5.03	1.760	31
		Male	4.87	1.746	31
		TOTAL	4.95	1.741	62

A review of the mean scores reveals that students exposed to Storytelling (*M* = 5.29) achieved an overall higher score than students exposed to Reading Aloud (*M* = 4.75) and Silent Reading (*M* = 4.81). However, the Silent Reading group's mean score was higher than that of the Reading Aloud group. Note that females outperformed males in the Storytelling (a mean score of 5.45 as compared to 5.10) and Reading Aloud (a mean of 4.80 as compared to 4.70) groups but not in the silent reading groups (where the mean score for males was 4.82 while that for females was 4.80).

Table 4.3 presents descriptive statistics involving students' scores on the Expository Comprehension sub-test of the QRI-3 including the Mean (*M*), Standard Deviation (*SD*), and number of participants (*N*) organized by treatment group and gender.

Table 4.3
Fourth Grade Expository Comprehension Descriptive Statistics

QRI-3 Assessment	Group	Gender	*M*	*SD*	*N*
Expository Comprehension	Storytelling	Female	5.91	1.375	11
		Male	6.00	1.491	10
		TOTAL	5.95	1.396	21
	Reading Aloud	Female	5.60	2.011	10
		Male	5.40	1.897	10
		TOTAL	5.50	1.906	20
	Silent Reading	Female	5.30	1.252	10
		Male	5.64	1.963	11
		TOTAL	5.48	1.632	21
	TOTAL	Female	5.61	1.542	31
		Male	5.68	1.759	31
		TOTAL	5.65	1.641	62

As was the case with the Narrative Comprehension sub-test, on the Expository Comprehension sub-test students exposed to Storytelling (*M* = 5.95) achieved an overall higher score than students exposed to Reading Aloud (*M* = 5.50) and Silent Reading (*M* = 5.48). Moreover, on this sub-test, students exposed to Reading Aloud recorded a slightly higher mean score than the Silent Reading students unlike the situation on the Narrative Comprehension sub-test. Another peculiarity with this sub-test as compared to the Narrative Comprehension sub-test, is that males in the Storytelling and Silent Reading groups outperformed their female counterparts, although this relationship was reversed in the Reading Aloud group. Note too, that the mean scores for all student groups on the Expository Comprehension sub-test were higher than the mean scores on the Narrative Comprehension sub-test.

In order to determine if the differences between any of the Narrative and Expository Comprehension mean scores of the groups was statistically significant,

MANOVA was employed with gender (female, male) and treatment (Storytelling, Reading Aloud, and Silent Reading) serving as between-subjects factors (Table 4.4).

The multivariate main effect of gender on fourth grade Narrative and Expository Comprehension was not significant ($F(4, 53) = .338$, $p = .851$, partial $\eta^2 = .025$). Similarly, multivariate results also show no significant main effect of group ($F(8, 108) = .747$, $p = .650$, partial $\eta^2 = .052$) on fourth grade Narrative and Expository Comprehension. Finally, there was no significant multivariate interaction between gender and treatment ($F(8, 108) = .425$, $p = .904$, partial $\eta^2 = .030$).

Table 4.4
Multivariate and Univariate Analyses of Variance for Fourth Grade Comprehension

	Multivariate			Univariate					
				Narrative Comprehension			Expository Comprehension		
Source	F[c,d]	p	Partial η^2	F[e,f]	p	Partial η^2	F[e,f]	p	Partial η^2
Gender (G)[a]	.338	.851	.025	.102	.751	.002	.031	.861	.001
Group (Gr.)[a]	.747	.650	.052	.537	.588	.019	.538	.587	.019
G × Gr.[b]	.425	.904	.030	.059	.943	.002	.129	.880	.005

Note. Multivariate F ratios were generated from Pillai's Trace. [a]Alpha (α) = .10. [b]Alpha (α) = .05. [c]Multivariate df for G = 4, 53. [d]Multivariate df for Gr. and G × Gr. = 8, 108. [e]Univariate df for G = 1, 56. [f]Univariate df for Gr. and G × Gr. = 2, 56.

Univariate main effect results of gender on fourth grade Narrative ($F(1, 56) = .102$, $p = .751$, partial $\eta^2 = .002$) and Expository ($F(1, 56) = .031$, $p = .861$, partial $\eta^2 = .001$) Comprehension were not significant. Likewise, univariate results also show no significant main effect of group on fourth grade Narrative ($F(2, 56) = .537$, $p = .588$, partial $\eta^2 = .019$) and Expository ($F(2, 56) = .538$, $p = .587$, partial $\eta^2 = .019$) Comprehension. As a final point, there was no significant univariate interaction between gender and treatment in fourth grade Narrative $F(2, 56) = .059$, $p = .943$,

partial η^2 = .002) and Expository $F(2, 56) = .129$, $p = .880$, partial η^2 = .005) Comprehension.

On the basis of the MANOVA analysis, there is insufficient evidence to reject the claim that there is no difference in fourth grade students' reading comprehension of narrative and expository texts as a result of employing two story performance techniques (H_1). Additionally, there is not enough evidence to reject the claim that there is no difference in fourth grade students' reading comprehension of narrative and expository texts due to the effects of a teacher's telling and a teacher's reading aloud of twenty-eight stories to the students (H_3). Lastly, there is meager evidence to reject the claim that there is no significant interaction among two story performance techniques held constant across the factor of gender (H_5).

Nonparametric Analysis of Interactions for Fourth Grade Narrative and Expository Comprehension

For the nonparametric interaction analyses of fourth grade Narrative Comprehension, student raw scores were first adjusted by subtracting marginal means from each row and column (Figure 4.1). Table 4.5 depicts how marginal means were calculated using the raw data; this procedure was used to isolate interactions by removing all main effects (as seen in Tables 4.6, 4.7, 4.8, 4.9, 4.10, and 4.11) (Leys & Schumann, 2010; Sawilowsky, 1990, 2000). Next, students' adjusted scores were pooled together to form one set so that ranks could be appropriately assigned. This end result was attained by arranging all students' scores in an increasing order, assigning a rank ranging from one to sixty-two, and adapting the rank for all ties by assigning equal

average ranks to each one (Table 4.12). Finally, a 2×3 factorial ANOVA was computed using the transformed ART scores.

Figure 4.1
Blair-Sawilowsky Salter-Fawcett Adjusted Rank Transformation Test (ART) Procedure for Fourth and Fifth Grade Narrative and Expository Comprehension/Oral Reading Fluency Interactions

	A_2	A_1	A_0	Marginal Mean
B_1	Female Raw Scores - $\overline{A}_2$ - $\overline{B}_1$	Female Raw Scores - $\overline{A}_1$ - $\overline{B}_1$	Female Raw Scores - $\overline{A}_0$ - $\overline{B}_1$	$\overline{B}_1$
Group Mean	$\overline{\overline{AB}}_{21}$	$\overline{\overline{AB}}_{11}$	$\overline{\overline{AB}}_{01}$	
B_0	Male Raw Scores - $\overline{A}_2$ - $\overline{B}_0$	Male Raw Scores - $\overline{A}_1$ - $\overline{B}_0$	Male Raw Scores - $\overline{A}_0$ - $\overline{B}_0$	$\overline{B}_0$
Group Mean	$\overline{\overline{AB}}_{20}$	$\overline{\overline{AB}}_{10}$	$\overline{\overline{AB}}_{00}$	
Marginal Mean	$\overline{A}_2$	$\overline{A}_1$	$\overline{A}_0$	$\overline{\overline{X}}$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading. B_1 = Female. B_0 = Male.

Table 4.5
Fourth Grade Narrative Comprehension Raw Scores

	A_2	A_1	A_0	Marginal Mean
B_1	7 3 7 4 6 5 7 4 5 6 6	7 6 7 0 5 4 5 5 5 4	3 4 4 8 1 6 6 6 4 6	$\overline{B}_1 = 5.03$
Group Mean	$\overline{AB}_{21} = 5.45$	$\overline{AB}_{11} = 4.80$	$\overline{AB}_{01} = 4.80$	
B_0	6 5 2 7 4 8 5 4 5 5	8 7 2 3 6 4 6 4 2 5	4 5 6 6 1 4 6 4 4 6 7	$\overline{B}_0 = 4.87$
Group Mean	$\overline{AB}_{20} = 5.10$	$\overline{AB}_{10} = 4.70$	$\overline{AB}_{00} = 4.82$	
Marginal Mean	$\overline{A}_2 = 5.29$	$\overline{A}_1 = 4.75$	$\overline{A}_0 = 4.81$	$\overline{X} = 4.95$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.6
Calculation of Adjusted Raw Scores of Females Exposed to Storytelling for Fourth Grade Narrative Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_2$	-	$\overline{B}_1$	=	Adjusted Raw Score
4	Storytelling	Female	7	-	5.29	-	5.03	=	-3.32
4	Storytelling	Female	3	-	5.29	-	5.03	=	-7.32
4	Storytelling	Female	7	-	5.29	-	5.03	=	-3.32
4	Storytelling	Female	4	-	5.29	-	5.03	=	-6.32
4	Storytelling	Female	6	-	5.29	-	5.03	=	-4.32
4	Storytelling	Female	5	-	5.29	-	5.03	=	-5.32
4	Storytelling	Female	7	-	5.29	-	5.03	=	-3.32
4	Storytelling	Female	4	-	5.29	-	5.03	=	-6.32
4	Storytelling	Female	5	-	5.29	-	5.03	=	-5.32
4	Storytelling	Female	6	-	5.29	-	5.03	=	-4.32
4	Storytelling	Female	6	-	5.29	-	5.03	=	-4.32

Note. $\overline{A}_2$ = Storytelling marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.7
Calculation of Adjusted Raw Scores of Males Exposed to Storytelling for Fourth Grade Narrative Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_2$	-	$\overline{B}_0$	=	Adjusted Raw Score
4	Storytelling	Male	6	-	5.29	-	4.87	=	-4.16
4	Storytelling	Male	5	-	5.29	-	4.87	=	-5.16
4	Storytelling	Male	2	-	5.29	-	4.87	=	-8.16
4	Storytelling	Male	7	-	5.29	-	4.87	=	-3.16
4	Storytelling	Male	4	-	5.29	-	4.87	=	-6.16
4	Storytelling	Male	8	-	5.29	-	4.87	=	-2.16
4	Storytelling	Male	5	-	5.29	-	4.87	=	-5.16
4	Storytelling	Male	4	-	5.29	-	4.87	=	-6.16
4	Storytelling	Male	5	-	5.29	-	4.87	=	-5.16
4	Storytelling	Male	5	-	5.29	-	4.87	=	-5.16

Note. $\overline{A}_2$ = Storytelling marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.8
Calculation of Adjusted Raw Scores of Females Exposed to Reading Aloud for Fourth Grade Narrative Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_1$	-	$\overline{B}_1$	=	Adjusted Raw Score
4	Reading Aloud	Female	7	-	4.75	-	5.03	=	-2.78
4	Reading Aloud	Female	6	-	4.75	-	5.03	=	-3.78
4	Reading Aloud	Female	7	-	4.75	-	5.03	=	-2.78
4	Reading Aloud	Female	0	-	4.75	-	5.03	=	-9.78
4	Reading Aloud	Female	5	-	4.75	-	5.03	=	-4.78
4	Reading Aloud	Female	4	-	4.75	-	5.03	=	-5.78
4	Reading Aloud	Female	5	-	4.75	-	5.03	=	-4.78
4	Reading Aloud	Female	5	-	4.75	-	5.03	=	-4.78
4	Reading Aloud	Female	5	-	4.75	-	5.03	=	-4.78
4	Reading Aloud	Female	4	-	4.75	-	5.03	=	-5.78

Note. $\overline{A}_1$ = Reading Aloud marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.9
Calculation of Adjusted Raw Scores of Males Exposed to Reading Aloud for Fourth Grade Narrative Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_1$	-	$\overline{B}_0$	=	Adjusted Raw Score
4	Reading Aloud	Male	8	-	4.75	-	4.87	=	-1.62
4	Reading Aloud	Male	7	-	4.75	-	4.87	=	-2.62
4	Reading Aloud	Male	2	-	4.75	-	4.87	=	-7.62
4	Reading Aloud	Male	3	-	4.75	-	4.87	=	-6.62
4	Reading Aloud	Male	6	-	4.75	-	4.87	=	-3.62
4	Reading Aloud	Male	4	-	4.75	-	4.87	=	-5.62
4	Reading Aloud	Male	6	-	4.75	-	4.87	=	-3.62
4	Reading Aloud	Male	4	-	4.75	-	4.87	=	-5.62
4	Reading Aloud	Male	2	-	4.75	-	4.87	=	-7.62
4	Reading Aloud	Male	5	-	4.75	-	4.87	=	-4.62

Note. $\overline{A}_1$ = Reading Aloud marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.10
Calculation of Adjusted Raw Scores of Females Exposed to Silent Reading for Fourth Grade Narrative Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_0$	-	$\overline{B}_1$	=	Adjusted Raw Score
4	Silent Reading	Female	3	-	4.81	-	5.03	=	-6.84
4	Silent Reading	Female	4	-	4.81	-	5.03	=	-5.84
4	Silent Reading	Female	4	-	4.81	-	5.03	=	-5.84
4	Silent Reading	Female	8	-	4.81	-	5.03	=	-1.84
4	Silent Reading	Female	1	-	4.81	-	5.03	=	-8.84
4	Silent Reading	Female	6	-	4.81	-	5.03	=	-3.84
4	Silent Reading	Female	6	-	4.81	-	5.03	=	-3.84
4	Silent Reading	Female	6	-	4.81	-	5.03	=	-3.84
4	Silent Reading	Female	4	-	4.81	-	5.03	=	-5.84
4	Silent Reading	Female	6	-	4.81	-	5.03	=	-3.84

Note. $\overline{A}_0$ = Silent Reading marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.11
Calculation of Adjusted Raw Scores of Males Exposed to Silent Reading for Fourth Grade Narrative Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_0$	-	$\overline{B}_0$	=	Adjusted Raw Score
4	Silent Reading	Male	4	-	4.81	-	4.87	=	-5.68
4	Silent Reading	Male	5	-	4.81	-	4.87	=	-4.68
4	Silent Reading	Male	6	-	4.81	-	4.87	=	-3.68
4	Silent Reading	Male	6	-	4.81	-	4.87	=	-3.68
4	Silent Reading	Male	1	-	4.81	-	4.87	=	-8.68
4	Silent Reading	Male	4	-	4.81	-	4.87	=	-5.68
4	Silent Reading	Male	6	-	4.81	-	4.87	=	-3.68
4	Silent Reading	Male	4	-	4.81	-	4.87	=	-5.68
4	Silent Reading	Male	4	-	4.81	-	4.87	=	-5.68
4	Silent Reading	Male	6	-	4.81	-	4.87	=	-3.68
4	Silent Reading	Male	7	-	4.81	-	4.87	=	-2.68

Note. $\overline{A}_0$ = Silent Reading marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.12
Fourth Grade Narrative Comprehension Adjusted Raw Scores Transformed Into Ranks (ART)

	A_2			A_1			A_0		
	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART
	-3.32	→	53.00	-2.78	→	56.50	-6.84	→	8.00
	-7.32	→	7.00	-3.78	→	45.00	-5.84	→	15.00
	-3.32	→	53.00	-2.78	→	56.50	-5.84	→	15.00
	-6.32	→	10.50	-9.78	→	1.00	-1.84	→	61.00
	-4.32	→	38.00	-4.78	→	32.50	-8.84	→	2.00
B_1	-5.32	→	25.50	-5.78	→	17.50	-3.84	→	42.50
	-3.32	→	53.00	-4.78	→	32.50	-3.84	→	42.50
	-6.32	→	10.50	-4.78	→	32.50	-3.84	→	42.50
	-5.32	→	25.50	-4.78	→	32.50	-5.84	→	15.00
	-4.32	→	38.00	-5.78	→	17.50	-3.84	→	42.50
	-4.32	→	38.00						
	-4.16	→	40.00	-1.62	→	62.00	-5.68	→	20.50
	-5.16	→	28.50	-2.62	→	59.00	-4.68	→	35.00
	-8.16	→	4.00	-7.62	→	5.50	-3.68	→	47.50
	-3.16	→	55.00	-6.62	→	9.00	-3.68	→	47.50
	-6.16	→	12.50	-3.62	→	50.50	-8.68	→	3.00
B_0	-2.16	→	60.00	-5.62	→	23.50	-5.68	→	20.50
	-5.16	→	28.50	-3.62	→	50.50	-3.68	→	47.50
	-6.16	→	12.50	-5.62	→	23.50	-5.68	→	20.50
	-5.16	→	28.50	-7.62	→	5.50	-5.68	→	20.50
	-5.16	→	28.50	-4.62	→	36.00	-3.68	→	47.50
							-2.68	→	58.00

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.13 depicts the calculation of group and marginal means using the transformed ART rank. These results are also signified in Table 4.14, which displays descriptive statistics involving students' ART scores from the Narrative Comprehension sub-test of the QRI-3 and consists of Mean (*M*), Standard Deviation (*SD*), and number of participants (*N*) organized by treatment group and gender.

Table 4.13
Fourth Grade Narrative Comprehension Adjusted Raw Scores Replaced by Ranks (ART)

	A_2	A_1	A_0	Marginal Mean
B_1	53.00 7.00 53.00 10.50 38.00 25.50 53.00 10.50 25.50 38.00 38.00	56.50 45.00 56.50 1.00 32.50 17.50 32.50 32.50 32.50 17.50	8.00 15.00 15.00 61.00 2.00 42.50 42.50 42.50 15.00 42.50	$\overline{B}_1 = 31.03$
Group Mean	$\overline{AB}_{21} = 32.00$	$\overline{AB}_{11} = 32.40$	$\overline{AB}_{01} = 28.60$	
B_0	40.00 28.50 4.00 55.00 12.50 60.00 28.50 12.50 28.50 28.50	62.00 59.00 5.50 9.00 50.50 23.50 50.50 23.50 5.50 36.00	20.50 35.00 47.50 47.50 3.00 20.50 47.50 20.50 20.50 47.50 58.00	$\overline{B}_0 = 31.97$
Group Mean	$\overline{AB}_{20} = 29.80$	$\overline{AB}_{10} = 32.50$	$\overline{AB}_{00} = 33.46$	
Marginal Mean	$\overline{A}_2 = 30.95$	$\overline{A}_1 = 32.45$	$\overline{A}_0 = 31.14$	$\overline{X} = 31.50$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.14
Descriptive Statistics for Fourth Grade Narrative Comprehension Interactions

Gender	Group	*M*	*SD*	*N*
Female	Storytelling	32.00	17.507	11
	Reading Aloud	32.40	17.481	10
	Silent Reading	28.60	19.747	10
	Total	31.03	17.713	31
Male	Storytelling	29.80	18.019	10
	Reading Aloud	32.50	22.123	10
	Silent Reading	33.46	17.300	11
	Total	31.97	18.614	31
Total	Storytelling	30.95	17.339	21
	Reading Aloud	32.45	19.406	20
	Silent Reading	31.14	18.201	21
	Total	31.50	18.026	62

Close examination of mean results show that males in the Silent Reading treatment level produced the highest overall fourth grade Narrative Comprehension mean result (*M* = 33.46), while females in the same group scored the lowest (*M* = 28.60). With regard to interaction patterns, females in the Reading Aloud treatment level scored the highest Narrative Comprehension mean (*M* = 32.40), followed by females exposed to Storytelling (*M* = 32.00), and lastly females in the Silent Reading group. With males, however, the highest Narrative Comprehension mean was recorded by the students in the Silent Reading group, trailed by the Reading Aloud group (*M* = 32.50) and finally the Storytelling group (*M* = 29.80).

Interaction results for fourth grade students' Narrative Comprehension ART scores are reported in Table 4.15. As previously documented, a 2×3 univariate ANOVA was employed for the analysis, with gender (female, male) and group (Storytelling, Reading Aloud, Storytelling) as between-subjects factors. Univariate outcomes revealed no significant interaction for between-subjects factors (Gender × Group) in

fourth grade students' Narrative Comprehension ($F(2, 56) = .193$, $p = .825$, partial $\eta^2 = .007$).

Table 4.15
Factorial ANOVA Interaction Results for Fourth Grade Narrative Comprehension

Source	Type III Sum of Squares	df	*F*	Sig.	Partial η^2
Gender × Group	135.439	2	.193	.825	.007
Error	19644.627	56			
Total	81340.000	62			

Note. Being irrelevant, main effects are not presented. Alpha (α) = .05.

Based on the analysis of Narrative Comprehension, there is insufficient evidence to reject the claim that there is no significant interaction among two story performance techniques held constant across the factor of gender (H_5).

The same nonparametric procedures previously described for Narrative Comprehension interactions were replicated for Expository Comprehension interactions. Again, student raw scores were initially adjusted by subtracting marginal means from each row and column (Table 4.16 documents how marginal means were calculated using the raw data); this course of action was used to isolate interactions by removing all main effects (as seen in Tables 4.17, 4.18, 4.19, 4.20, 4.21, and 4.22) (Leys & Schumann, 2010; Sawilowsky, 1990, 2000). After that, students' adjusted scores were pooled together to form one set so that ranks could be properly assigned. This outcome was reached by arranging all students' scores in an increasing order, assigning a rank ranging from one to sixty-two, and adapting the rank for all tie values by assigning equal average ranks to each one (Table 4.23). To conclude, a 2×3 factorial ANOVA was computed using the transformed ART dataset.

Table 4.16
Fourth Grade Expository Comprehension Raw Scores

	A_2	A_1	A_0	Marginal Mean
B_1	7 4 7 3 8 6 6 6 6 6 6	6 7 6 1 3 6 7 6 7 7	4 4 6 7 4 7 6 6 4 5	$\overline{B}_1 = 5.61$
Group Mean	$\overline{AB}_{21} = 5.91$	$\overline{AB}_{11} = 5.60$	$\overline{AB}_{01} = 5.30$	
B_0	7 4 4 7 7 8 6 6 4 7	8 8 3 4 4 5 6 6 3 7	7 7 8 4 1 6 6 4 6 6 7	$\overline{B}_0 = 5.68$
Group Mean	$\overline{AB}_{20} = 6.00$	$\overline{AB}_{10} = 5.40$	$\overline{AB}_{00} = 5.64$	
Marginal Mean	$\overline{A}_2 = 5.95$	$\overline{A}_1 = 5.50$	$\overline{A}_0 = 5.48$	$\overline{X} = 5.65$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.17
Calculation of Adjusted Raw Scores of Females Exposed to Storytelling for Fourth Grade Expository Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_2$	-	$\overline{B}_1$	=	Adjusted Raw Score
4	Storytelling	Female	7	-	5.95	-	5.61	=	-4.56
4	Storytelling	Female	4	-	5.95	-	5.61	=	-7.56
4	Storytelling	Female	7	-	5.95	-	5.61	=	-4.56
4	Storytelling	Female	3	-	5.95	-	5.61	=	-8.56
4	Storytelling	Female	8	-	5.95	-	5.61	=	-3.56
4	Storytelling	Female	6	-	5.95	-	5.61	=	-5.56
4	Storytelling	Female	6	-	5.95	-	5.61	=	-5.56
4	Storytelling	Female	6	-	5.95	-	5.61	=	-5.56
4	Storytelling	Female	6	-	5.95	-	5.61	=	-5.56
4	Storytelling	Female	6	-	5.95	-	5.61	=	-5.56
4	Storytelling	Female	6	-	5.95	-	5.61	=	-5.56

Note. $\overline{A}_2$ = Storytelling marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.18
Calculation of Adjusted Raw Scores of Males Exposed to Storytelling for Fourth Grade Expository Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_2$	-	$\overline{B}_0$	=	Adjusted Raw Score
4	Storytelling	Male	7	-	5.95	-	5.68	=	-4.63
4	Storytelling	Male	4	-	5.95	-	5.68	=	-7.63
4	Storytelling	Male	4	-	5.95	-	5.68	=	-7.63
4	Storytelling	Male	7	-	5.95	-	5.68	=	-4.63
4	Storytelling	Male	7	-	5.95	-	5.68	=	-4.63
4	Storytelling	Male	8	-	5.95	-	5.68	=	-3.63
4	Storytelling	Male	6	-	5.95	-	5.68	=	-5.63
4	Storytelling	Male	6	-	5.95	-	5.68	=	-5.63
4	Storytelling	Male	4	-	5.95	-	5.68	=	-7.63
4	Storytelling	Male	7	-	5.95	-	5.68	=	-4.63

Note. $\overline{A}_2$ = Storytelling marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.19
Calculation of Adjusted Raw Scores of Females Exposed to Reading Aloud for Fourth Grade Expository Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_1$	-	$\overline{B}_1$	=	Adjusted Raw Score
4	Reading Aloud	Female	6	-	5.50	-	5.61	=	-5.11
4	Reading Aloud	Female	7	-	5.50	-	5.61	=	-4.11
4	Reading Aloud	Female	6	-	5.50	-	5.61	=	-5.11
4	Reading Aloud	Female	1	-	5.50	-	5.61	=	-10.11
4	Reading Aloud	Female	3	-	5.50	-	5.61	=	-8.11
4	Reading Aloud	Female	6	-	5.50	-	5.61	=	-5.11
4	Reading Aloud	Female	7	-	5.50	-	5.61	=	-4.11
4	Reading Aloud	Female	6	-	5.50	-	5.61	=	-5.11
4	Reading Aloud	Female	7	-	5.50	-	5.61	=	-4.11
4	Reading Aloud	Female	7	-	5.50	-	5.61	=	-4.11

Note. $\overline{A}_1$ = Reading Aloud marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.20
Calculation of Adjusted Raw Scores of Males Exposed to Reading Aloud for Fourth Grade Expository Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_1$	-	$\overline{B}_0$	=	Adjusted Raw Score
4	Reading Aloud	Male	8	-	5.50	-	5.68	=	-3.18
4	Reading Aloud	Male	8	-	5.50	-	5.68	=	-3.18
4	Reading Aloud	Male	3	-	5.50	-	5.68	=	-8.18
4	Reading Aloud	Male	4	-	5.50	-	5.68	=	-7.18
4	Reading Aloud	Male	4	-	5.50	-	5.68	=	-7.18
4	Reading Aloud	Male	5	-	5.50	-	5.68	=	-6.18
4	Reading Aloud	Male	6	-	5.50	-	5.68	=	-5.18
4	Reading Aloud	Male	6	-	5.50	-	5.68	=	-5.18
4	Reading Aloud	Male	3	-	5.50	-	5.68	=	-8.18
4	Reading Aloud	Male	7	-	5.50	-	5.68	=	-4.18

Note. $\overline{A}_1$ = Reading Aloud marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.21
Calculation of Adjusted Raw Scores of Females Exposed to Silent Reading for Fourth Grade Expository Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_0$	-	$\overline{B}_1$	=	Adjusted Raw Score
4	Silent Reading	Female	4	-	5.48	-	5.61	=	-7.09
4	Silent Reading	Female	4	-	5.48	-	5.61	=	-7.09
4	Silent Reading	Female	6	-	5.48	-	5.61	=	-5.09
4	Silent Reading	Female	7	-	5.48	-	5.61	=	-4.09
4	Silent Reading	Female	4	-	5.48	-	5.61	=	-7.09
4	Silent Reading	Female	7	-	5.48	-	5.61	=	-4.09
4	Silent Reading	Female	6	-	5.48	-	5.61	=	-5.09
4	Silent Reading	Female	6	-	5.48	-	5.61	=	-5.09
4	Silent Reading	Female	4	-	5.48	-	5.61	=	-7.09
4	Silent Reading	Female	5	-	5.48	-	5.61	=	-6.09

Note. $\overline{A}_0$ = Silent Reading marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.22
Calculation of Adjusted Raw Scores of Males Exposed to Silent Reading for Fourth Grade Expository Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_0$	-	$\overline{B}_0$	=	Adjusted Raw Score
4	Silent Reading	Male	7	-	5.48	-	5.68	=	-4.16
4	Silent Reading	Male	7	-	5.48	-	5.68	=	-4.16
4	Silent Reading	Male	8	-	5.48	-	5.68	=	-3.16
4	Silent Reading	Male	4	-	5.48	-	5.68	=	-7.16
4	Silent Reading	Male	1	-	5.48	-	5.68	=	-10.16
4	Silent Reading	Male	6	-	5.48	-	5.68	=	-5.16
4	Silent Reading	Male	6	-	5.48	-	5.68	=	-5.16
4	Silent Reading	Male	4	-	5.48	-	5.68	=	-7.16
4	Silent Reading	Male	6	-	5.48	-	5.68	=	-5.16
4	Silent Reading	Male	6	-	5.48	-	5.68	=	-5.16
4	Silent Reading	Male	7	-	5.48	-	5.68	=	-4.16

Note. $\overline{A}_0$ = Silent Reading marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.23
Fourth Grade Expository Comprehension Adjusted Raw Scores Transformed Into Ranks (ART)

	A_2			A_1			A_0		
	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART
	-4.56	→	46.50	-5.11	→	36.50	-7.09	→	16.50
	-7.56	→	10.00	-4.11	→	53.50	-7.09	→	16.50
	-4.56	→	46.50	-5.11	→	36.50	-5.09	→	40.00
	-8.56	→	3.00	-10.11	→	2.00	-4.09	→	56.50
	-3.56	→	59.00	-8.11	→	6.00	-7.09	→	16.50
B_1	-5.56	→	25.50	-5.11	→	36.50	-4.09	→	56.50
	-5.56	→	25.50	-4.11	→	53.50	-5.09	→	40.00
	-5.56	→	25.50	-5.11	→	36.50	-5.09	→	40.00
	-5.56	→	25.50	-4.11	→	53.50	-7.09	→	16.50
	-5.56	→	25.50	-4.11	→	53.50	-6.09	→	20.00
	-5.56	→	25.50						
	-4.63	→	43.50	-3.18	→	60.50	-4.16	→	50.00
	-7.63	→	8.00	-3.18	→	60.50	-4.16	→	50.00
	-7.63	→	8.00	-8.18	→	4.50	-3.16	→	62.00
	-4.63	→	43.50	-7.18	→	11.50	-7.16	→	13.50
	-4.63	→	43.50	-7.18	→	11.50	-10.16	→	1.00
B_0	-3.63	→	58.00	-6.18	→	19.00	-5.16	→	32.50
	-5.63	→	21.50	-5.18	→	29.50	-5.16	→	32.50
	-5.63	→	21.50	-5.18	→	29.50	-7.16	→	13.50
	-7.63	→	8.00	-8.18	→	4.50	-5.16	→	32.50
	-4.63	→	43.50	-4.18	→	48.00	-5.16	→	32.50
							-4.16	→	50.00

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.24 shows the calculation of group and marginal means using the transformed ART ranks. These results are also represented in Table 4.25, which displays descriptive statistics involving students' ART scores from the Expository Comprehension sub-test of the QRI-3 and consists of Mean (*M*), Standard Deviation (*SD*), and number of participants (*N*) organized by treatment group and gender.

Table 4.24
Fourth Grade Expository Comprehension Adjusted Raw Scores Replaced by Ranks (ART)

	A_2	A_1	A_0	Marginal Mean
B_1	46.50 10.00 46.50 3.00 59.00 25.50 25.50 25.50 25.50 25.50 25.50	36.50 53.50 36.50 2.00 6.00 36.50 53.50 36.50 53.50 53.50	16.50 16.50 40.00 56.50 16.50 56.50 40.00 40.00 16.50 20.00	$\overline{B}_1 = 32.42$
Group Mean	$\overline{AB}_{21} = 28.91$	$\overline{AB}_{11} = 36.80$	$\overline{AB}_{01} = 31.90$	
B_0	43.50 8.00 8.00 43.50 43.50 58.00 21.50 21.50 8.00 43.50	60.50 60.50 4.50 11.50 11.50 19.00 29.50 29.50 4.50 48.00	50.00 50.00 62.00 13.50 1.00 32.50 32.50 13.50 32.50 32.50 50.00	$\overline{B}_0 = 30.58$
Group Mean	$\overline{AB}_{20} = 29.90$	$\overline{AB}_{10} = 27.90$	$\overline{AB}_{00} = 33.64$	
Marginal Mean	$\overline{A}_2 = 29.38$	$\overline{A}_1 = 32.35$	$\overline{A}_0 = 32.81$	$\overline{X} = 31.50$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.25
Descriptive Statistics for Fourth Grade Expository Comprehension Interactions

Gender	Group	*M*	*SD*	*N*
Female	Storytelling	28.91	16.195	11
	Reading Aloud	36.80	19.078	10
	Silent Reading	31.90	16.658	10
	Total	32.42	17.055	31
Male	Storytelling	29.90	18.587	10
	Reading Aloud	27.90	21.723	10
	Silent Reading	33.64	18.679	11
	Total	30.58	19.170	31
Total	Storytelling	29.38	16.937	21
	Reading Aloud	32.35	20.415	20
	Silent Reading	32.81	17.324	21
	Total	31.50	18.018	62

Careful inspection of Expository Comprehension mean results show that females exposed to Reading Aloud attained the highest overall fourth grade result (*M* = 36.80), while males in the same group produced the lowest (*M* = 27.90). As for interaction patterns, note that females in the Reading Aloud treatment level scored the highest Expository Comprehension mean (*M* = 36.80), followed by females exposed to Silent Reading (*M* = 32.00) and females exposed to Storytelling (*M* = 28.91). With regard to males, though, the highest Expository Comprehension mean was produced by the Silent Reading group (*M* = 33.64), trailed by the Storytelling group (*M* = 29.90) and lastly the Reading Aloud group (*M* = 27.90). Incidentally, female students exposed to Reading Aloud produced the highest Narrative (*M* = 32.40) and Expository (*M* = 36.80) Comprehension results for their respective gender. Likewise, male students exposed to Silent Reading also produced the highest Narrative (*M* = 33.46) and Expository (*M* = 33.64) Comprehension results for their own gender.

Interaction outcomes for fourth grade students' Expository Comprehension ART scores are reported in Table 4.26. Similar to that of Narrative Comprehension, a 2×3 univariate ANOVA was used for the analyses, with gender (female, male) and group (Storytelling, Reading Aloud, Storytelling) as between-subjects factors. Results show no significant interaction for between-subjects factors (Gender × Group) in fourth grade students' Expository Comprehension ($F(2, 56) = .521$, $p = .597$, partial $\eta^2 = .018$).

Table 4.26
Factorial ANOVA Interaction Results for Fourth Grade Expository Comprehension

Source	Type III Sum of Squares	df	*F*	Sig.	Partial η^2
Gender × Group	357.998	2	.521	.597	.018
Error	19241.255	56			
Total	81322.500	62			

Note. Being irrelevant, main effects are not presented. Alpha (α) = .05.

Due to the aforesaid data analysis, there is insufficient evidence to reject the claim that there is no significant interaction among two story performance techniques held constant across the factor of gender (H_5).

Nonparametric Analysis of Main Effects for Fourth Grade Narrative and Expository Comprehension

Main effect results for fourth grade Narrative and Expository Comprehension were evaluated through one-way Kruskal-Wallis H and Wilcoxon Rank-Sum (Mann-Whitney U) tests. The Kruskal-Wallis H test, which is a nonparametric test equivalent to a one-way ANOVA, was selected to compare three or more sets of scores that come from different groups. It also permits the assessment of more than two independent groups. If significant differences between cell means are detected using the Kruskal-Wallis H test, post hoc Wilcoxon Rank-Sum (Mann-Whitney U) tests will be employed.

This nonparametric procedure will test hypotheses H_1 and H_3 and determine the location of any significant differences.

Before running the analysis, the Blair-Sawilowsky Salter-Fawcett adjusted rank transformation test (ART) procedure for main effects was carried out for both Narrative and Expository Comprehension datasets (please see Table 4.5 for Narrative Comprehension and 4.16 for Expository Comprehension group and marginal mean computations). This technique involved isolating main effects by subtracting the interaction from the raw data (Leys & Schumann, 2010; Sawilowsky, 1990, 2000). In order for main effects to be calculated without being affected by the interaction (Figure 4.2), the interaction (i.e., $\rightarrow \frac{5.45 + 4.70 + 4.82}{3}$ = 4.99) was deducted from each raw score by subtracting $\frac{\overline{AB}_{21} + \overline{AB}_{10} + \overline{AB}_{00}}{3}$, the mean of the three diagonal group means (please see Narrative Comprehension Tables 4.27, 4.28, 4.29, 4.30, 4.31, and 4.32; Expository Comprehension Tables 4.35, 4.36, 4.37, 4.38, 4.39, and 4.40). Next, students' adjusted raw scores were pooled together to form one set so that ranks could be properly assigned (please see Narrative Comprehension Table 4.33; Expository Comprehension Table 4.41). This outcome was reached by arranging all students' scores in an increasing order, assigning a rank ranging from one to sixty-two, and adapting the rank for all tie values by assigning equal average ranks to each one. Finally, one-way Kruskal-Wallis H and, if necessary, post hoc Wilcoxon Rank-Sum (Mann-Whitney U) tests were computed using the transformed ART scores.

Figure 4.2
Blair-Sawilowsky Salter-Fawcett Adjusted Rank Transformation Test (ART) Procedure for Fourth and Fifth Grade Narrative and Expository Comprehension/Oral Reading Fluency Main Effects

	A_2	A_1	A_0
B_1	Female raw scores - $\frac{\overline{AB}_{21} + \overline{AB}_{10} + \overline{AB}_{00}}{3}$	Female raw scores - $\frac{\overline{AB}_{11} + \overline{AB}_{20} + \overline{AB}_{00}}{3}$	Female raw scores - $\frac{\overline{AB}_{01} + \overline{AB}_{10} + \overline{AB}_{20}}{3}$
Group Mean =	$\overline{AB}_{21}$	$\overline{AB}_{11}$	$\overline{AB}_{01}$
B_0	Male raw scores - $\frac{\overline{AB}_{20} + \overline{AB}_{11} + \overline{AB}_{01}}{3}$	Male raw scores - $\frac{\overline{AB}_{10} + \overline{AB}_{21} + \overline{AB}_{01}}{3}$	Male raw scores - $\frac{\overline{AB}_{00} + \overline{AB}_{11} + \overline{AB}_{21}}{3}$
Group Mean =	$\overline{AB}_{20}$	$\overline{AB}_{10}$	$\overline{AB}_{00}$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading. B_1 = Female. B_0 = Male

Table 4.27
Calculation of Adjusted Raw Scores of Females Exposed to Storytelling for Fourth Grade Narrative Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{21} + \overline{AB}_{10} + \overline{AB}_{00}}{3}$	=	Adjusted Raw Score
4	Storytelling	Female	7	-	4.99	=	2.01
4	Storytelling	Female	3	-	4.99	=	-1.99
4	Storytelling	Female	7	-	4.99	=	2.01
4	Storytelling	Female	4	-	4.99	=	-0.99
4	Storytelling	Female	6	-	4.99	=	1.01
4	Storytelling	Female	5	-	4.99	=	0.01
4	Storytelling	Female	7	-	4.99	=	2.01
4	Storytelling	Female	4	-	4.99	=	-0.99
4	Storytelling	Female	5	-	4.99	=	0.01
4	Storytelling	Female	6	-	4.99	=	1.01
4	Storytelling	Female	6	-	4.99	=	1.01

Note. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{00}$ = Group mean of males Exposed to Silent Reading.

Table 4.28
Calculation of Adjusted Raw Scores of Males Exposed to Storytelling for Fourth Grade Narrative Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{20} + \overline{AB}_{11} + \overline{AB}_{01}}{3}$	=	Adjusted Raw Score
4	Storytelling	Male	6	-	4.90	=	1.10
4	Storytelling	Male	5	-	4.90	=	0.10
4	Storytelling	Male	2	-	4.90	=	-2.90
4	Storytelling	Male	7	-	4.90	=	2.10
4	Storytelling	Male	4	-	4.90	=	-0.90
4	Storytelling	Male	8	-	4.90	=	3.10
4	Storytelling	Male	5	-	4.90	=	0.10
4	Storytelling	Male	4	-	4.90	=	-0.90
4	Storytelling	Male	5	-	4.90	=	0.10
4	Storytelling	Male	5	-	4.90	=	0.10

Note. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading.

Table 4.29
Calculation of Adjusted Raw Scores of Females Exposed to Reading Aloud for Fourth Grade Narrative Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{11} + \overline{AB}_{20} + \overline{AB}_{00}}{3}$	=	Adjusted Raw Score
4	Reading Aloud	Female	7	-	4.91	=	2.09
4	Reading Aloud	Female	6	-	4.91	=	1.09
4	Reading Aloud	Female	7	-	4.91	=	2.09
4	Reading Aloud	Female	0	-	4.91	=	-4.91
4	Reading Aloud	Female	5	-	4.91	=	0.09
4	Reading Aloud	Female	4	-	4.91	=	-0.91
4	Reading Aloud	Female	5	-	4.91	=	0.09
4	Reading Aloud	Female	5	-	4.91	=	0.09
4	Reading Aloud	Female	5	-	4.91	=	0.09
4	Reading Aloud	Female	4	-	4.91	=	-0.91

Note. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling. $\overline{AB}_{00}$ = Group mean of males exposed to Silent Reading.

Table 4.30
Calculation of Adjusted Raw Scores of Males Exposed to Reading Aloud for Fourth Grade Narrative Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{10} + \overline{AB}_{21} + \overline{AB}_{01}}{3}$	=	Adjusted Raw Score
4	Reading Aloud	Male	8	-	4.98	=	3.02
4	Reading Aloud	Male	7	-	4.98	=	2.02
4	Reading Aloud	Male	2	-	4.98	=	-2.98
4	Reading Aloud	Male	3	-	4.98	=	-1.98
4	Reading Aloud	Male	6	-	4.98	=	1.02
4	Reading Aloud	Male	4	-	4.98	=	-0.98
4	Reading Aloud	Male	6	-	4.98	=	1.02
4	Reading Aloud	Male	4	-	4.98	=	-0.98
4	Reading Aloud	Male	2	-	4.98	=	-2.98
4	Reading Aloud	Male	5	-	4.98	=	0.02

Note. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading.

Table 4.31
Calculation of Adjusted Raw Scores of Females Exposed to Silent Reading for Fourth Grade Narrative Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{01} + \overline{AB}_{10} + \overline{AB}_{20}}{3}$	=	Adjusted Raw Score
4	Silent Reading	Female	3	-	4.87	=	-1.87
4	Silent Reading	Female	4	-	4.87	=	-0.87
4	Silent Reading	Female	4	-	4.87	=	-0.87
4	Silent Reading	Female	8	-	4.87	=	3.13
4	Silent Reading	Female	1	-	4.87	=	-3.87
4	Silent Reading	Female	6	-	4.87	=	1.13
4	Silent Reading	Female	6	-	4.87	=	1.13
4	Silent Reading	Female	6	-	4.87	=	1.13
4	Silent Reading	Female	4	-	4.87	=	-0.87
4	Silent Reading	Female	6	-	4.87	=	1.13

Note. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling.

Table 4.32
Calculation of Adjusted Raw Scores of Males Exposed to Silent Reading for Fourth Grade Narrative Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{00} + \overline{AB}_{11} + \overline{AB}_{21}}{3}$	=	Adjusted Raw Score
4	Silent Reading	Male	4	-	5.02	=	-1.02
4	Silent Reading	Male	5	-	5.02	=	-0.02
4	Silent Reading	Male	6	-	5.02	=	0.98
4	Silent Reading	Male	6	-	5.02	=	0.98
4	Silent Reading	Male	1	-	5.02	=	-4.02
4	Silent Reading	Male	4	-	5.02	=	-1.02
4	Silent Reading	Male	6	-	5.02	=	0.98
4	Silent Reading	Male	4	-	5.02	=	-1.02
4	Silent Reading	Male	4	-	5.02	=	-1.02
4	Silent Reading	Male	6	-	5.02	=	0.98
4	Silent Reading	Male	7	-	5.02	=	1.98

Note. $\overline{AB}_{00}$ = Group mean of males exposed to Silent Reading. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling.

Table 4.33
Fourth Grade Narrative Comprehension Adjusted Raw Scores Transformed Into Ranks (ART)

	A_2			A_1			A_0		
	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART
	2.01	→	54.00	2.09	→	57.50	-1.87	→	9.00
	-1.99	→	7.00	1.09	→	46.00	-0.87	→	23.00
	2.01	→	54.00	2.09	→	57.50	-0.87	→	23.00
	-0.99	→	14.50	-4.91	→	1.00	3.13	→	62.00
	1.01	→	42.00	0.09	→	30.50	-3.87	→	3.00
B_1	0.01	→	26.50	-0.91	→	18.50	1.13	→	49.50
	2.01	→	54.00	0.09	→	30.50	1.13	→	49.50
	-0.99	→	14.50	0.09	→	30.50	1.13	→	49.50
	0.01	→	26.50	0.09	→	30.50	-0.87	→	23.00
	1.01	→	42.00	-0.91	→	18.50	1.13	→	49.50
	1.01	→	42.00						
	1.10	→	47.00	3.02	→	60.00	-1.02	→	11.50
	0.10	→	34.50	2.02	→	56.00	-0.02	→	25.00
	-2.90	→	6.00	-2.98	→	4.50	0.98	→	38.50
	2.10	→	59.00	-1.98	→	8.00	0.98	→	38.50
	-0.90	→	20.50	1.02	→	44.50	-4.02	→	2.00
B_0	3.10	→	61.00	-0.98	→	16.50	-1.02	→	11.50
	0.10	→	34.50	1.02	→	44.50	0.98	→	38.50
	-0.90	→	20.50	-0.98	→	16.50	-1.02	→	11.50
	0.10	→	34.50	-2.98	→	4.50	-1.02	→	11.50
	0.10	→	34.50	0.02	→	28.00	0.98	→	38.50
							1.98	→	52.00

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.34
Fourth Grade Narrative Comprehension Adjusted Raw Scores Replaced by Ranks (ART)

	A_2	A_1	A_0	Marginal Mean
B_1	54.00 7.00 54.00 14.50 42.00 26.50 54.00 14.50 26.50 42.00 42.00	57.50 46.00 57.50 1.00 30.50 18.50 30.50 30.50 30.50 18.50	9.00 23.00 23.00 62.00 3.00 49.50 49.50 49.50 23.00 49.50	$\overline{B}_1 = 33.52$
Group Mean	$\overline{AB}_{21} = 34.27$	$\overline{AB}_{11} = 32.10$	$\overline{AB}_{01} = 34.10$	
B_0	47.00 34.50 6.00 59.00 20.50 61.00 34.50 20.50 34.50 34.50	60.00 56.00 4.50 8.00 44.50 16.50 44.50 16.50 4.50 28.00	11.50 25.00 38.50 38.50 2.00 11.50 38.50 11.50 11.50 38.50 52.00	$\overline{B}_0 = 29.48$
Group Mean	$\overline{AB}_{20} = 35.20$	$\overline{AB}_{10} = 28.30$	$\overline{AB}_{00} = 25.36$	
Marginal Mean	$\overline{A}_2 = 34.71$	$\overline{A}_1 = 30.20$	$\overline{A}_0 = 29.52$	$\overline{X} = 31.50$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.35
Calculation of Adjusted Raw Scores of Females Exposed to Storytelling for Fourth Grade Expository Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{21} + \overline{AB}_{10} + \overline{AB}_{00}}{3}$	=	Adjusted Raw Score
4	Storytelling	Female	7	-	5.65	=	1.35
4	Storytelling	Female	4	-	5.65	=	-1.65
4	Storytelling	Female	7	-	5.65	=	1.35
4	Storytelling	Female	3	-	5.65	=	-2.65
4	Storytelling	Female	8	-	5.65	=	2.35
4	Storytelling	Female	6	-	5.65	=	0.35
4	Storytelling	Female	6	-	5.65	=	0.35
4	Storytelling	Female	6	-	5.65	=	0.35
4	Storytelling	Female	6	-	5.65	=	0.35
4	Storytelling	Female	6	-	5.65	=	0.35
4	Storytelling	Female	6	-	5.65	=	0.35

Note. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{00}$ = Group mean of males Exposed to Silent Reading.

Table 4.36
Calculation of Adjusted Raw Scores of Males Exposed to Storytelling for Fourth Grade Expository Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{20} + \overline{AB}_{11} + \overline{AB}_{01}}{3}$	=	Adjusted Raw Score
4	Storytelling	Male	7	-	5.63	=	1.37
4	Storytelling	Male	4	-	5.63	=	-1.63
4	Storytelling	Male	4	-	5.63	=	-1.63
4	Storytelling	Male	7	-	5.63	=	1.37
4	Storytelling	Male	7	-	5.63	=	1.37
4	Storytelling	Male	8	-	5.63	=	2.37
4	Storytelling	Male	6	-	5.63	=	0.37
4	Storytelling	Male	6	-	5.63	=	0.37
4	Storytelling	Male	4	-	5.63	=	-1.63
4	Storytelling	Male	7	-	5.63	=	1.37

Note. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading.

Table 4.37
Calculation of Adjusted Raw Scores of Females Exposed to Reading Aloud for Fourth Grade Expository Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{11} + \overline{AB}_{20} + \overline{AB}_{00}}{3}$	=	Adjusted Raw Score
4	Reading Aloud	Female	6	-	5.75	=	0.25
4	Reading Aloud	Female	7	-	5.75	=	1.25
4	Reading Aloud	Female	6	-	5.75	=	0.25
4	Reading Aloud	Female	1	-	5.75	=	-4.75
4	Reading Aloud	Female	3	-	5.75	=	-2.75
4	Reading Aloud	Female	6	-	5.75	=	0.25
4	Reading Aloud	Female	7	-	5.75	=	1.25
4	Reading Aloud	Female	6	-	5.75	=	0.25
4	Reading Aloud	Female	7	-	5.75	=	1.25
4	Reading Aloud	Female	7	-	5.75	=	1.25

Note. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling. $\overline{AB}_{00}$ = Group mean of males exposed to Silent Reading.

Table 4.38
Calculation of Adjusted Raw Scores of Males Exposed to Reading Aloud for Fourth Grade Expository Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{10} + \overline{AB}_{21} + \overline{AB}_{01}}{3}$	=	Adjusted Raw Score
4	Reading Aloud	Male	8	-	5.54	=	2.46
4	Reading Aloud	Male	8	-	5.54	=	2.46
4	Reading Aloud	Male	3	-	5.54	=	-2.54
4	Reading Aloud	Male	4	-	5.54	=	-1.54
4	Reading Aloud	Male	4	-	5.54	=	-1.54
4	Reading Aloud	Male	5	-	5.54	=	-0.54
4	Reading Aloud	Male	6	-	5.54	=	0.46
4	Reading Aloud	Male	6	-	5.54	=	0.46
4	Reading Aloud	Male	3	-	5.54	=	-2.54
4	Reading Aloud	Male	7	-	5.54	=	1.46

Note. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading.

Table 4.39
Calculation of Adjusted Raw Scores of Females Exposed to Silent Reading for Fourth Grade Expository Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{01} + \overline{AB}_{10} + \overline{AB}_{20}}{3}$	=	Adjusted Raw Score
4	Silent Reading	Female	4	-	5.57	=	-1.57
4	Silent Reading	Female	4	-	5.57	=	-1.57
4	Silent Reading	Female	6	-	5.57	=	0.43
4	Silent Reading	Female	7	-	5.57	=	1.43
4	Silent Reading	Female	4	-	5.57	=	-1.57
4	Silent Reading	Female	7	-	5.57	=	1.43
4	Silent Reading	Female	6	-	5.57	=	0.43
4	Silent Reading	Female	6	-	5.57	=	0.43
4	Silent Reading	Female	4	-	5.57	=	-1.57
4	Silent Reading	Female	5	-	5.57	=	-0.57

Note. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling.

Table 4.40
Calculation of Adjusted Raw Scores of Males Exposed to Silent Reading for Fourth Grade Expository Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{00} + \overline{AB}_{11} + \overline{AB}_{21}}{3}$	=	Adjusted Raw Score
4	Silent Reading	Male	7	-	5.72	=	1.28
4	Silent Reading	Male	7	-	5.72	=	1.28
4	Silent Reading	Male	8	-	5.72	=	2.28
4	Silent Reading	Male	4	-	5.72	=	-1.72
4	Silent Reading	Male	1	-	5.72	=	-4.72
4	Silent Reading	Male	6	-	5.72	=	0.28
4	Silent Reading	Male	6	-	5.72	=	0.28
4	Silent Reading	Male	4	-	5.72	=	-1.72
4	Silent Reading	Male	6	-	5.72	=	0.28
4	Silent Reading	Male	6	-	5.72	=	0.28
4	Silent Reading	Male	7	-	5.72	=	1.28

Note. $\overline{AB}_{00}$ = Group mean of males exposed to Silent Reading. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling.

Table 4.41
Fourth Grade Expository Comprehension Adjusted Raw Scores Transformed Into Ranks (ART)

	A_2			A_1			A_0		
	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART
	1.35	→	49.50	0.25	→	22.50	-1.57	→	14.50
	-1.65	→	9.00	1.25	→	43.50	-1.57	→	14.50
	1.35	→	49.50	0.25	→	22.50	0.43	→	38.00
	-2.65	→	4.00	-4.75	→	1.00	1.43	→	55.50
	2.35	→	59.00	-2.75	→	3.00	-1.57	→	14.50
B_1	0.35	→	31.50	0.25	→	22.50	1.43	→	55.50
	0.35	→	31.50	1.25	→	43.50	0.43	→	38.00
	0.35	→	31.50	0.25	→	22.50	0.43	→	38.00
	0.35	→	31.50	1.25	→	43.50	-1.57	→	14.50
	0.35	→	31.50	1.25	→	43.50	-0.57	→	19.00
	0.35	→	31.50						
	1.37	→	52.50	2.46	→	61.50	1.28	→	47.00
	-1.63	→	11.00	2.46	→	61.50	1.28	→	47.00
	-1.63	→	11.00	-2.54	→	5.50	2.28	→	58.00
	1.37	→	52.50	-1.54	→	17.50	-1.72	→	7.50
	1.37	→	52.50	-1.54	→	17.50	-4.72	→	2.00
B_0	2.37	→	60.00	-0.54	→	20.00	0.28	→	26.50
	0.37	→	35.50	0.46	→	40.50	0.28	→	26.50
	0.37	→	35.50	0.46	→	40.50	-1.72	→	7.50
	-1.63	→	11.00	-2.54	→	5.50	0.28	→	26.50
	1.37	→	52.50	1.46	→	57.00	0.28	→	26.50
							1.28	→	47.00

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.42
Fourth Grade Expository Comprehension Adjusted Raw Scores Replaced by Ranks (ART)

	A_2	A_1	A_0	Marginal Mean
B_1	49.50 9.00 49.50 4.00 59.00 31.50 31.50 31.50 31.50 31.50 31.50	22.50 43.50 22.50 1.00 3.00 22.50 43.50 22.50 43.50 43.50	14.50 14.50 38.00 55.50 14.50 55.50 38.00 38.00 14.50 19.00	$\overline{B}_1 = 30.00$
Group Mean	$\overline{AB}_{21} = 32.73$	$\overline{AB}_{11} = 26.80$	$\overline{AB}_{01} = 30.20$	
B_0	52.50 11.00 11.00 52.50 52.50 60.00 35.50 35.50 11.00 52.50	61.50 61.50 5.50 17.50 17.50 20.00 40.50 40.50 5.50 57.00	47.00 47.00 58.00 7.50 2.00 26.50 26.50 7.50 26.50 26.50 47.00	$\overline{B}_0 = 33.00$
Group Mean	$\overline{AB}_{20} = 37.40$	$\overline{AB}_{10} = 32.70$	$\overline{AB}_{00} = 29.27$	
Marginal Mean	$\overline{A}_2 = 34.95$	$\overline{A}_1 = 29.75$	$\overline{A}_0 = 29.71$	$\overline{X} = 31.50$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Calculation results of group means using the transformed ART ranks for Narrative and Expository Comprehension are shown in Tables 4.34 and 4.42. These results are also denoted in Table 4.43, where fourth grade case summaries by group for Narrative and Expository Comprehension main effects are presented. A review of the

mean scores exposes an interesting pattern. Students exposed to Storytelling (*M* = 34.71) achieved the highest mean score for Narrative Comprehension, followed by students exposed to Reading Aloud (*M* = 30.20), then by students exposed to Silent Reading (*M* = 29.52). Interestingly enough, this pattern of highest to lowest mean scores was the same for Expository Comprehension, where students exposed to Storytelling (*M* = 34.95) produced a higher Expository Comprehension score than students exposed to Reading Aloud (*M* = 29.75) and Silent Reading (*M* = 29.71).

Table 4.43
Fourth Grade Case Summaries by Group for Narrative and Expository Comprehension

Group		Narrative Comprehension	Expository Comprehension
Storytelling	N	21	21
	Mean	34.71	34.95
	Std. Deviation	16.813	17.728
Reading Aloud	N	20	20
	Mean	30.20	29.75
	Std. Deviation	19.227	19.290
Silent Reading	N	21	21
	Mean	29.52	29.71
	Std. Deviation	18.450	17.420
Total	N	62	62
	Mean	31.50	31.50
	Std. Deviation	18.026	18.018

Kruskal Wallis H test results reveal no significant main effect of group on fourth grade Narrative (H(2) = 1.024, *P* = .599) and Expository (H(2) = 1.166, *P* = .558) Comprehension (Table 4.44). As a result, there is insufficient evidence to reject the claim that there is no difference in fourth grade students' reading comprehension of narrative and expository texts as a result of employing two story performance techniques (H_1). Furthermore, there is insufficient evidence to reject the claim that there

is no difference in fourth grade students' reading comprehension of narrative and expository texts due to the effects of a teacher's telling and a teacher's reading aloud of twenty-eight stories to the students (H_3).

Table 4.44
Kruskal Wallis H Test Results by Group for Fourth Grade Narrative and Expository Comprehension Main Effects

	Narrative Comprehension	Expository Comprehension
Chi-Square	1.024	1.166
df	2	2
Asymp. Sig.	.599	.558

Note. Alpha (α) = .10.

As previously indicated, calculation of group means using the transformed ART ranks for Narrative and Expository Comprehension are revealed in Tables 4.34 and 4.42. Furthermore, these results are also represented in Table 4.45, where fourth grade case summaries by gender for Narrative and Expository Comprehension main effects are offered. Narrative Comprehension case summaries show that female participants had the highest overall mean (M = 33.52) when compared to males (M = 29.48). By contrast, males had the highest overall Expository Comprehension mean value (M = 33.00) in contrast to their female peers (M = 30.00). Also note that females produced a higher mean result for Narrative Comprehension (M = 33.52) than Expository Comprehension (M = 30.00). Conversely, male participants achieved a higher mean value in Expository Comprehension (M = 33.00) as opposed to Narrative Comprehension (M = 29.48).

Table 4.45
Fourth Grade Case Summaries by Gender for Narrative and Expository Comprehension Main Effects

Gender		Narrative Comprehension	Expository Comprehension
Female	N	31	31
	Mean	33.52	30.00
	Std. Deviation	17.840	16.156
Male	N	31	31
	Mean	29.48	33.00
	Std. Deviation	18.276	19.860
Total	N	62	62
	Mean	31.50	31.50
	Std. Deviation	18.026	18.018

Kruskal Wallis H test results reveal no significant main effect of gender on fourth grade Narrative (H(1) = .776, *P* = .378) and Expository (H(1) = .430, *P* = .512) Comprehension. Because of this, there is insufficient evidence to reject the claim that there is no difference in fourth grade students' reading comprehension of narrative and expository texts as a result of employing two story performance techniques irrespective of a student's gender *(H_1)*. What's more, there is insufficient evidence to reject the claim that there is no difference in fourth grade students' reading comprehension of narrative and expository texts due to the effects of a teacher's telling and a teacher's reading aloud of twenty-eight stories to the students irrespective of their gender *(H_3)* (Table 4.46).

Table 4.46
Kruskal Wallis H Test Results by Gender for Fourth Grade Narrative and Expository Comprehension Main Effects

	Narrative Comprehension	Expository Comprehension
Chi-Square	.776	.430
df	1	1
Asymp. Sig.	.378	.512

Note. Alpha (α) = .10.

Parametric Analysis (MANOVA) of Fourth Grade Narrative and Expository Oral Reading Fluency

Table 4.47 presents descriptive statistics involving students' scores on the Narrative Oral Reading Fluency sub-test of the QRI-3 including the Mean (*M*), Standard Deviation (*SD*), and number of participants (*N*) organized by treatment group and gender.

Table 4.47
Fourth Grade Narrative Oral Reading Fluency Descriptive Statistics

QRI-3 Assessment	Group	Gender	*M*	*SD*	*N*
Narrative Fluency	Storytelling	Female	113.00	44.786	11
		Male	106.30	25.953	10
		Total	109.81	36.301	21
	Reading Aloud	Female	123.30	33.748	10
		Male	117.20	25.455	10
		Total	120.25	29.261	20
	Silent Reading	Female	114.50	33.791	10
		Male	105.64	34.018	11
		Total	109.86	33.362	21
	Total	Female	116.81	37.067	31
		Male	109.58	28.475	31
		Total	113.19	32.981	62

Descriptive statistics for fourth grade Narrative Oral Reading Fluency show that students exposed to Reading Aloud achieved the highest Narrative Oral Reading Fluency mean (*M* = 120.25) followed by students exposed to Silent Reading (*M* = 109.86), then students exposed to Storytelling (*M* = 109.81). Note that female participants produced a higher overall mean result (*M* = 116.81) than males (*M* = 109.58). With regard to all treatment levels of students by gender, female participants exposed to Reading Aloud produced the highest Narrative Oral Reading Fluency result (*M* = 123.30), followed by males of the same group (*M* = 117.20). Similarly, females also produced higher averages than their male peers in the Silent Reading (a mean score of 114.50 as compared to 105.64) and Storytelling (a mean score of 113.00 as compared to 106.30) groups. Additionally, note that males exposed to Silent Reading produced the lowest Narrative Oral Reading Fluency sub-test result (*M* = 105.64).

Table 4.48 presents descriptive statistics involving students' scores on the Expository Oral Reading Fluency sub-test of the QRI-3 including the Mean (*M*), Standard Deviation (*SD*), and number of participants (*N*) organized by treatment group and gender.

Table 4.48
Fourth Grade Expository Oral Reading Fluency Descriptive Statistics

QRI-3 Assessment	Group	Gender	*M*	*SD*	*N*
Expository Fluency	Storytelling	Female	99.91	33.804	11
		Male	95.10	21.278	10
		Total	97.62	27.949	21
	Reading Aloud	Female	105.50	22.337	10
		Male	103.20	19.060	10
		Total	104.35	20.244	20
	Silent Reading	Female	105.30	26.899	10
		Male	94.36	27.034	11
		Total	99.57	26.877	21
	Total	Female	103.45	27.473	31
		Male	97.45	22.468	31
		Total	100.45	25.072	62

Mean scores for fourth grade Expository Oral Reading Fluency features an aggregate result of 100.45, which is lower than the previously cited Narrative Oral Reading Fluency mean (*M* = 113.19). As with Narrative Oral Reading Fluency, female participants (*M* = 103.45) attained mean scores higher than their male counterparts (*M* = 97.45) in Expository Oral Reading Fluency. Further review of the mean scores also demonstrates that students exposed to Reading Aloud (*M* = 104.35) attained an overall higher score than students exposed to Silent Reading (*M* = 99.57) and Storytelling (*M* = 97.62). Identical findings were discovered with Narrative Oral Reading Fluency. Once more, note that the Silent Reading group's mean score was slightly higher than that of the Storytelling group. As with Narrative Oral Reading Fluency, female participants exposed to Reading Aloud produced the highest Expository Oral Reading Fluency score (*M* = 105.50), closely trailed by females in the Silent Reading set (*M* = 105.30). Another noteworthy outcome is that females achieved higher results than their male peers in

each of the three treatment levels. Finally, males exposed to Storytelling produced the lowest Expository Oral Reading Fluency result (*M* = 97.62).

In order to find out if the differences between any of the Narrative and Expository Oral Reading Fluency mean scores of the groups was statistically significant, MANOVA was employed with gender (female, male) and treatment (Storytelling, Reading Aloud, and Silent Reading) serving as between-subjects factors (Table 4.49).

The multivariate main effect of gender on fourth grade Narrative and Expository Oral Reading Fluency was not significant ($F(4, 53) = .338$, $p = .851$, partial $\eta^2 = .025$). Similarly, multivariate results also show no a significant main effect of group ($F(8, 108) = .747$, $p = .650$, partial $\eta^2 = .052$) on fourth grade Narrative and Expository Oral Reading Fluency. Finally, there was no significant multivariate interaction between gender and treatment ($F(8, 108) = .425$, $p = .904$, partial $\eta^2 = .030$).

Table 4.49
Multivariate and Univariate Analyses of Variance for Fourth Grade Oral Reading Fluency

				Univariate					
	Multivariate			Narrative Fluency			Expository Fluency		
Source	F[c,d]	p	Partial η^2	F[e,f]	p	Partial η^2	F[e,f]	p	Partial η^2
Gender (G)[a]	.338	.851	.025	.705	.405	.012	.845	.362	.015
Group (Gr.)[a]	.747	.650	.052	.640	.531	.022	.373	.690	.013
G × Gr.[b]	.425	.904	.030	.010	.991	.000	.154	.858	.005

Note. Multivariate *F* ratios were generated from Pillai's Trace. [a]Alpha (α) = .10. [b]Alpha (α) = .05. [c]Multivariate df for G = 4, 53. [d]Multivariate df for Gr. and G × Gr. = 8, 108. [e]Univariate df for G = 1, 56. [f]Univariate df for Gr. and G × Gr. = 2, 56.

Univariate main effect results of gender on fourth grade Narrative ($F(1, 56) = .705$, $p = .405$, partial $\eta^2 = .012$) and Expository ($F(1, 56) = .845$, $p = .362$, partial $\eta^2 = .015$) Oral Reading Fluency were not significant. Similarly, univariate results also show no significant main effect of group on fourth grade Narrative ($F(2, 56) = .640$, $p = .531$, partial $\eta^2 = .022$) and Expository ($F(2, 56) = .373$, $p = .690$, partial $\eta^2 = .013$) Oral

Reading Fluency. Lastly, there was no significant univariate interaction between gender and treatment in fourth grade Narrative $F(2, 56) = .010$, $p = .991$, partial $\eta^2 = .000$) and Expository $F(2, 56) = .154$, $p = .858$, partial $\eta^2 = .005$) Oral Reading Fluency.

On the basis of the MANOVA analysis, there is insufficient evidence to reject the claim that there is no difference in fourth grade students' oral reading fluency of narrative and expository texts as a result of employing two story performance techniques *(H_2)*. Additionally, there is not enough evidence to reject the claim that there is no difference in fourth grade students' oral reading fluency of narrative and expository texts due to the effects of a teacher's telling and a teacher's reading aloud of twenty-eight stories to the students *(H_4)*. Lastly, there is insufficient evidence to reject the claim that there is no significant interaction among two story performance techniques held constant across the factor of gender *(H_5)*.

Nonparametric Analysis of Interactions for Fourth Grade Narrative and Expository Oral Reading Fluency

As a result of the small sample sizes and unbalanced groups, nonparametric tests, identical to the ones described for Narrative and Expository Comprehension interactions (Figure 4.1), were also used for Narrative Oral Reading Fluency interactions. Table 4.50 illustrates how marginal means were computed using the raw data; this procedure was used to isolate interactions by removing all main effects (as seen in Tables 4.51, 4.52, 4.53, 4.54, 4.55, and 4.56) (Leys & Schumann, 2010; Sawilowsky, 1990, 2000). Then, students' adjusted scores were pooled together to form one set so that ranks could be appropriately assigned. This result was reached by arranging all students' scores in an increasing order, assigning a rank ranging from one

to sixty-two, and adapting the rank for all ties by assigning equal average ranks to each one (Table 4.57). Finally, a 2×3 factorial ANOVA was computed using the transformed ART scores.

Table 4.50
Fourth Grade Narrative Oral Reading Fluency Raw Scores

	A_2	A_1	A_0	Marginal Mean
B_1	112 77 58 114 120 102 81 93 94 195 197	144 170 105 66 92 106 172 116 121 141	166 89 166 128 79 93 84 144 104 92	$\overline{B}_1 = 116.81$
Group Mean	$\overline{AB}_{21} = 113.00$	$\overline{AB}_{11} = 123.30$	$\overline{AB}_{01} = 114.50$	
B_0	113 106 104 146 80 143 82 88 74 127	82 158 112 136 99 84 140 124 102 135	131 103 130 117 49 57 118 88 78 156 135	$\overline{B}_0 = 109.58$
Group Mean	$\overline{AB}_{20} = 106.30$	$\overline{AB}_{10} = 117.20$	$\overline{AB}_{00} = 105.64$	
Marginal Mean	$\overline{A}_2 = 109.81$	$\overline{A}_1 = 120.25$	$\overline{A}_0 = 109.86$	$\overline{X} = 113.19$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.51
Calculation of Adjusted Raw Scores of Females Exposed to Storytelling for Fourth Grade Narrative Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_2$	-	$\overline{B}_1$	=	Adjusted Raw Score
4	Storytelling	Female	112	-	109.81	-	116.81	=	-114.62
4	Storytelling	Female	77	-	109.81	-	116.81	=	-149.62
4	Storytelling	Female	58	-	109.81	-	116.81	=	-168.62
4	Storytelling	Female	114	-	109.81	-	116.81	=	-112.62
4	Storytelling	Female	120	-	109.81	-	116.81	=	-106.62
4	Storytelling	Female	102	-	109.81	-	116.81	=	-124.62
4	Storytelling	Female	81	-	109.81	-	116.81	=	-145.62
4	Storytelling	Female	93	-	109.81	-	116.81	=	-133.62
4	Storytelling	Female	94	-	109.81	-	116.81	=	-132.62
4	Storytelling	Female	195	-	109.81	-	116.81	=	-31.62
4	Storytelling	Female	197	-	109.81	-	116.81	=	-29.62

Note. $\overline{A}_2$ = Storytelling marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.52
Calculation of Adjusted Raw Scores of Males Exposed to Storytelling for Fourth Grade Narrative Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_2$	-	$\overline{B}_0$	=	Adjusted Raw Score
4	Storytelling	Male	113	-	109.81	-	109.58	=	-106.39
4	Storytelling	Male	106	-	109.81	-	109.58	=	-113.39
4	Storytelling	Male	104	-	109.81	-	109.58	=	-115.39
4	Storytelling	Male	146	-	109.81	-	109.58	=	-73.39
4	Storytelling	Male	80	-	109.81	-	109.58	=	-139.39
4	Storytelling	Male	143	-	109.81	-	109.58	=	-76.39
4	Storytelling	Male	82	-	109.81	-	109.58	=	-137.39
4	Storytelling	Male	88	-	109.81	-	109.58	=	-131.39
4	Storytelling	Male	74	-	109.81	-	109.58	=	-145.39
4	Storytelling	Male	127	-	109.81	-	109.58	=	-92.39

Note. $\overline{A}_2$ = Storytelling marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.53
Calculation of Adjusted Raw Scores of Females Exposed to Reading Aloud for Fourth Grade Narrative Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_1$	-	$\overline{B}_1$	=	Adjusted Raw Score
4	Reading Aloud	Female	144	-	120.25	-	116.81	=	-93.06
4	Reading Aloud	Female	170	-	120.25	-	116.81	=	-67.06
4	Reading Aloud	Female	105	-	120.25	-	116.81	=	-132.06
4	Reading Aloud	Female	66	-	120.25	-	116.81	=	-171.06
4	Reading Aloud	Female	92	-	120.25	-	116.81	=	-145.06
4	Reading Aloud	Female	106	-	120.25	-	116.81	=	-131.06
4	Reading Aloud	Female	172	-	120.25	-	116.81	=	-65.06
4	Reading Aloud	Female	116	-	120.25	-	116.81	=	-121.06
4	Reading Aloud	Female	121	-	120.25	-	116.81	=	-116.06
4	Reading Aloud	Female	141	-	120.25	-	116.81	=	-96.06

Note. $\overline{A}_1$ = Reading Aloud marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.54
Calculation of Adjusted Raw Scores of Males Exposed to Reading Aloud for Fourth Grade Narrative Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_1$	-	$\overline{B}_0$	=	Adjusted Raw Score
4	Reading Aloud	Male	82	-	120.25	-	109.58	=	-147.83
4	Reading Aloud	Male	158	-	120.25	-	109.58	=	-71.83
4	Reading Aloud	Male	112	-	120.25	-	109.58	=	-117.83
4	Reading Aloud	Male	136	-	120.25	-	109.58	=	-93.83
4	Reading Aloud	Male	99	-	120.25	-	109.58	=	-130.83
4	Reading Aloud	Male	84	-	120.25	-	109.58	=	-145.83
4	Reading Aloud	Male	140	-	120.25	-	109.58	=	-89.83
4	Reading Aloud	Male	124	-	120.25	-	109.58	=	-105.83
4	Reading Aloud	Male	102	-	120.25	-	109.58	=	-127.83
4	Reading Aloud	Male	135	-	120.25	-	109.58	=	-94.83

Note. $\overline{A}_1$ = Reading Aloud marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.55
Calculation of Adjusted Raw Scores of Females Exposed to Silent Reading for Fourth Grade Narrative Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_0$	-	$\overline{B}_1$	=	Adjusted Raw Score
4	Silent Reading	Female	166	-	109.86	-	116.81	=	-60.67
4	Silent Reading	Female	89	-	109.86	-	116.81	=	-137.67
4	Silent Reading	Female	166	-	109.86	-	116.81	=	-60.67
4	Silent Reading	Female	128	-	109.86	-	116.81	=	-98.67
4	Silent Reading	Female	79	-	109.86	-	116.81	=	-147.67
4	Silent Reading	Female	93	-	109.86	-	116.81	=	-133.67
4	Silent Reading	Female	84	-	109.86	-	116.81	=	-142.67
4	Silent Reading	Female	144	-	109.86	-	116.81	=	-82.67
4	Silent Reading	Female	104	-	109.86	-	116.81	=	-122.67
4	Silent Reading	Female	92	-	109.86	-	116.81	=	-134.67

Note. $\overline{A}_0$ = Silent Reading marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.56
Calculation of Adjusted Raw Scores of Males Exposed to Silent Reading for Fourth Grade Narrative Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_0$	-	$\overline{B}_0$	=	Adjusted Raw Score
4	Silent Reading	Male	131	-	109.86	-	109.58	=	-88.44
4	Silent Reading	Male	103	-	109.86	-	109.58	=	-116.44
4	Silent Reading	Male	130	-	109.86	-	109.58	=	-89.44
4	Silent Reading	Male	117	-	109.86	-	109.58	=	-102.44
4	Silent Reading	Male	49	-	109.86	-	109.58	=	-170.44
4	Silent Reading	Male	57	-	109.86	-	109.58	=	-162.44
4	Silent Reading	Male	118	-	109.86	-	109.58	=	-101.44
4	Silent Reading	Male	88	-	109.86	-	109.58	=	-131.44
4	Silent Reading	Male	78	-	109.86	-	109.58	=	-141.44
4	Silent Reading	Male	156	-	109.86	-	109.58	=	-63.44
4	Silent Reading	Male	135	-	109.86	-	109.58	=	-84.44

Note. $\overline{A}_0$ = Silent Reading marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.57
Fourth Grade Narrative Oral Reading Fluency Adjusted Raw Scores Transformed Into Ranks (ART)

	A_2			A_1			A_0		
	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART
	-114.62	→	34.00	-93.06	→	46.00	-60.67	→	59.50
	-149.62	→	5.00	-67.06	→	56.00	-137.67	→	15.00
	-168.62	→	3.00	-132.06	→	21.00	-60.67	→	59.50
	-112.62	→	36.00	-171.06	→	1.00	-98.67	→	42.00
	-106.62	→	37.00	-145.06	→	11.00	-147.67	→	7.00
B_1	-124.62	→	27.00	-131.06	→	24.00	-133.67	→	18.00
	-145.62	→	9.00	-65.06	→	57.00	-142.67	→	12.00
	-133.62	→	19.00	-121.06	→	29.00	-82.67	→	52.00
	-132.62	→	20.00	-116.06	→	32.00	-122.67	→	28.00
	-31.62	→	61.00	-96.06	→	43.00	-134.67	→	17.00
	-29.62	→	62.00						
	-106.39	→	38.00	-147.83	→	6.00	-88.44	→	50.00
	-113.39	→	35.00	-71.83	→	55.00	-116.44	→	31.00
	-115.39	→	33.00	-117.83	→	30.00	-89.44	→	49.00
	-73.39	→	54.00	-93.83	→	45.00	-102.44	→	40.00
	-139.39	→	14.00	-130.83	→	25.00	-170.44	→	2.00
B_0	-76.39	→	53.00	-145.83	→	8.00	-162.44	→	4.00
	-137.39	→	16.00	-89.83	→	48.00	-101.44	→	41.00
	-131.39	→	23.00	-105.83	→	39.00	-131.44	→	22.00
	-145.39	→	10.00	-127.83	→	26.00	-141.44	→	13.00
	-92.39	→	47.00	-94.83	→	44.00	-63.44	→	58.00
							-84.44	→	51.00

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.58 depicts the calculation of group and marginal means using the transformed ART rank. These results are also signified in Table 4.59, which exhibits descriptive statistics involving students' ART scores from the Narrative Oral Reading Fluency sub-test of the QRI-3 and consists of Mean (*M*), Standard Deviation (*SD*), and number of participants (*N*) organized by treatment group and gender.

Table 4.58
Fourth Grade Narrative Oral Reading Fluency Adjusted Raw Scores Replaced by Ranks (ART)

	A_2	A_1	A_0	Marginal Mean
B_1	34.00 5.00 3.00 36.00 37.00 27.00 9.00 19.00 20.00 61.00 62.00	46.00 56.00 21.00 1.00 11.00 24.00 57.00 29.00 32.00 43.00	59.50 15.00 59.50 42.00 7.00 18.00 12.00 52.00 28.00 17.00	$\overline{B}_1 = 30.42$
Group Mean	$\overline{AB}_{21} = 28.46$	$\overline{AB}_{11} = 32.00$	$\overline{AB}_{01} = 31.00$	
B_0	38.00 35.00 33.00 54.00 14.00 53.00 16.00 23.00 10.00 47.00	6.00 55.00 30.00 45.00 25.00 8.00 48.00 39.00 26.00 44.00	50.00 31.00 49.00 40.00 2.00 4.00 41.00 22.00 13.00 58.00 51.00	$\overline{B}_0 = 32.58$
Group Mean	$\overline{AB}_{20} = 32.30$	$\overline{AB}_{10} = 32.60$	$\overline{AB}_{00} = 32.82$	
Marginal Mean	$\overline{A}_2 = 30.29$	$\overline{A}_1 = 32.30$	$\overline{A}_0 = 31.95$	$\overline{X} = 31.50$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Thorough examination of ART mean interaction scores for fourth grade Narrative Oral Reading Fluency show that males exposed to Silent Reading (M = 32.82) achieved the highest overall Narrative Oral Reading Fluency score followed by males exposed to Reading Aloud (M = 32.60) then males exposed to Storytelling (M = 32.30). Oddly

enough, all three Narrative Oral Reading Fluency outcomes (Storytelling, Reading Aloud, and Silent Reading) produced by male participants were higher than those fashioned by their female peers. Even so, the treatment level that generated the highest Narrative Oral Reading Fluency score for female participants was Reading Aloud (*M* = 32.00), trailed by female students exposed to Silent Reading (*M* = 31.00) and Storytelling (*M* = 28.46). Note that males and females exposed to Storytelling produced the lowest overall Narrative Oral Reading Fluency results for their respective gender.

Table 4.59
Descriptive Statistics for Fourth Grade Narrative Oral Reading Fluency Interactions

Gender	Group	*M*	*SD*	*N*
Female	Storytelling	28.46	20.211	11
	Reading Aloud	32.00	18.601	10
	Silent Reading	31.00	20.422	10
	Total	30.42	19.169	31
Male	Storytelling	32.30	16.125	10
	Reading Aloud	32.60	16.615	10
	Silent Reading	32.82	19.833	11
	Total	32.58	17.088	31
Total	Storytelling	30.29	18.031	21
	Reading Aloud	32.30	17.168	20
	Silent Reading	31.95	19.627	21
	Total	31.50	18.041	62

Interaction results for fourth grade students' Narrative Oral Reading Fluency ART scores are reported in Table 4.60. As previously indicated, a 2×3 univariate ANOVA was employed for the analysis, with gender (female, male) and group (Storytelling, Reading Aloud, Storytelling) as between-subjects factors. Univariate outcomes revealed no significant interaction for between-subjects factors (Gender × Group) in

fourth grade students' Narrative Oral Reading Fluency ($F(2, 56) = .039$, $p = .962$, partial $\eta^2 = .001$).

Table 4.60
Factorial ANOVA for Fourth Grade Narrative Oral Reading Fluency Interactions

Source	Type III Sum of Squares	df	*F*	Sig.	Partial η^2
Gender × Group	27.623	2	.039	.962	.001
Error	19710.364	56			
Total	81374.500	62			

Note. Being irrelevant, main effects are not presented. Alpha (α) = .05.

Outcomes of the analysis indicate that there is insufficient evidence to reject the claim that there is no significant interaction among two story performance techniques held constant across the factor of gender (H_5).

Identical nonparametric procedures previously described for Narrative Oral Reading Fluency interactions were simulated for Expository Oral Reading Fluency interactions. Once more, student raw scores were adjusted by subtracting marginal means from each row and column (Table 4.61 characterizes how marginal means were calculated using the raw data); this procedure was used to isolate interactions by removing all main effects (as seen in Tables 4.62, 4.63, 4.64, 4.65, 4.66, and 4.67) (Leys & Schumann, 2010; Sawilowsky, 1990, 2000). Next, students' adjusted scores were pooled together to form one set so that ranks could be properly assigned. This outcome was reached by arranging all students' scores in an increasing order, assigning a rank ranging from one to sixty-two, and adapting the rank for all tie values by assigning equal average ranks to each one (Table 4.68). Lastly, a 2×3 factorial ANOVA was computed using the transformed ART dataset.

Table 4.61
Fourth Grade Expository Oral Reading Fluency Raw Scores

	A_2	A_1	A_0	Marginal Mean
B_1	102 76 52 98 111 103 69 88 82 162 156	114 138 92 71 88 86 136 114 96 120	146 86 141 131 73 86 80 119 103 88	$\overline{B}_1 = 103.45$
Group Mean	$\overline{AB}_{21} = 99.91$	$\overline{AB}_{11} = 105.50$	$\overline{AB}_{01} = 105.30$	
B_0	96 97 91 123 75 129 67 82 76 115	80 131 98 118 87 77 118 106 93 124	114 86 104 103 52 66 95 78 76 150 114	$\overline{B}_0 = 97.45$
Group Mean	$\overline{AB}_{20} = 95.10$	$\overline{AB}_{10} = 103.20$	$\overline{AB}_{00} = 94.36$	
Marginal Mean	$\overline{A}_2 = 97.62$	$\overline{A}_1 = 104.35$	$\overline{A}_0 = 99.57$	$\overline{X} = 100.45$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.62
Calculation of Adjusted Raw Scores of Females Exposed to Storytelling for Fourth Grade Expository Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_2$	-	$\overline{B}_1$	=	Adjusted Raw Score
4	Storytelling	Female	102	-	97.62	-	103.45	=	-99.07
4	Storytelling	Female	76	-	97.62	-	103.45	=	-125.07
4	Storytelling	Female	52	-	97.62	-	103.45	=	-149.07
4	Storytelling	Female	98	-	97.62	-	103.45	=	-103.07
4	Storytelling	Female	111	-	97.62	-	103.45	=	-90.07
4	Storytelling	Female	103	-	97.62	-	103.45	=	-98.07
4	Storytelling	Female	69	-	97.62	-	103.45	=	-132.07
4	Storytelling	Female	88	-	97.62	-	103.45	=	-113.07
4	Storytelling	Female	82	-	97.62	-	103.45	=	-119.07
4	Storytelling	Female	162	-	97.62	-	103.45	=	-39.07
4	Storytelling	Female	156	-	97.62	-	103.45	=	-45.07

Note. $\overline{A}_2$ = Storytelling marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.63
Calculation of Adjusted Raw Scores of Males Exposed to Storytelling for Fourth Grade Expository Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_2$	-	$\overline{B}_0$	=	Adjusted Raw Score
4	Storytelling	Male	96	-	97.62	-	97.45	=	-99.07
4	Storytelling	Male	97	-	97.62	-	97.45	=	-98.07
4	Storytelling	Male	91	-	97.62	-	97.45	=	-104.07
4	Storytelling	Male	123	-	97.62	-	97.45	=	-72.07
4	Storytelling	Male	75	-	97.62	-	97.45	=	-120.07
4	Storytelling	Male	129	-	97.62	-	97.45	=	-66.07
4	Storytelling	Male	67	-	97.62	-	97.45	=	-128.07
4	Storytelling	Male	82	-	97.62	-	97.45	=	-113.07
4	Storytelling	Male	76	-	97.62	-	97.45	=	-119.07
4	Storytelling	Male	115	-	97.62	-	97.45	=	-80.07

Note. $\overline{A}_2$ = Storytelling marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.64
Calculation of Adjusted Raw Scores of Females Exposed to Reading Aloud for Fourth Grade Expository Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_1$	-	$\overline{B}_1$	=	Adjusted Raw Score
4	Reading Aloud	Female	114	-	104.35	-	103.45	=	-93.80
4	Reading Aloud	Female	138	-	104.35	-	103.45	=	-69.80
4	Reading Aloud	Female	92	-	104.35	-	103.45	=	-115.80
4	Reading Aloud	Female	71	-	104.35	-	103.45	=	-136.80
4	Reading Aloud	Female	88	-	104.35	-	103.45	=	-119.80
4	Reading Aloud	Female	86	-	104.35	-	103.45	=	-121.80
4	Reading Aloud	Female	136	-	104.35	-	103.45	=	-71.80
4	Reading Aloud	Female	114	-	104.35	-	103.45	=	-93.80
4	Reading Aloud	Female	96	-	104.35	-	103.45	=	-111.80
4	Reading Aloud	Female	120	-	104.35	-	103.45	=	-87.80

Note. $\overline{A}_1$ = Reading Aloud marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.65
Calculation of Adjusted Raw Scores of Males Exposed to Reading Aloud for Fourth Grade Expository Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_1$	-	$\overline{B}_0$	=	Adjusted Raw Score
4	Reading Aloud	Male	80	-	104.35	-	97.45	=	-121.80
4	Reading Aloud	Male	131	-	104.35	-	97.45	=	-70.80
4	Reading Aloud	Male	98	-	104.35	-	97.45	=	-103.80
4	Reading Aloud	Male	118	-	104.35	-	97.45	=	-83.80
4	Reading Aloud	Male	87	-	104.35	-	97.45	=	-114.80
4	Reading Aloud	Male	77	-	104.35	-	97.45	=	-124.80
4	Reading Aloud	Male	118	-	104.35	-	97.45	=	-83.80
4	Reading Aloud	Male	106	-	104.35	-	97.45	=	-95.80
4	Reading Aloud	Male	93	-	104.35	-	97.45	=	-108.80
4	Reading Aloud	Male	124	-	104.35	-	97.45	=	-77.80

Note. $\overline{A}_1$ = Reading Aloud marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.66
Calculation of Adjusted Raw Scores of Females Exposed to Silent Reading for Fourth Grade Expository Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_0$	-	$\overline{B}_1$	=	Adjusted Raw Score
4	Silent Reading	Female	146	-	99.57	-	103.45	=	-57.02
4	Silent Reading	Female	86	-	99.57	-	103.45	=	-117.02
4	Silent Reading	Female	141	-	99.57	-	103.45	=	-62.02
4	Silent Reading	Female	131	-	99.57	-	103.45	=	-72.02
4	Silent Reading	Female	73	-	99.57	-	103.45	=	-130.02
4	Silent Reading	Female	86	-	99.57	-	103.45	=	-117.02
4	Silent Reading	Female	80	-	99.57	-	103.45	=	-123.02
4	Silent Reading	Female	119	-	99.57	-	103.45	=	-84.02
4	Silent Reading	Female	103	-	99.57	-	103.45	=	-100.02
4	Silent Reading	Female	88	-	99.57	-	103.45	=	-115.02

Note. $\overline{A}_0$ = Silent Reading marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.67
Calculation of Adjusted Raw Scores of Males Exposed to Silent Reading for Fourth Grade Expository Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_0$	-	$\overline{B}_0$	=	Adjusted Raw Score
4	Silent Reading	Male	114	-	99.57	-	97.45	=	-83.02
4	Silent Reading	Male	86	-	99.57	-	97.45	=	-111.02
4	Silent Reading	Male	104	-	99.57	-	97.45	=	-93.02
4	Silent Reading	Male	103	-	99.57	-	97.45	=	-94.02
4	Silent Reading	Male	52	-	99.57	-	97.45	=	-145.02
4	Silent Reading	Male	66	-	99.57	-	97.45	=	-131.02
4	Silent Reading	Male	95	-	99.57	-	97.45	=	-102.02
4	Silent Reading	Male	78	-	99.57	-	97.45	=	-119.02
4	Silent Reading	Male	76	-	99.57	-	97.45	=	-121.02
4	Silent Reading	Male	150	-	99.57	-	97.45	=	-47.02
4	Silent Reading	Male	114	-	99.57	-	97.45	=	-83.02

Note. $\overline{A}_0$ = Silent Reading marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.68
Fourth Grade Expository Oral Reading Fluency Adjusted Raw Scores Transformed Into Ranks (ART)

	A_2			A_1			A_0		
	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART
	-99.07	→	34.50	-93.80	→	40.50	-57.02	→	59.00
	-125.07	→	8.00	-69.80	→	56.00	-117.02	→	19.50
	-149.07	→	1.00	-115.80	→	21.00	-62.02	→	58.00
	-103.07	→	31.00	-136.80	→	3.00	-72.02	→	53.00
	-90.07	→	43.00	-119.80	→	15.00	-130.02	→	6.00
B_1	-98.07	→	36.50	-121.80	→	11.50	-117.02	→	19.50
	-132.07	→	4.00	-71.80	→	54.00	-123.02	→	10.00
	-113.07	→	24.50	-93.80	→	40.50	-84.02	→	45.00
	-119.07	→	16.50	-111.80	→	26.00	-100.02	→	33.00
	-39.07	→	62.00	-87.80	→	44.00	-115.02	→	22.00
	-45.07	→	61.00						
	-99.07	→	34.50	-121.80	→	11.50	-83.02	→	48.50
	-98.07	→	36.50	-70.80	→	55.00	-111.02	→	27.00
	-104.07	→	29.00	-103.80	→	30.00	-93.02	→	42.00
	-72.07	→	52.00	-83.80	→	46.50	-94.02	→	39.00
	-120.07	→	14.00	-114.80	→	23.00	-145.02	→	2.00
B_0	-66.07	→	57.00	-124.80	→	9.00	-131.02	→	5.00
	-128.07	→	7.00	-83.80	→	46.50	-102.02	→	32.00
	-113.07	→	24.50	-95.80	→	38.00	-119.02	→	18.00
	-119.07	→	16.50	-108.80	→	28.00	-121.02	→	13.00
	-80.07	→	50.00	-77.80	→	51.00	-47.02	→	60.00
							-83.02	→	48.50

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.69 depicts the calculation of group and marginal means using the transformed ART ranks. These results are also represented in Table 4.70, which displays descriptive statistics involving students' ART scores from the Expository Oral Reading Fluency sub-test of the QRI-3 and consists of Mean (*M*), Standard Deviation (*SD*), and number of participants (*N*) organized by treatment group and gender.

Table 4.69
Fourth Grade Expository Oral Reading Fluency Adjusted Raw Scores Replaced by Ranks (ART)

	A_2	A_1	A_0	Marginal Mean
B_1	34.50 8.00 1.00 31.00 43.00 36.50 4.00 24.50 16.50 62.00 61.00	40.50 56.00 21.00 3.00 15.00 11.50 54.00 40.50 26.00 44.00	59.00 19.50 58.00 53.00 6.00 19.50 10.00 45.00 33.00 22.00	$\overline{B}_1 = 30.92$
Group Mean	$\overline{AB}_{21} = 29.27$	$\overline{AB}_{11} = 31.15$	$\overline{AB}_{01} = 32.50$	
B_0	34.50 36.50 29.00 52.00 14.00 57.00 7.00 24.50 16.50 50.00	11.50 55.00 30.00 46.50 23.00 9.00 46.50 38.00 28.00 51.00	48.50 27.00 42.00 39.00 2.00 5.00 32.00 18.00 13.00 60.00 48.50	$\overline{B}_0 = 32.08$
Group Mean	$\overline{AB}_{20} = 32.10$	$\overline{AB}_{10} = 33.85$	$\overline{AB}_{00} = 30.46$	
Marginal Mean	$\overline{A}_2 = 30.62$	$\overline{A}_1 = 32.50$	$\overline{A}_0 = 31.43$	$\overline{X} = 31.50$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

In general, the pattern of descriptive statistics for Expository Oral Reading Fluency (Table 4.70) varied across the factors of gender and treatment. For example, male (M = 33.85) students exposed to Reading Aloud attained the highest overall Expository Oral Reading Fluency mean than any other group of participants.

Parenthetically, they were closely followed by female students exposed to Silent Reading (*M* = 32.50). On the other hand, of the remaining groups of students, male participants exposed to Storytelling (*M* = 32.10) attained a higher score than female students exposed to Reading Aloud (*M* = 31.15) and males exposed to Silent Reading (*M* = 30.46). As can be seen, however, females exposed to Reading Aloud had a higher mean score than males exposed to Silent Reading. The lowest performing group for Expository Oral Reading Fluency were females exposed to Storytelling (*M* = 29.27).

Table 4.70
Descriptive Statistics for Fourth Grade Expository Oral Reading Fluency Interactions

Gender	Group	*M*	*SD*	*N*
Female	Storytelling	29.27	21.036	11
	Reading Aloud	31.15	18.405	10
	Silent Reading	32.50	19.961	10
	Total	30.92	19.248	31
Male	Storytelling	32.10	17.094	10
	Reading Aloud	33.85	16.202	10
	Silent Reading	30.46	19.137	11
	Total	32.08	17.044	31
Total	Storytelling	30.62	18.837	21
	Reading Aloud	32.50	16.933	20
	Silent Reading	31.43	19.066	21
	Total	31.50	18.040	62

Interaction results for fourth grade students' Expository Oral Reading Fluency ART scores are reported in Table 4.71. Once more, a 2×3 univariate ANOVA was employed for the analysis, with gender (female, male) and group (Storytelling, Reading Aloud, Storytelling) as between-subjects factors. Univariate outcomes revealed no significant interaction for between-subjects factors (Gender × Group) in fourth grade students' Expository Oral Reading Fluency ($F(2, 56) = .114$, $p = .893$, partial $\eta^2 = .004$).

Table 4.71
Factorial ANOVA for Fourth Grade Expository Oral Reading Fluency Interactions

Source	Type III Sum of Squares	df	*F*	Sig.	Partial η^2
Gender × Group	80.232	2	.114	.893	.004
Error	19714.359	56			
Total	81370.500	62			

Note. Being irrelevant, main effects are not presented. Alpha (α) = .05.

Based upon the analysis, there is not enough evidence to reject the claim that there is no significant interaction among two story performance techniques held constant across the factor of gender (H_5).

Nonparametric Analysis of Main Effects for Fourth Grade Narrative and Expository Oral Reading Fluency

As with Narrative and Expository Comprehension, main effect results for fourth grade Narrative and Expository Oral Reading Fluency were assessed through one-way Kruskal-Wallis H and Wilcoxon Rank-Sum (Mann-Whitney U) tests. The Kruskal-Wallis H test, which is a nonparametric test equivalent to a one-way ANOVA, was chosen to compare three or more sets of scores that come from different groups. It also allows the assessment of more than two independent groups. If significant differences between cell means are detected using the Kruskal-Wallis H test, post hoc Wilcoxon Rank-Sum (Mann-Whitney U) tests will be employed. This nonparametric procedure will test hypotheses H_2 and H_4 and determine the location of any significant differences.

Prior to running the analysis, the Blair-Sawilowsky Salter-Fawcett adjusted rank transformation test (ART) procedure for main effects was carried out for both Narrative and Expository Oral Reading Fluency datasets (please see Table 4.50 for Narrative Oral Reading Fluency and 4.61 for Expository Oral Reading Fluency group and

marginal mean computations). This procedure involved isolating main effects by subtracting the interaction from the raw data (Leys & Schumann, 2010; Sawilowsky, 1990, 2000). In order for main effects to be calculated without being affected by the interaction (Figure 4.2), the interaction (i.e., $\frac{\overline{AB}_{21} + \overline{AB}_{10} + \overline{AB}_{00}}{3} \rightarrow \frac{113.00 + 117.20 + 105.64}{3} = 111.95$) was deducted from each raw score by subtracting the mean of the three diagonal group means (please see Narrative Oral Reading Fluency Tables 4.72, 4.73, 4.74, 4.75, 4.76, and 4.77; Expository Oral Reading Fluency Tables 4.80, 4.81, 4.82, 4.83, 4.84, and 4.85). Next, students' adjusted raw scores were pooled together to form one set so that ranks could be properly assigned (please see Narrative Oral Reading Fluency Table 4.78; Expository Oral Reading Fluency Table 4.86). This outcome was reached by arranging all students' scores in an increasing order, assigning a rank ranging from one to sixty-two, and adapting the rank for all tie values by assigning equal average ranks to each one. Finally, one-way Kruskal-Wallis H and, if need be, post hoc Wilcoxon Rank-Sum (Mann-Whitney U) tests were computed using the transformed ART scores.

Table 4.72
Calculation of Adjusted Raw Scores of Females Exposed to Storytelling for Fourth Grade Narrative Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{21} + \overline{AB}_{10} + \overline{AB}_{00}}{3}$	=	Adjusted Raw Score
4	Storytelling	Female	112	-	111.95	=	0.05
4	Storytelling	Female	77	-	111.95	=	-34.95
4	Storytelling	Female	58	-	111.95	=	-53.95
4	Storytelling	Female	114	-	111.95	=	2.05
4	Storytelling	Female	120	-	111.95	=	8.05
4	Storytelling	Female	102	-	111.95	=	-9.95
4	Storytelling	Female	81	-	111.95	=	-30.95
4	Storytelling	Female	93	-	111.95	=	-18.95
4	Storytelling	Female	94	-	111.95	=	-17.95
4	Storytelling	Female	195	-	111.95	=	83.05
4	Storytelling	Female	197	-	111.95	=	85.05

Note. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{00}$ = Group mean of males Exposed to Silent Reading.

Table 4.73
Calculation of Adjusted Raw Scores of Males Exposed to Storytelling for Fourth Grade Narrative Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{20} + \overline{AB}_{11} + \overline{AB}_{01}}{3}$	=	Adjusted Raw Score
4	Storytelling	Male	113	-	114.70	=	-1.70
4	Storytelling	Male	106	-	114.70	=	-8.70
4	Storytelling	Male	104	-	114.70	=	-10.70
4	Storytelling	Male	146	-	114.70	=	31.30
4	Storytelling	Male	80	-	114.70	=	-34.70
4	Storytelling	Male	143	-	114.70	=	28.30
4	Storytelling	Male	82	-	114.70	=	-32.70
4	Storytelling	Male	88	-	114.70	=	-26.70
4	Storytelling	Male	74	-	114.70	=	-40.70
4	Storytelling	Male	127	-	114.70	=	12.30

Note. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading.

Table 4.74
Calculation of Adjusted Raw Scores of Females Exposed to Reading Aloud for Fourth Grade Narrative Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{11} + \overline{AB}_{20} + \overline{AB}_{00}}{3}$	=	Adjusted Raw Score
4	Reading Aloud	Female	144	-	111.75	=	32.25
4	Reading Aloud	Female	170	-	111.75	=	58.25
4	Reading Aloud	Female	105	-	111.75	=	-6.75
4	Reading Aloud	Female	66	-	111.75	=	-45.75
4	Reading Aloud	Female	92	-	111.75	=	-19.75
4	Reading Aloud	Female	106	-	111.75	=	-5.75
4	Reading Aloud	Female	172	-	111.75	=	60.25
4	Reading Aloud	Female	116	-	111.75	=	4.25
4	Reading Aloud	Female	121	-	111.75	=	9.25
4	Reading Aloud	Female	141	-	111.75	=	29.25

Note. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling. $\overline{AB}_{00}$ = Group mean of males exposed to Silent Reading.

Table 4.75
Calculation of Adjusted Raw Scores of Males Exposed to Reading Aloud for Fourth Grade Narrative Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{10} + \overline{AB}_{21} + \overline{AB}_{01}}{3}$	=	Adjusted Raw Score
4	Reading Aloud	Male	82	-	114.90	=	-32.90
4	Reading Aloud	Male	158	-	114.90	=	43.10
4	Reading Aloud	Male	112	-	114.90	=	-2.90
4	Reading Aloud	Male	136	-	114.90	=	21.10
4	Reading Aloud	Male	99	-	114.90	=	-15.90
4	Reading Aloud	Male	84	-	114.90	=	-30.90
4	Reading Aloud	Male	140	-	114.90	=	25.10
4	Reading Aloud	Male	124	-	114.90	=	9.10
4	Reading Aloud	Male	102	-	114.90	=	-12.90
4	Reading Aloud	Male	135	-	114.90	=	20.10

Note. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading.

Table 4.76
Calculation of Adjusted Raw Scores of Females Exposed to Silent Reading for Fourth Grade Narrative Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{01} + \overline{AB}_{10} + \overline{AB}_{20}}{3}$	=	Adjusted Raw Score
4	Silent Reading	Female	166	-	112.67	=	53.33
4	Silent Reading	Female	89	-	112.67	=	-23.67
4	Silent Reading	Female	166	-	112.67	=	53.33
4	Silent Reading	Female	128	-	112.67	=	15.33
4	Silent Reading	Female	79	-	112.67	=	-33.67
4	Silent Reading	Female	93	-	112.67	=	-19.67
4	Silent Reading	Female	84	-	112.67	=	-28.67
4	Silent Reading	Female	144	-	112.67	=	31.33
4	Silent Reading	Female	104	-	112.67	=	-8.67
4	Silent Reading	Female	92	-	112.67	=	-20.67

Note. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling.

Table 4.77
Calculation of Adjusted Raw Scores of Males Exposed to Silent Reading for Fourth Grade Narrative Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{00} + \overline{AB}_{11} + \overline{AB}_{21}}{3}$	=	Adjusted Raw Score
4	Silent Reading	Male	131	-	113.98	=	17.02
4	Silent Reading	Male	103	-	113.98	=	-10.98
4	Silent Reading	Male	130	-	113.98	=	16.02
4	Silent Reading	Male	117	-	113.98	=	3.02
4	Silent Reading	Male	49	-	113.98	=	-64.98
4	Silent Reading	Male	57	-	113.98	=	-56.98
4	Silent Reading	Male	118	-	113.98	=	4.02
4	Silent Reading	Male	88	-	113.98	=	-25.98
4	Silent Reading	Male	78	-	113.98	=	-35.98
4	Silent Reading	Male	156	-	113.98	=	42.02
4	Silent Reading	Male	135	-	113.98	=	21.02

Note. $\overline{AB}_{00}$ = Group mean of males exposed to Silent Reading. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling.

Table 4.78
Fourth Grade Narrative Oral Reading Fluency Adjusted Raw Scores Transformed Into Ranks (ART)

	A_2			A_1			A_0		
	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART
	0.05	→	34.00	32.25	→	54.0	53.33	→	57.5
	-34.95	→	7.00	58.25	→	59.0	-23.67	→	17.0
	-53.95	→	3.00	-6.75	→	30.0	53.33	→	57.5
	2.05	→	35.00	-45.75	→	4.0	15.33	→	43.0
	8.05	→	39.00	-19.75	→	19.0	-33.67	→	9.0
B_1	-9.95	→	27.00	-5.75	→	31.0	-19.67	→	20.0
	-30.95	→	12.00	60.25	→	60.0	-28.67	→	14.0
	-18.95	→	21.00	4.25	→	38.0	31.33	→	53.0
	-17.95	→	22.00	9.25	→	41.0	-8.67	→	29.0
	83.05	→	61.00	29.25	→	51.0	-20.67	→	18.0
	85.05	→	62.00						
	-1.70	→	33.00	-32.90	→	10.0	17.02	→	45.0
	-8.70	→	28.00	43.10	→	56.0	-10.98	→	25.0
	-10.70	→	26.00	-2.90	→	32.0	16.02	→	44.0
	31.30	→	52.00	21.10	→	48.0	3.02	→	36.0
	-34.70	→	8.00	-15.90	→	23.0	-64.98	→	1.0
B_0	28.30	→	50.00	-30.90	→	13.0	-56.98	→	2.0
	-32.70	→	11.00	25.10	→	49.0	4.02	→	37.0
	-26.70	→	15.00	9.10	→	40.0	-25.98	→	16.0
	-40.70	→	5.00	-12.90	→	24.0	-35.98	→	6.0
	12.30	→	42.00	20.10	→	46.0	42.02	→	55.0
							21.02	→	47.0

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.79
Fourth Grade Narrative Oral Reading Fluency Adjusted Raw Scores Replaced by Ranks (ART)

	A_2	A_1	A_0	Marginal Mean
B_1	34.00 7.00 3.00 35.00 39.00 27.00 12.00 21.00 22.00 61.00 62.00	54.0 59.0 30.0 4.0 19.0 31.0 60.0 38.0 41.0 51.0	57.5 17.0 57.5 43.0 9.0 20.0 14.0 53.0 29.0 18.0	$\overline{B}_1 = 33.16$
Group Mean	$\overline{AB}_{21} = 29.36$	$\overline{AB}_{11} = 38.70$	$\overline{AB}_{01} = 31.80$	
B_0	33.00 28.00 26.00 52.00 8.00 50.00 11.00 15.00 5.00 42.00	10.0 56.0 32.0 48.0 23.0 13.0 49.0 40.0 24.0 46.0	45.0 25.0 44.0 36.0 1.0 2.0 37.0 16.0 6.0 55.0 47.0	$\overline{B}_0 = 29.84$
Group Mean	$\overline{AB}_{20} = 27.00$	$\overline{AB}_{10} = 34.10$	$\overline{AB}_{00} = 28.55$	
Marginal Mean	$\overline{A}_2 = 28.24$	$\overline{A}_1 = 36.40$	$\overline{A}_0 = 30.10$	$\overline{X} = 31.50$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.80
Calculation of Adjusted Raw Scores of Females Exposed to Storytelling for Fourth Grade Expository Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{21} + \overline{AB}_{10} + \overline{AB}_{00}}{3}$	=	Adjusted Raw Score
4	Storytelling	Female	102	-	99.16	=	2.84
4	Storytelling	Female	76	-	99.16	=	-23.16
4	Storytelling	Female	52	-	99.16	=	-47.16
4	Storytelling	Female	98	-	99.16	=	-1.16
4	Storytelling	Female	111	-	99.16	=	11.84
4	Storytelling	Female	103	-	99.16	=	3.84
4	Storytelling	Female	69	-	99.16	=	-30.16
4	Storytelling	Female	88	-	99.16	=	-11.16
4	Storytelling	Female	82	-	99.16	=	-17.16
4	Storytelling	Female	162	-	99.16	=	62.84
4	Storytelling	Female	156	-	99.16	=	56.84

Note. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{00}$ = Group mean of males Exposed to Silent Reading.

Table 4.81
Calculation of Adjusted Raw Scores of Males Exposed to Storytelling for Fourth Grade Expository Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{20} + \overline{AB}_{11} + \overline{AB}_{01}}{3}$	=	Adjusted Raw Score
4	Storytelling	Male	96	-	101.97	=	-5.97
4	Storytelling	Male	97	-	101.97	=	-4.97
4	Storytelling	Male	91	-	101.97	=	-10.97
4	Storytelling	Male	123	-	101.97	=	21.03
4	Storytelling	Male	75	-	101.97	=	-26.97
4	Storytelling	Male	129	-	101.97	=	27.03
4	Storytelling	Male	67	-	101.97	=	-34.97
4	Storytelling	Male	82	-	101.97	=	-19.97
4	Storytelling	Male	76	-	101.97	=	-25.97
4	Storytelling	Male	115	-	101.97	=	13.03

Note. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading.

Table 4.82
Calculation of Adjusted Raw Scores of Females Exposed to Reading Aloud for Fourth Grade Expository Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{11} + \overline{AB}_{20} + \overline{AB}_{00}}{3}$	=	Adjusted Raw Score
4	Reading Aloud	Female	114	-	98.32	=	15.68
4	Reading Aloud	Female	138	-	98.32	=	39.68
4	Reading Aloud	Female	92	-	98.32	=	-6.32
4	Reading Aloud	Female	71	-	98.32	=	-27.32
4	Reading Aloud	Female	88	-	98.32	=	-10.32
4	Reading Aloud	Female	86	-	98.32	=	-12.32
4	Reading Aloud	Female	136	-	98.32	=	37.68
4	Reading Aloud	Female	114	-	98.32	=	15.68
4	Reading Aloud	Female	96	-	98.32	=	-2.32
4	Reading Aloud	Female	120	-	98.32	=	21.68

Note. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling. $\overline{AB}_{00}$ = Group mean of males exposed to Silent Reading.

Table 4.83
Calculation of Adjusted Raw Scores of Males Exposed to Reading Aloud for Fourth Grade Expository Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{10} + \overline{AB}_{21} + \overline{AB}_{01}}{3}$	=	Adjusted Raw Score
4	Reading Aloud	Male	80	-	102.80	=	-22.80
4	Reading Aloud	Male	131	-	102.80	=	28.20
4	Reading Aloud	Male	98	-	102.80	=	-4.80
4	Reading Aloud	Male	118	-	102.80	=	15.20
4	Reading Aloud	Male	87	-	102.80	=	-15.80
4	Reading Aloud	Male	77	-	102.80	=	-25.80
4	Reading Aloud	Male	118	-	102.80	=	15.20
4	Reading Aloud	Male	106	-	102.80	=	3.20
4	Reading Aloud	Male	93	-	102.80	=	-9.80
4	Reading Aloud	Male	124	-	102.80	=	21.20

Note. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading.

Table 4.84
Calculation of Adjusted Raw Scores of Females Exposed to Silent Reading for Fourth Grade Expository Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{01} + \overline{AB}_{10} + \overline{AB}_{20}}{3}$	=	Adjusted Raw Score
4	Silent Reading	Female	146	-	101.20	=	44.80
4	Silent Reading	Female	86	-	101.20	=	-15.20
4	Silent Reading	Female	141	-	101.20	=	39.80
4	Silent Reading	Female	131	-	101.20	=	29.80
4	Silent Reading	Female	73	-	101.20	=	-28.20
4	Silent Reading	Female	86	-	101.20	=	-15.20
4	Silent Reading	Female	80	-	101.20	=	-21.20
4	Silent Reading	Female	119	-	101.20	=	17.80
4	Silent Reading	Female	103	-	101.20	=	1.80
4	Silent Reading	Female	88	-	101.20	=	-13.20

Note. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling.

Table 4.85
Calculation of Adjusted Raw Scores of Males Exposed to Silent Reading for Fourth Grade Expository Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{00} + \overline{AB}_{11} + \overline{AB}_{21}}{3}$	=	Adjusted Raw Score
4	Silent Reading	Male	114	-	99.92	=	14.08
4	Silent Reading	Male	86	-	99.92	=	-13.92
4	Silent Reading	Male	104	-	99.92	=	4.08
4	Silent Reading	Male	103	-	99.92	=	3.08
4	Silent Reading	Male	52	-	99.92	=	-47.92
4	Silent Reading	Male	66	-	99.92	=	-33.92
4	Silent Reading	Male	95	-	99.92	=	-4.92
4	Silent Reading	Male	78	-	99.92	=	-21.92
4	Silent Reading	Male	76	-	99.92	=	-23.92
4	Silent Reading	Male	150	-	99.92	=	50.08
4	Silent Reading	Male	114	-	99.92	=	14.08

Note. $\overline{AB}_{00}$ = Group mean of males exposed to Silent Reading. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling.

Table 4.86
Fourth Grade Expository Oral Reading Fluency Adjusted Raw Scores Transformed Into Ranks (ART)

	A_2			A_1			A_0		
	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART
	2.84	→	36.00	15.68	→	47.50	44.80	→	59.00
	-23.16	→	12.00	39.68	→	57.00	-15.20	→	19.50
	-47.16	→	2.00	-6.32	→	28.00	39.80	→	58.00
	-1.16	→	34.00	-27.32	→	7.00	29.80	→	55.00
	11.84	→	41.00	-10.32	→	26.00	-28.20	→	6.00
B_1	3.84	→	39.00	-12.32	→	23.00	-15.20	→	19.50
	-30.16	→	5.00	37.68	→	56.00	-21.20	→	15.00
	-11.16	→	24.00	15.68	→	47.50	17.80	→	49.00
	-17.16	→	17.00	-2.32	→	33.00	1.80	→	35.00
	62.84	→	62.00	21.68	→	52.00	-13.20	→	22.00
	56.84	→	61.00						
	-5.97	→	29.00	-22.80	→	13.00	14.08	→	43.50
	-4.97	→	30.00	28.20	→	54.00	-13.92	→	21.00
	-10.97	→	25.00	-4.80	→	32.00	4.08	→	40.00
	21.03	→	50.00	15.20	→	45.50	3.08	→	37.00
	-26.97	→	8.00	-15.80	→	18.00	-47.92	→	1.00
B_0	27.03	→	53.00	-25.80	→	10.00	-33.92	→	4.00
	-34.97	→	3.00	15.20	→	45.50	-4.92	→	31.00
	-19.97	→	16.00	3.20	→	38.00	-21.92	→	14.00
	-25.97	→	9.00	-9.80	→	27.00	-23.92	→	11.00
	13.03	→	42.00	21.20	→	51.00	50.08	→	60.00
							14.08	→	43.50

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.87
Fourth Grade Expository Oral Reading Fluency Adjusted Raw Scores Replaced by Ranks (ART)

	A_2	A_1	A_0	Marginal Mean
B_1	36.00 12.00 2.00 34.00 41.00 39.00 5.00 24.00 17.00 62.00 61.00	47.50 57.00 28.00 7.00 26.00 23.00 56.00 47.50 33.00 52.00	59.00 19.50 58.00 55.00 6.00 19.50 15.00 49.00 35.00 22.00	$\overline{B}_1 = 33.81$
Group Mean	$\overline{AB}_{21} = 30.27$	$\overline{AB}_{11} = 37.70$	$\overline{AB}_{01} = 33.80$	
B_0	29.00 30.00 25.00 50.00 8.00 53.00 3.00 16.00 9.00 42.00	13.00 54.00 32.00 45.50 18.00 10.00 45.50 38.00 27.00 51.00	43.50 21.00 40.00 37.00 1.00 4.00 31.00 14.00 11.00 60.00 43.50	$\overline{B}_0 = 29.19$
Group Mean	$\overline{AB}_{20} = 26.50$	$\overline{AB}_{10} = 33.40$	$\overline{AB}_{00} = 27.82$	
Marginal Mean	$\overline{A}_2 = 28.48$	$\overline{A}_1 = 35.55$	$\overline{A}_0 = 30.67$	$\overline{X} = 31.50$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Computation results of group means using the transformed ART ranks for Narrative and Expository Oral Reading Fluency are shown in Tables 4.79 and 4.87. These results are also represented in Table 4.88, where fourth grade case summaries by group for Narrative and Expository Oral Reading Fluency main effects are presented.

As can be seen, students exposed to Reading Aloud produced higher Narrative (*M* = 36.40) and Expository (*M* = 35.55) Oral Reading Fluency scores than students exposed to Silent Reading (where the mean score for Narrative Oral Reading Fluency was 30.10 while that for Expository Oral Reading Fluency was 30.67) and Storytelling (where the mean score for Narrative Oral Reading Fluency was 28.24 while that for Expository Oral Reading Fluency was 28.48). Note that the Silent Reading group's mean score for Narrative and Expository Oral Reading Fluency was higher than that of the Storytelling group. Also note that fourth grade students exposed to Reading Aloud produced a higher mean for Narrative Oral Reading Fluency than Expository Oral Reading Fluency. However, fourth grade students exposed to Storytelling and Silent Reading attained higher mean scores in Expository Oral Reading Fluency.

Table 4.88
Fourth Grade Case Summaries by Group for Narrative and Expository Oral Reading Fluency Main Effects

Group		Narrative Oral Reading Fluency	Expository Oral Reading Fluency
Storytelling	N	21	21
	Mean	28.24	28.48
	Std. Deviation	18.069	18.811
Reading Aloud	N	20	20
	Mean	36.40	35.55
	Std. Deviation	16.885	16.059
Silent Reading	N	21	21
	Mean	30.10	30.67
	Std. Deviation	18.9253	19.159
Total	N	62	62
	Mean	31.50	31.50
	Std. Deviation	18.041	18.041

Kruskal Wallis H test results reveal no significant main effect of group on fourth grade Narrative (H(2) = 2.289, *P* = .318) and Expository (H(2) = 1.643, *P* = .440) Oral Reading Fluency (Table 4.89). As a result, there is insufficient evidence to reject the claim that there is no difference in fourth grade students' reading oral reading fluency of narrative and expository texts as a result of employing two story performance techniques (H_2). Furthermore, there is insufficient evidence to reject the claim that there is no difference in fourth grade students' reading oral reading fluency of narrative and expository texts due to the effects of a teacher's telling and a teacher's reading aloud of twenty-eight stories to the students (H_4).

Table 4.89
Kruskal Wallis H Test Results by Group for Fourth Grade Narrative and Expository Oral Reading Fluency Main Effects

	Narrative Oral Reading Fluency	Expository Oral Reading Fluency
Chi-Square	2.289	1.643
df	2	2
Asymp. Sig.	.318	.440

Note. Alpha (α) = .10.

As previously referred to, computation results of group means using the transformed ART ranks for Narrative and Expository Oral Reading Fluency are revealed in Tables 4.79 and 4.87. Furthermore, these results are also represented in Table 4.90, where fourth grade case summaries by gender for Narrative and Expository Oral Reading Fluency main effects are offered. Narrative Oral Reading Fluency case summaries show that female participants attained the highest overall mean (*M* = 33.16) when compared to males (*M* = 29.84). Likewise, female participants also produced the highest overall Expository Oral Reading Fluency mean (*M* = 33.81) when contrasted

against their male peers (*M* = 29.19). Note that fourth grade female participants had a slightly higher mean in Expository Oral Reading Fluency in comparison to Narrative Oral Reading Fluency. The exact opposite was true for males, who managed a somewhat higher mean in Narrative Oral Reading Fluency as opposed to Expository Oral Reading Fluency.

Table 4.90
Fourth Grade Case Summaries by Gender for Narrative and Expository Oral Reading Fluency Main Effects

Gender		Narrative Oral Reading Fluency	Expository Oral Reading Fluency
Female	N	31	31
	Mean	33.16	33.81
	Std. Deviation	18.793	18.760
Male	N	31	31
	Mean	29.84	29.19
	Std. Deviation	17.405	17.288
Total	N	62	62
	Mean	31.50	31.50
	Std. Deviation	18.041	18.041

Kruskal Wallis H test results failed to demonstrate a main effect of gender on fourth grade Narrative (H(1) = .526, *P* = .468) and Expository (H(1) = 1.013, *P* = .314) Oral Reading Fluency (Table 4.91). These outcomes confirm that there is insufficient evidence to reject the claim that there is no difference in fourth grade students' reading oral reading fluency of narrative and expository texts as a result of employing two story performance techniques (H_2). Moreover, there is insufficient evidence to reject the claim that there is no difference in fourth grade students' reading oral reading fluency of narrative and expository texts due to the effects of a teacher's telling and a teacher's reading aloud of twenty-eight stories to the students (H_4).

Table 4.91
Kruskal Wallis H Test Results by Gender for Narrative and Expository Oral Reading Fluency Main Effects

	Narrative Oral Reading Fluency	Expository Oral Reading Fluency
Chi-Square	.526	1.013
df	1	1
Asymp. Sig.	.468	.314

Note. Alpha (α) = .10.

Data Analysis for the Fifth Grade Sample

Fifth Grade Sample

In the study, there was an unequal number of fifth grade females (*N* = 29) and males (*N* = 35). Because of this, distributions of students across treatment groups were affected. For example, as can be seen in Table 4.92, cell sizes for the Storytelling cluster had the least amount of students (*N* = 20), with only eleven males and nine females. Conversely, the Reading Aloud group had the most amount of fifth grade student participants (*N* = 23) and included thirteen male and ten female participants. Finally, note that the Silent Reading cluster (*N* = 21) had comparable numbers to the Storytelling group, but differed by only one more female (*N* = 11) student participant. Also note that the Reading Aloud group had the most male participants (*N* = 13), while the Storytelling set had the least amount of female participants (*N* = 9) in the study.

Table 4.92
Fifth Grade Sample Distribution

	Gender		
Group	Male	Female	*N*
Storytelling	11	9	20
Reading Aloud	13	10	23
Silent Reading	11	10	21
N	35	29	64

Fifth Grade Hypotheses

The hypotheses tested by this study are stated in the null form as follows:

H_1 - There is no difference in fifth grade students' reading comprehension of narrative and expository texts as a result of employing two story performance techniques.

H_2 - There is no difference in fifth grade students' oral reading fluency of narrative and expository texts as a result of employing two story performance techniques.

H_3 - There is no difference in fifth grade students' reading comprehension of narrative and expository texts due to the effects of:

(e) A teacher's telling twenty-eight stories to the students.

(f) A teacher's reading aloud of twenty-eight stories to the students.

H_4 - There is no difference in fifth grade students' oral reading fluency of narrative and expository texts due to the effects of:

(e) A teacher's telling twenty-eight stories to the students.

(f) A teacher's reading aloud of twenty-eight stories to the students.

H_5 - There is no significant interaction among two story performance techniques held constant across the factor of gender.

Parametric Analysis (MANOVA) of Fifth Grade Narrative and Expository Comprehension

Table 4.93 presents descriptive statistics involving students' scores on the Narrative Comprehension sub-test of the QRI-3 including the Mean (*M*), Standard Deviation (*SD*), and number of participants (*N*) organized by treatment group and gender.

Table 4.93
Fifth Grade Descriptive Statistics for Narrative Comprehension

QRI-3 Assessment	Group	Gender	*M*	*SD*	*N*
Narrative Comprehension	Storytelling	Female	6.33	1.658	9
		Male	5.82	1.401	11
		TOTAL	6.05	1.504	20
	Reading Aloud	Female	6.10	1.287	10
		Male	6.31	1.377	13
		TOTAL	6.22	1.313	23
	Silent Reading	Female	5.30	1.337	10
		Male	5.45	1.368	11
		TOTAL	5.38	1.322	21
	TOTAL	Female	5.90	1.448	29
		Male	5.89	1.388	35
		TOTAL	5.89	1.404	64

Overall, female participants in the study achieved a slightly higher score (*M* = 5.90) than their male peers (*M* = 5.89). In regard to treatment level, students exposed to Reading Aloud produced the highest Narrative Comprehension result (*M* = 6.22) followed by students exposed to Storytelling (*M* = 6.05) then students exposed to Silent Reading (*M* = 5.38). Among treatment levels, female participants exposed to Storytelling achieved the highest Narrative Comprehension score (*M* = 6.33) and outperformed all other groups. Nonetheless, male participants (*M* = 6.31) exposed to Reading Aloud bettered their female counterparts (*M* = 6.10) as well as males exposed to Silent Reading (*M* = 5.45), who also managed to surpass their female peers (*M* = 5.30) in Narrative Comprehension. Finally, observe that fifth grade females and males exposed to Silent Reading achieved the lowest Narrative Comprehension scores in the study.

Table 4.94 presents descriptive statistics involving students' scores on the Expository Comprehension sub-test of the QRI-3 including the Mean (*M*), Standard

Deviation (*SD*), and number of participants (*N*) organized by treatment group and gender.

Table 4.94
Fifth Grade Descriptive Statistics for Expository Comprehension

QRI-3 Assessment	Group	Gender	*M*	*SD*	*N*
Expository Comprehension	Storytelling	Female	6.11	1.167	9
		Male	5.82	1.079	11
		TOTAL	5.95	1.099	20
	Reading Aloud	Female	6.00	1.247	10
		Male	6.08	1.320	13
		TOTAL	6.04	1.261	23
	Silent Reading	Female	5.50	.972	10
		Male	6.09	1.375	11
		TOTAL	5.81	1.209	21
	TOTAL	Female	5.86	1.125	29
		Male	6.00	1.237	35
		TOTAL	5.94	1.180	64

As a whole, descriptive results for fifth grade Expository Comprehension produced a total mean of 5.94, which slightly exceeds the previously cited Narrative Comprehension mean (*M* = 5.89). Male (*M* = 6.00) participants, rather than females (*M* = 5.86), fashioned a higher Expository Comprehension result. In regard to treatment, fifth grade students exposed to Reading Aloud (*M* = 6.04) achieved an overall higher Expository Comprehension score than students exposed to Storytelling (*M* = 5.95) and Silent Reading (*M* = 5.81). Also note that the Storytelling group's mean score was higher than that of the Silent Reading group. Among treatment groups, females exposed to Storytelling attained the highest Expository Comprehension result (*M* = 6.11). On the other hand, females exposed to Silent Reading produced the lowest result (M = 5.50). Interestingly enough, male (*M* = 6.09) participants exposed to Silent Reading produced a higher Expository Comprehension composite score than their

female (*M* = 5.50) counterparts. Analogous to Silent Reading, males exposed to Reading Aloud (*M* = 6.08) also outperformed their female peers (*M* = 6.00).

In order to determine if the differences between any of the Narrative and Expository Comprehension mean scores of the groups was statistically significant, MANOVA was employed with gender (female, male) and treatment (Storytelling, Reading Aloud, and Silent Reading) serving as between-subjects factors (Table 4.95).

The multivariate main effect of gender on fifth grade Narrative and Expository Comprehension was not significant ($F(4, 55) = .066$, $p = .992$, partial $\eta^2 = .005$). Likewise, multivariate results also show no significant main effect of group ($F(8, 112) = .898$, $p = .520$, partial $\eta^2 = .060$) on fifth grade Narrative and Expository Comprehension. As a final point, there was no significant multivariate interaction between gender and treatment ($F(8, 112) = .289$, $p = .968$, partial $\eta^2 = .020$).

Table 4.95
Multivariate and Univariate Analyses of Variance for Fifth Grade Comprehension

				Univariate					
	Multivariate			Narrative Comprehension			Expository Comprehension		
Source	*F*[c,d]	*p*	Partial η^2	*F*[e,f]	*p*	Partial η^2	*F*[e,f]	*p*	Partial η^2
Gender (G)[a]	.066	.992	.005	.021	.886	.000	.169	.683	.003
Group (Gr.)[a]	.898	.520	.060	2.139	.127	.069	.228	.797	.008
G × Gr.[b]	.289	.968	.020	.422	.657	.014	.688	.506	.023

Note. Multivariate *F* ratios were generated from Pillai's Trace. [a]Alpha (α) = .10. [b]Alpha (α) = .05. [c]Multivariate df for G = 4, 55. [d]Multivariate df for Gr. and G × Gr. = 8, 112. [e]Univariate df for G = 1, 58. [f]Univariate df for Gr. and G × Gr. = 2, 58.

Univariate main effect results of gender on fifth grade Narrative ($F(1, 58) = .021$, $p = .886$, partial $\eta^2 = .000$) and Expository ($F(1, 58) = .169$, $p = .683$, partial $\eta^2 = .003$) Comprehension were not significant. Additionally, univariate results also show no significant main effect of group on fifth grade Narrative ($F(2, 58) = 2.139$, $p = .127$,

partial η^2 = .069) and Expository (F(2, 58) = .228, p = .797, partial η^2 = .008) Comprehension. Lastly, there was no significant univariate interaction between gender and treatment in fifth grade Narrative F(2, 58) = .422, p = .657, partial η^2 = .014) and Expository F(2, 58) = .688, p = .506, partial η^2 = .023) Comprehension.

On the basis of the MANOVA analysis, there is insufficient evidence to reject the claim that there is no difference in fifth grade students' reading comprehension of narrative and expository texts as a result of employing two story performance techniques (H_1). Moreover, there is not enough evidence to reject the claim that there is no difference in fifth grade students' reading comprehension of narrative and expository texts due to the effects of a teacher's telling and a teacher's reading aloud of twenty-eight stories to the students (H_3). Lastly, there is insufficient evidence to reject the claim that there is no significant interaction among two story performance techniques held constant across the factor of gender (H_5).

Nonparametric Analysis of Interactions for Fifth Grade Narrative and Expository Comprehension

For the nonparametric interaction analyses of fifth grade Narrative Comprehension, student raw scores were first adjusted by subtracting marginal means from each row and column (Figure 4.1). Table 4.96 depicts how marginal means were calculated using the raw data; this procedure was used to isolate interactions by removing all main effects (as seen in Tables 4.97, 4.98, 4.99, 4.100, 4.101, and 4.102) (Leys & Schumann, 2010; Sawilowsky, 1990, 2000). Next, students' adjusted scores were pooled together to form one set so that ranks could be appropriately assigned. This end result was attained by arranging all students' scores in an increasing order,

assigning a rank ranging from one to sixty-four, and adapting the rank for all ties by assigning equal average ranks to each one (Table 4.103). Finally, a 2×3 factorial ANOVA was computed using the transformed ART scores.

Table 4.96
Fifth Grade Narrative Comprehension Raw Scores

	A_2	A_1	A_0	Marginal Mean
B_1	6 5 3 6 8 6 8 8 7	3 6 7 6 6 8 7 6 6 6	5 4 7 5 6 5 4 8 5 4	$\overline{B}_1 = 5.90$
Group Mean	$\overline{AB}_{21} = 6.33$	$\overline{AB}_{11} = 6.10$	$\overline{AB}_{01} = 5.30$	
B_0	7 5 8 6 5 4 5 6 6 8 4	6 8 5 7 8 6 6 7 5 3 7 7 7	4 6 3 5 4 6 5 7 7 7 6	$\overline{B}_0 = 5.89$
Group Mean	$\overline{AB}_{20} = 5.82$	$\overline{AB}_{10} = 6.31$	$\overline{AB}_{00} = 5.45$	
Marginal Mean	$\overline{A}_2 = 6.05$	$\overline{A}_1 = 6.22$	$\overline{A}_0 = 5.38$	$\overline{X} = 5.89$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.97
Calculation of Adjusted Raw Scores of Females Exposed to Storytelling for Fifth Grade Narrative Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_2$	-	$\overline{B}_1$	=	Adjusted Raw Score
5	Storytelling	Female	6	-	6.05	-	5.90	=	-5.95
5	Storytelling	Female	5	-	6.05	-	5.90	=	-6.95
5	Storytelling	Female	3	-	6.05	-	5.90	=	-8.95
5	Storytelling	Female	6	-	6.05	-	5.90	=	-5.95
5	Storytelling	Female	8	-	6.05	-	5.90	=	-3.95
5	Storytelling	Female	6	-	6.05	-	5.90	=	-5.95
5	Storytelling	Female	8	-	6.05	-	5.90	=	-3.95
5	Storytelling	Female	8	-	6.05	-	5.90	=	-3.95
5	Storytelling	Female	7	-	6.05	-	5.90	=	-4.95

Note. $\overline{A}_2$ = Storytelling marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.98
Calculation of Adjusted Raw Scores of Males Exposed to Storytelling for Fifth Grade Narrative Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_2$	-	$\overline{B}_0$	=	Adjusted Raw Score
5	Storytelling	Male	7	-	6.05	-	5.89	=	-4.94
5	Storytelling	Male	5	-	6.05	-	5.89	=	-6.94
5	Storytelling	Male	8	-	6.05	-	5.89	=	-3.94
5	Storytelling	Male	6	-	6.05	-	5.89	=	-5.94
5	Storytelling	Male	5	-	6.05	-	5.89	=	-6.94
5	Storytelling	Male	4	-	6.05	-	5.89	=	-7.94
5	Storytelling	Male	5	-	6.05	-	5.89	=	-6.94
5	Storytelling	Male	6	-	6.05	-	5.89	=	-5.94
5	Storytelling	Male	6	-	6.05	-	5.89	=	-5.94
5	Storytelling	Male	8	-	6.05	-	5.89	=	-3.94
5	Storytelling	Male	4	-	6.05	-	5.89	=	-7.94

Note. $\overline{A}_2$ = Storytelling marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.99
Calculation of Adjusted Raw Scores of Females Exposed to Reading Aloud for Fifth Grade Narrative Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_1$	-	$\overline{B}_1$	=	Adjusted Raw Score
5	Reading Aloud	Female	3	-	6.22	-	5.90	=	-9.12
5	Reading Aloud	Female	6	-	6.22	-	5.90	=	-6.12
5	Reading Aloud	Female	7	-	6.22	-	5.90	=	-5.12
5	Reading Aloud	Female	6	-	6.22	-	5.90	=	-6.12
5	Reading Aloud	Female	6	-	6.22	-	5.90	=	-6.12
5	Reading Aloud	Female	8	-	6.22	-	5.90	=	-4.12
5	Reading Aloud	Female	7	-	6.22	-	5.90	=	-5.12
5	Reading Aloud	Female	6	-	6.22	-	5.90	=	-6.12
5	Reading Aloud	Female	6	-	6.22	-	5.90	=	-6.12
5	Reading Aloud	Female	6	-	6.22	-	5.90	=	-6.12

Note. $\overline{A}_1$ = Reading Aloud marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.100
Calculation of Adjusted Raw Scores of Males Exposed to Reading Aloud for Fifth Grade Narrative Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_1$	-	$\overline{B}_0$	=	Adjusted Raw Score
5	Reading Aloud	Male	6	-	6.22	-	5.89	=	-6.11
5	Reading Aloud	Male	8	-	6.22	-	5.89	=	-4.11
5	Reading Aloud	Male	5	-	6.22	-	5.89	=	-7.11
5	Reading Aloud	Male	7	-	6.22	-	5.89	=	-5.11
5	Reading Aloud	Male	8	-	6.22	-	5.89	=	-4.11
5	Reading Aloud	Male	6	-	6.22	-	5.89	=	-6.11
5	Reading Aloud	Male	6	-	6.22	-	5.89	=	-6.11
5	Reading Aloud	Male	7	-	6.22	-	5.89	=	-5.11
5	Reading Aloud	Male	5	-	6.22	-	5.89	=	-7.11
5	Reading Aloud	Male	3	-	6.22	-	5.89	=	-9.11
5	Reading Aloud	Male	7	-	6.22	-	5.89	=	-5.11
5	Reading Aloud	Male	7	-	6.22	-	5.89	=	-5.11
5	Reading Aloud	Male	7	-	6.22	-	5.89	=	-5.11

Note. $\overline{A}_1$ = Reading Aloud marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.101
Calculation of Adjusted Raw Scores of Females Exposed to Silent Reading for Fifth Grade Narrative Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_0$	-	$\overline{B}_1$	=	Adjusted Raw Score
5	Silent Reading	Female	5	-	5.38	-	5.90	=	-6.28
5	Silent Reading	Female	4	-	5.38	-	5.90	=	-7.28
5	Silent Reading	Female	7	-	5.38	-	5.90	=	-4.28
5	Silent Reading	Female	5	-	5.38	-	5.90	=	-6.28
5	Silent Reading	Female	6	-	5.38	-	5.90	=	-5.28
5	Silent Reading	Female	5	-	5.38	-	5.90	=	-6.28
5	Silent Reading	Female	4	-	5.38	-	5.90	=	-7.28
5	Silent Reading	Female	8	-	5.38	-	5.90	=	-3.28
5	Silent Reading	Female	5	-	5.38	-	5.90	=	-6.28
5	Silent Reading	Female	4	-	5.38	-	5.90	=	-7.28

Note. $\overline{A}_0$ = Silent Reading marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.102
Calculation of Adjusted Raw Scores of Males Exposed to Silent Reading for Fifth Grade Narrative Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_0$	-	$\overline{B}_0$	=	Adjusted Raw Score
5	Silent Reading	Male	4	-	5.38	-	5.89	=	-7.27
5	Silent Reading	Male	6	-	5.38	-	5.89	=	-5.27
5	Silent Reading	Male	3	-	5.38	-	5.89	=	-8.27
5	Silent Reading	Male	5	-	5.38	-	5.89	=	-6.27
5	Silent Reading	Male	4	-	5.38	-	5.89	=	-7.27
5	Silent Reading	Male	6	-	5.38	-	5.89	=	-5.27
5	Silent Reading	Male	5	-	5.38	-	5.89	=	-6.27
5	Silent Reading	Male	7	-	5.38	-	5.89	=	-4.27
5	Silent Reading	Male	7	-	5.38	-	5.89	=	-4.27
5	Silent Reading	Male	7	-	5.38	-	5.89	=	-4.27
5	Silent Reading	Male	6	-	5.38	-	5.89	=	-5.27

Note. $\overline{A}_0$ = Silent Reading marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.103
Fifth Grade Narrative Comprehension Adjusted Raw Scores Transformed Into Ranks (ART)

	A_2			A_1			A_0		
	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART
B_1	-5.95	→	34.00	-9.12	→	1.00	-6.28	→	19.50
	-6.95	→	14.00	-6.12	→	26.50	-7.28	→	8.00
	-8.95	→	3.00	-5.12	→	43.50	-4.28	→	52.00
	-5.95	→	34.00	-6.12	→	26.50	-6.28	→	19.50
	-3.95	→	60.00	-6.12	→	26.50	-5.28	→	39.00
	-5.95	→	34.00	-4.12	→	56.00	-6.28	→	19.50
	-3.95	→	60.00	-5.12	→	43.50	-7.28	→	8.00
	-3.95	→	60.00	-6.12	→	26.50	-3.28	→	64.00
	-4.95	→	50.00	-6.12	→	26.50	-6.28	→	19.50
				-6.12	→	26.50	-7.28	→	8.00
B_0	-4.94	→	51.00	-6.11	→	31.00	-7.27	→	10.50
	-6.94	→	16.00	-4.11	→	57.50	-5.27	→	41.00
	-3.94	→	62.50	-7.11	→	12.50	-8.27	→	4.00
	-5.94	→	37.00	-5.11	→	47.00	-6.27	→	22.50
	-6.94	→	16.00	-4.11	→	57.50	-7.27	→	10.50
	-7.94	→	5.50	-6.11	→	31.00	-5.27	→	41.00
	-6.94	→	16.00	-6.11	→	31.00	-6.27	→	22.50
	-5.94	→	37.00	-5.11	→	47.00	-4.27	→	54.00
	-5.94	→	37.00	-7.11	→	12.50	-4.27	→	54.00
	-3.94	→	62.50	-9.11	→	2.00	-4.27	→	54.00
	-7.94	→	5.50	-5.11	→	47.00	-5.27	→	41.00
				-5.11	→	47.00			
				-5.11	→	47.00			

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.104 depicts the calculation of group and marginal means using the transformed ART rank. These results are also signified in Table 4.105, which displays descriptive statistics involving students' ART scores from the Narrative Comprehension sub-test of the QRI-3 and consists of Mean (*M*), Standard Deviation (*SD*), and number of participants (*N*) organized by treatment group and gender.

Table 4.104
Fifth Grade Narrative Comprehension Adjusted Raw Scores Replaced by Ranks (ART)

	A_2	A_1	A_0	Marginal Mean
	34.00	1.00	19.50	
	14.00	26.50	8.00	
	3.00	43.50	52.00	
	34.00	26.50	19.50	
	60.00	26.50	39.00	
B_1	34.00	56.00	19.50	$\overline{B}_1 = 31.35$
	60.00	43.50	8.00	
	60.00	26.50	64.00	
	50.00	26.50	19.50	
		26.50	8.00	
Group Mean	$\overline{AB}_{21} = 38.78$	$\overline{AB}_{11} = 30.30$	$\overline{AB}_{01} = 25.70$	
	51.00	31.00	10.50	
	16.00	57.50	41.00	
	62.50	12.50	4.00	
	37.00	47.00	22.50	
	16.00	57.50	10.50	
	5.50	31.00	41.00	
B_0	16.00	31.00	22.50	$\overline{B}_0 = 33.46$
	37.00	47.00	54.00	
	37.00	12.50	54.00	
	62.50	2.00	54.00	
	5.50	47.00	41.00	
		47.00		
		47.00		
Group Mean	$\overline{AB}_{20} = 31.46$	$\overline{AB}_{10} = 36.15$	$\overline{AB}_{00} = 32.27$	
Marginal Mean	$\overline{A}_2 = 34.75$	$\overline{A}_1 = 33.61$	$\overline{A}_0 = 29.14$	$\overline{X} = 32.50$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading. B_1 = Female. B_0 = Male.

Overall ART interaction scores for Narrative Comprehension exhibit varied results. To be more specific, female students exposed to Storytelling achieved the highest overall Narrative Comprehension score (M = 38.78). Ironically, female students

exposed to Reading Aloud (*M* = 30.30) and Silent Reading (*M* = 25.70) produced the lowest overall Narrative Comprehension results. Yet, notice that the Reading Aloud group's mean for females was higher than that of the Silent Reading group. As for fifth grade males, the Reading Aloud group attained the highest fifth grade Narrative Comprehension score (*M* = 36.15) as compared to those exposed to Silent Reading (*M* = 32.27) and Storytelling (*M* = 31.46). However, the Silent Reading group's mean score for males was higher than that of the Storytelling group. Note that males exposed to Storytelling attained the lowest Narrative Comprehension score for their respective gender. Also note that males in the Silent Reading and Reading Aloud groups outperformed their female peers. This relationship was inverted in the Storytelling cluster.

Table 4.105
Descriptive Statistics for Fifth Grade Narrative Comprehension Interactions

Gender	Group	*M*	*SD*	*N*
Female	Storytelling	38.78	20.735	9
	Reading Aloud	30.30	14.735	10
	Silent Reading	25.70	19.520	10
	Total	31.35	18.564	29
Male	Storytelling	31.46	21.132	11
	Reading Aloud	36.15	17.946	13
	Silent Reading	32.27	18.929	11
	Total	33.46	18.840	35
Total	Storytelling	34.75	20.737	20
	Reading Aloud	33.61	16.532	23
	Silent Reading	29.14	19.024	21
	Total	32.50	18.597	64

Interaction results for fifth grade students' Narrative Comprehension ART scores are reported in Table 4.106. For the analysis, a 2×3 univariate ANOVA was used, with gender (female, male) and group (Storytelling, Reading Aloud, Storytelling) as between-

subjects factors. Univariate outcomes revealed no significant interaction for between-subjects factors (Gender × Group) in fifth grade students' Narrative Comprehension ($F(2, 58) = .872$, $p = .423$, partial $\eta^2 = .029$).

Table 4.106
Factorial ANOVA for Fifth Grade Narrative Comprehension Interactions

Source	Type III Sum of Squares	df	*F*	Sig.	Partial η^2
Gender × Group	623.73	2	.872	.423	.029
Error	20736.36	58			
Total	89388.00	64			

Note. Being irrelevant, main effects are not presented. Alpha (α) = .05.

Based upon the analysis of Narrative Comprehension, there is insufficient evidence to reject the claim that there is no significant interaction among two story performance techniques held constant across the factor of gender (H_5).

Nonparametric measures previously described for fifth grade Narrative Comprehension ART interactions were also employed for Expository Comprehension ART interactions. Again, student raw scores were initially adjusted by subtracting marginal means from each row and column. Table 4.107 documents how marginal means were calculated using the raw data. This course of action was used to isolate interactions by removing all main effects (as seen in Tables 4.108, 4.109, 4.110, 4.111, 4.112, and 4.113) (Leys & Schumann, 2010; Sawilowsky, 1990, 2000). Next, students' adjusted scores were pooled together to form one set so that ranks could be properly assigned. This outcome was reached by arranging all students' scores in an increasing order, assigning a rank ranging from one to sixty-four, and adapting the rank for all tie values by assigning equal average ranks to each one (Table 4.114). Lastly, a 2×3 factorial ANOVA was computed using the transformed ART dataset.

Table 4.107
Fifth Grade Expository Comprehension Raw Scores

	A_2	A_1	A_0	Marginal Mean
B_1	4 6 6 7 6 7 8 6 5	6 4 8 5 7 7 6 5 5 7	4 5 6 4 6 6 5 7 6 6	$\overline{B}_1 = 5.86$
Group Mean	$\overline{AB}_{21} = 6.11$	$\overline{AB}_{11} = 6.00$	$\overline{AB}_{01} = 5.50$	
B_0	7 6 6 4 6 6 5 7 7 6 4	5 7 7 6 7 5 6 4 8 4 8 6 6	6 7 5 5 3 7 7 6 6 7 8	$\overline{B}_0 = 6.00$
Group Mean	$\overline{AB}_{20} = 5.82$	$\overline{AB}_{10} = 6.08$	$\overline{AB}_{00} = 6.09$	
Marginal Mean	$\overline{A}_2 = 5.95$	$\overline{A}_1 = 6.04$	$\overline{A}_0 = 5.81$	$\overline{X} = 5.93$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.108
Calculation of Adjusted Raw Scores of Females Exposed to Storytelling for Fifth Grade Expository Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_2$	-	$\overline{B}_1$	=	Adjusted Raw Score
5	Storytelling	Female	4	-	5.95	-	5.86	=	-7.81
5	Storytelling	Female	6	-	5.95	-	5.86	=	-5.81
5	Storytelling	Female	6	-	5.95	-	5.86	=	-5.81
5	Storytelling	Female	7	-	5.95	-	5.86	=	-4.81
5	Storytelling	Female	6	-	5.95	-	5.86	=	-5.81
5	Storytelling	Female	7	-	5.95	-	5.86	=	-4.81
5	Storytelling	Female	8	-	5.95	-	5.86	=	-3.81
5	Storytelling	Female	6	-	5.95	-	5.86	=	-5.81
5	Storytelling	Female	5	-	5.95	-	5.86	=	-6.81

Note. $\overline{A}_2$ = Storytelling marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.109
Calculation of Adjusted Raw Scores of Males Exposed to Storytelling for Fifth Grade Expository Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_2$	-	$\overline{B}_0$	=	Adjusted Raw Score
5	Storytelling	Male	7	-	5.95	-	6.00	=	-4.95
5	Storytelling	Male	6	-	5.95	-	6.00	=	-5.95
5	Storytelling	Male	6	-	5.95	-	6.00	=	-5.95
5	Storytelling	Male	4	-	5.95	-	6.00	=	-7.95
5	Storytelling	Male	6	-	5.95	-	6.00	=	-5.95
5	Storytelling	Male	6	-	5.95	-	6.00	=	-5.95
5	Storytelling	Male	5	-	5.95	-	6.00	=	-6.95
5	Storytelling	Male	7	-	5.95	-	6.00	=	-4.95
5	Storytelling	Male	7	-	5.95	-	6.00	=	-4.95
5	Storytelling	Male	6	-	5.95	-	6.00	=	-5.95
5	Storytelling	Male	4	-	5.95	-	6.00	=	-7.95

Note. $\overline{A}_2$ = Storytelling marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.110
Calculation of Adjusted Raw Scores of Females Exposed to Reading Aloud for Fifth Grade Expository Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_1$	-	$\overline{B}_1$	=	Adjusted Raw Score
5	Reading Aloud	Female	6	-	6.04	-	5.86	=	-5.90
5	Reading Aloud	Female	4	-	6.04	-	5.86	=	-7.90
5	Reading Aloud	Female	8	-	6.04	-	5.86	=	-3.90
5	Reading Aloud	Female	5	-	6.04	-	5.86	=	-6.90
5	Reading Aloud	Female	7	-	6.04	-	5.86	=	-4.90
5	Reading Aloud	Female	7	-	6.04	-	5.86	=	-4.90
5	Reading Aloud	Female	6	-	6.04	-	5.86	=	-5.90
5	Reading Aloud	Female	5	-	6.04	-	5.86	=	-6.90
5	Reading Aloud	Female	5	-	6.04	-	5.86	=	-6.90
5	Reading Aloud	Female	7	-	6.04	-	5.86	=	-4.90

Note. $\overline{A}_1$ = Reading Aloud marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.111
Calculation of Adjusted Raw Scores of Males Exposed to Reading Aloud for Fifth Grade Expository Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_1$	-	$\overline{B}_0$	=	Adjusted Raw Score
5	Reading Aloud	Male	5	-	6.04	-	6.00	=	-7.04
5	Reading Aloud	Male	7	-	6.04	-	6.00	=	-5.04
5	Reading Aloud	Male	7	-	6.04	-	6.00	=	-5.04
5	Reading Aloud	Male	6	-	6.04	-	6.00	=	-6.04
5	Reading Aloud	Male	7	-	6.04	-	6.00	=	-5.04
5	Reading Aloud	Male	5	-	6.04	-	6.00	=	-7.04
5	Reading Aloud	Male	6	-	6.04	-	6.00	=	-6.04
5	Reading Aloud	Male	4	-	6.04	-	6.00	=	-8.04
5	Reading Aloud	Male	8	-	6.04	-	6.00	=	-4.04
5	Reading Aloud	Male	4	-	6.04	-	6.00	=	-8.04
5	Reading Aloud	Male	8	-	6.04	-	6.00	=	-4.04
5	Reading Aloud	Male	6	-	6.04	-	6.00	=	-6.04
5	Reading Aloud	Male	6	-	6.04	-	6.00	=	-6.04

Note. $\overline{A}_1$ = Reading Aloud marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.112
Calculation of Adjusted Raw Scores of Females Exposed to Silent Reading for Fifth Grade Expository Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_0$	-	$\overline{B}_1$	=	Adjusted Raw Score
5	Silent Reading	Female	4	-	5.81	-	5.86	=	-7.67
5	Silent Reading	Female	5	-	5.81	-	5.86	=	-6.67
5	Silent Reading	Female	6	-	5.81	-	5.86	=	-5.67
5	Silent Reading	Female	4	-	5.81	-	5.86	=	-7.67
5	Silent Reading	Female	6	-	5.81	-	5.86	=	-5.67
5	Silent Reading	Female	6	-	5.81	-	5.86	=	-5.67
5	Silent Reading	Female	5	-	5.81	-	5.86	=	-6.67
5	Silent Reading	Female	7	-	5.81	-	5.86	=	-4.67
5	Silent Reading	Female	6	-	5.81	-	5.86	=	-5.67
5	Silent Reading	Female	6	-	5.81	-	5.86	=	-5.67

Note. $\overline{A}_0$ = Silent Reading marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.113
Calculation of Adjusted Raw Scores of Males Exposed to Silent Reading for Fifth Grade Expository Comprehension Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_0$	-	$\overline{B}_0$	=	Adjusted Raw Score
5	Silent Reading	Male	6	-	5.81	-	6.00	=	-5.81
5	Silent Reading	Male	7	-	5.81	-	6.00	=	-4.81
5	Silent Reading	Male	5	-	5.81	-	6.00	=	-6.81
5	Silent Reading	Male	5	-	5.81	-	6.00	=	-6.81
5	Silent Reading	Male	3	-	5.81	-	6.00	=	-8.81
5	Silent Reading	Male	7	-	5.81	-	6.00	=	-4.81
5	Silent Reading	Male	7	-	5.81	-	6.00	=	-4.81
5	Silent Reading	Male	6	-	5.81	-	6.00	=	-5.81
5	Silent Reading	Male	6	-	5.81	-	6.00	=	-5.81
5	Silent Reading	Male	7	-	5.81	-	6.00	=	-4.81
5	Silent Reading	Male	8	-	5.81	-	6.00	=	-3.81

Note. $\overline{A}_0$ = Silent Reading marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.114
Fifth Grade Expository Comprehension Adjusted Raw Scores Transformed Into Ranks (ART)

	A_2			A_1			A_0		
	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART
B_1	-7.81	→	7.00	-5.90	→	30.50	-7.67	→	8.50
	-5.81	→	35.00	-7.90	→	6.00	-6.67	→	19.50
	-5.81	→	35.00	-3.90	→	62.00	-5.67	→	41.00
	-4.81	→	55.50	-6.90	→	14.00	-7.67	→	8.50
	-5.81	→	35.00	-4.90	→	51.00	-5.67	→	41.00
	-4.81	→	55.50	-4.90	→	51.00	-5.67	→	41.00
	-3.81	→	63.50	-5.90	→	30.50	-6.67	→	19.50
	-5.81	→	35.00	-6.90	→	14.00	-4.67	→	59.00
	-6.81	→	17.00	-6.90	→	14.00	-5.67	→	41.00
				-4.90	→	51.00	-5.67	→	41.00
B_0	-4.95	→	48.00	-7.04	→	10.50	-5.81	→	35.00
	-5.95	→	27.00	-5.04	→	45.00	-4.81	→	55.50
	-5.95	→	27.00	-5.04	→	45.00	-6.81	→	17.00
	-7.95	→	4.50	-6.04	→	22.50	-6.81	→	17.00
	-5.95	→	27.00	-5.04	→	45.00	-8.81	→	1.00
	-5.95	→	27.00	-7.04	→	10.50	-4.81	→	55.50
	-6.95	→	12.00	-6.04	→	22.50	-4.81	→	55.50
	-4.95	→	48.00	-8.04	→	2.50	-5.81	→	35.00
	-4.95	→	48.00	-4.04	→	60.50	-5.81	→	35.00
	-5.95	→	27.00	-8.04	→	2.50	-4.81	→	55.50
	-7.95	→	4.50	-4.04	→	60.50	-3.81	→	63.50
				-6.04	→	22.50			
				-6.04	→	22.50			

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.115 shows the calculation of group and marginal means using the transformed ART ranks. These results are also represented in Table 4.116, which displays descriptive statistics involving students' ART scores from the Expository Comprehension sub-test of the QRI-3 and consists of Mean (*M*), Standard Deviation (*SD*), and number of participants (*N*) organized by treatment group and gender.

Table 4.115
Fifth Grade Expository Comprehension Adjusted Raw Scores Replaced by Ranks (ART)

	A_2	A_1	A_0	Marginal Mean
B_1	7.00 35.00 35.00 55.50 35.00 55.50 63.50 35.00 17.00	30.50 6.00 62.00 14.00 51.00 51.00 30.50 14.00 14.00 51.00	8.50 19.50 41.00 8.50 41.00 41.00 19.50 59.00 41.00 41.00	$\overline{B}_1 = 33.88$
Group Mean	$\overline{AB}_{21} = 37.61$	$\overline{AB}_{11} = 32.40$	$\overline{AB}_{01} = 32.00$	
B_0	48.00 27.00 27.00 4.50 27.00 27.00 12.00 48.00 48.00 27.00 4.50	10.50 45.00 45.00 22.50 45.00 10.50 22.50 2.50 60.50 2.50 60.50 22.50 22.50	35.00 55.50 17.00 17.00 1.00 55.50 55.50 35.00 35.00 55.50 63.50	$\overline{B}_0 = 31.36$
Group Mean	$\overline{AB}_{20} = 27.27$	$\overline{AB}_{10} = 28.62$	$\overline{AB}_{00} = 38.68$	
Marginal Mean	$\overline{A}_2 = 31.93$	$\overline{A}_1 = 30.26$	$\overline{A}_0 = 35.50$	$\overline{X} = 32.50$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Overall ART interaction scores for fifth grade Expository Comprehension yield somewhat different results than Narrative Comprehension, but construct some similar patterns. For instance, one visible outcome is that males exposed to Silent Reading

produced the highest overall Expository Comprehension mean (*M* = 38.68). On the contrary, males exposed to Storytelling produced the lowest Expository Comprehension result (M = 27.27). Contrary to Expository Comprehension, females produced the highest and lowest overall interaction ART results for Narrative Comprehension (where the mean score for females exposed to Storytelling produced a mean of 38.78 and females exposed to Silent Reading attained a meager mean of 25.70). Another anomaly is that females exposed to Storytelling achieved the highest Narrative (M = 38.78) and Expository (M = 37.61) Comprehension results on behalf of their particular gender. In contrast, the opposite can be said about males exposed to Storytelling, who produced the lowest overall Narrative (M = 31.46) and Expository (M = 27.27) Comprehension results for their specific gender. Note too that females exposed to Storytelling (*M* = 37.61) attained an overall higher Expository Comprehension score than females exposed to Reading Aloud (M = 32.40) and Silent Reading (M = 32.00). The same pattern for females subsists when juxtaposed against Narrative Comprehension ART interaction scores.

Table 4.116
Descriptive Statistics for Fifth Grade Expository Comprehension Interactions

Gender	Group	*M*	*SD*	*N*
Female	Storytelling	37.61	18.369	9
	Reading Aloud	32.40	20.094	10
	Silent Reading	32.00	16.836	10
	Total	33.88	17.995	29
Male	Storytelling	27.27	15.999	11
	Reading Aloud	28.62	20.430	13
	Silent Reading	38.68	20.367	11
	Total	31.36	19.241	35
Total	Storytelling	31.93	17.454	20
	Reading Aloud	30.26	19.913	23
	Silent Reading	35.50	18.619	21
	Total	32.50	18.583	64

Interaction results for fifth grade students' Expository Comprehension ART scores are reported in Table 4.117. Once again, gender (female, male) and group (Storytelling, Reading Aloud, Storytelling) were used as between-subjects factors. Results show no significant interaction for between-subjects factors (Gender × Group) in fifth grade students' Expository Comprehension ($F(2, 58) = 1.063$, $p = .352$, partial $\eta^2 = .035$).

Table 4.117
Factorial ANOVA for Fifth Grade Expository Comprehension Interactions

Source	Type III Sum of Squares	df	*F*	Sig.	Partial η^2
Gender × Group	754.797	2	1.063	.352	.035
Error	20600.684	58			
Total	89355.500	64			

Note. Being irrelevant, main effects are not presented. Alpha (α) = .05.

As a result of the previously noted analysis, there is insufficient evidence to reject the claim that there is no significant interaction among two story performance techniques held constant across the factor of gender (H_5).

Nonparametric Analysis of Main Effects for Fifth Grade Narrative and Expository Comprehension

As with fourth grade, main effect results for fifth grade Narrative and Expository Comprehension were also evaluated through one-way Kruskal-Wallis H and Wilcoxon Rank-Sum (Mann-Whitney U) tests. The Kruskal-Wallis H test, which is a nonparametric test equivalent to a one-way ANOVA, was selected to compare three or more sets of scores that come from different groups. It also permits the assessment of more than two independent groups. If significant differences between cell means are detected using the Kruskal-Wallis H test, post hoc Wilcoxon Rank-Sum (Mann-Whitney U) tests will be employed. This nonparametric procedure will test hypotheses H_1 and H_3 and determine the location of any significant differences.

Previous to running the analysis, the Blair-Sawilowsky Salter-Fawcett adjusted rank transformation test (ART) procedure for main effects was carried out for both Narrative and Expository Comprehension datasets (please see Table 4.96 for Narrative Comprehension and 4.107 for Expository Comprehension group and marginal mean computations). This technique involved isolating main effects by subtracting the interaction from the raw data (Leys & Schumann, 2010; Sawilowsky, 1990, 2000). In order for main effects to be calculated without being affected by the interaction (Figure 4.2), the interaction (i.e., $\frac{6.33+6.31+5.45}{3}$ = 6.03) was deducted from each raw score by subtracting $\frac{\overline{AB}_{21}+\overline{AB}_{10}+\overline{AB}_{00}}{3}$, the mean of the three diagonal group means (please see Narrative Comprehension Tables 4.118, 4.119, 4.120, 4.121, 4.122, and 4.123; Expository Comprehension Tables 4.126, 4.127, 4.128, 4.129, 4.130, and 4.131). Next,

students' adjusted raw scores were pooled together to form one set so that ranks could be properly assigned (please see Narrative Comprehension Table 4.124; Expository Comprehension Table 4.132). This outcome was reached by arranging all students' scores in an increasing order, assigning a rank ranging from one to sixty-four, and adapting the rank for all tie values by assigning equal average ranks to each one. Finally, one-way Kruskal-Wallis H and, if necessary, post hoc Wilcoxon Rank-Sum (Mann-Whitney U) tests were computed using the transformed ART scores.

Table 4.118
Calculation of Adjusted Raw Scores of Females Exposed to Storytelling for Fifth Grade Narrative Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{21} + \overline{AB}_{10} + \overline{AB}_{00}}{3}$	=	Adjusted Raw Score
5	Storytelling	Female	6	-	6.03	=	-0.03
5	Storytelling	Female	5	-	6.03	=	-1.03
5	Storytelling	Female	3	-	6.03	=	-3.03
5	Storytelling	Female	6	-	6.03	=	-0.03
5	Storytelling	Female	8	-	6.03	=	1.97
5	Storytelling	Female	6	-	6.03	=	-0.03
5	Storytelling	Female	8	-	6.03	=	1.97
5	Storytelling	Female	8	-	6.03	=	1.97
5	Storytelling	Female	7	-	6.03	=	0.97

Note. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{00}$ = Group mean of males Exposed to Silent Reading.

Table 4.119
Calculation of Adjusted Raw Scores of Males Exposed to Storytelling for Fifth Grade Narrative Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{20} + \overline{AB}_{11} + \overline{AB}_{01}}{3}$	=	Adjusted Raw Score
5	Storytelling	Male	7	-	5.74	=	1.26
5	Storytelling	Male	5	-	5.74	=	-0.74
5	Storytelling	Male	8	-	5.74	=	2.26
5	Storytelling	Male	6	-	5.74	=	0.26
5	Storytelling	Male	5	-	5.74	=	-0.74
5	Storytelling	Male	4	-	5.74	=	-1.74
5	Storytelling	Male	5	-	5.74	=	-0.74
5	Storytelling	Male	6	-	5.74	=	0.26
5	Storytelling	Male	6	-	5.74	=	0.26
5	Storytelling	Male	8	-	5.74	=	2.26
5	Storytelling	Male	4	-	5.74	=	-1.74

Note. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading.

Table 4.120
Calculation of Adjusted Raw Scores of Females Exposed to Reading Aloud for Fifth Grade Narrative Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{11} + \overline{AB}_{20} + \overline{AB}_{00}}{3}$	=	Adjusted Raw Score
5	Reading Aloud	Female	3	-	5.79	=	-2.79
5	Reading Aloud	Female	6	-	5.79	=	0.21
5	Reading Aloud	Female	7	-	5.79	=	1.21
5	Reading Aloud	Female	6	-	5.79	=	0.21
5	Reading Aloud	Female	6	-	5.79	=	0.21
5	Reading Aloud	Female	8	-	5.79	=	2.21
5	Reading Aloud	Female	7	-	5.79	=	1.21
5	Reading Aloud	Female	6	-	5.79	=	0.21
5	Reading Aloud	Female	6	-	5.79	=	0.21
5	Reading Aloud	Female	6	-	5.79	=	0.21

Note. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling. $\overline{AB}_{00}$ = Group mean of males exposed to Silent Reading.

Table 4.121
Calculation of Adjusted Raw Scores of Males Exposed to Reading Aloud for Fifth Grade Narrative Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{10} + \overline{AB}_{21} + \overline{AB}_{01}}{3}$	=	Adjusted Raw Score
5	Reading Aloud	Male	6	-	5.98	=	0.02
5	Reading Aloud	Male	8	-	5.98	=	2.02
5	Reading Aloud	Male	5	-	5.98	=	-0.98
5	Reading Aloud	Male	7	-	5.98	=	1.02
5	Reading Aloud	Male	8	-	5.98	=	2.02
5	Reading Aloud	Male	6	-	5.98	=	0.02
5	Reading Aloud	Male	6	-	5.98	=	0.02
5	Reading Aloud	Male	7	-	5.98	=	1.02
5	Reading Aloud	Male	5	-	5.98	=	-0.98
5	Reading Aloud	Male	3	-	5.98	=	-2.98
5	Reading Aloud	Male	7	-	5.98	=	1.02
5	Reading Aloud	Male	7	-	5.98	=	1.02
5	Reading Aloud	Male	7	-	5.98	=	1.02

Note. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading.

Table 4.122
Calculation of Adjusted Raw Scores of Females Exposed to Silent Reading for Fifth Grade Narrative Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{01} + \overline{AB}_{10} + \overline{AB}_{20}}{3}$	=	Adjusted Raw Score
5	Silent Reading	Female	5	-	5.81	=	-0.81
5	Silent Reading	Female	4	-	5.81	=	-1.81
5	Silent Reading	Female	7	-	5.81	=	1.19
5	Silent Reading	Female	5	-	5.81	=	-0.81
5	Silent Reading	Female	6	-	5.81	=	0.19
5	Silent Reading	Female	5	-	5.81	=	-0.81
5	Silent Reading	Female	4	-	5.81	=	-1.81
5	Silent Reading	Female	8	-	5.81	=	2.19
5	Silent Reading	Female	5	-	5.81	=	-0.81
5	Silent Reading	Female	4	-	5.81	=	-1.81

Note. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling.

Table 4.123
Calculation of Adjusted Raw Scores of Males Exposed to Silent Reading for Fifth Grade Narrative Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{00} + \overline{AB}_{11} + \overline{AB}_{21}}{3}$	=	Adjusted Raw Score
5	Silent Reading	Male	4	-	5.96	=	-1.96
5	Silent Reading	Male	6	-	5.96	=	0.04
5	Silent Reading	Male	3	-	5.96	=	-2.96
5	Silent Reading	Male	5	-	5.96	=	-0.96
5	Silent Reading	Male	4	-	5.96	=	-1.96
5	Silent Reading	Male	6	-	5.96	=	0.04
5	Silent Reading	Male	5	-	5.96	=	-0.96
5	Silent Reading	Male	7	-	5.96	=	1.04
5	Silent Reading	Male	7	-	5.96	=	1.04
5	Silent Reading	Male	7	-	5.96	=	1.04
5	Silent Reading	Male	6	-	5.96	=	0.04

Note. $\overline{AB}_{00}$ = Group mean of males exposed to Silent Reading. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling.

Table 4.124
Fifth Grade Narrative Comprehension Adjusted Raw Scores Transformed Into Ranks (ART)

	A_2			A_1			A_0		
	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART
B_1	-0.03	→	25.00	-2.79	→	4.00	-0.81	→	18.50
	-1.03	→	12.00	0.21	→	36.50	-1.81	→	8.00
	-3.03	→	1.00	1.21	→	53.50	1.19	→	52.00
	-0.03	→	25.00	0.21	→	36.50	-0.81	→	18.50
	1.97	→	57.00	0.21	→	36.50	0.19	→	33.00
	-0.03	→	25.00	2.21	→	62.00	-0.81	→	18.50
	1.97	→	57.00	1.21	→	53.50	-1.81	→	8.00
	1.97	→	57.00	0.21	→	36.50	2.19	→	61.00
	0.97	→	43.00	0.21	→	36.50	-0.81	→	18.50
				0.21	→	36.50	-1.81	→	8.00
B_0	1.26	→	55.00	0.02	→	28.00	-1.96	→	5.50
	-0.74	→	22.00	2.02	→	59.50	0.04	→	31.00
	2.26	→	63.50	-0.98	→	13.50	-2.96	→	3.00
	0.26	→	41.00	1.02	→	46.00	-0.96	→	15.50
	-0.74	→	22.00	2.02	→	59.50	-1.96	→	5.50
	-1.74	→	10.50	0.02	→	28.00	0.04	→	31.00
	-0.74	→	22.00	0.02	→	28.00	-0.96	→	15.50
	0.26	→	41.00	1.02	→	46.00	1.04	→	50.00
	0.26	→	41.00	-0.98	→	13.50	1.04	→	50.00
	2.26	→	63.50	-2.98	→	2.00	1.04	→	50.00
	-1.74	→	10.50	1.02	→	46.00	0.04	→	31.00
				1.02	→	46.00			
				1.02	→	46.00			

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.125
Fifth Grade Narrative Comprehension Adjusted Raw Scores Replaced by Ranks (ART)

	A_2	A_1	A_0	Marginal Mean
B_1	25.00 12.00 1.00 25.00 57.00 25.00 57.00 57.00 43.00	4.00 36.50 53.50 36.50 36.50 62.00 53.50 36.50 36.50 36.50	18.50 8.00 52.00 18.50 33.00 18.50 8.00 61.00 18.50 8.00	$\overline{B}_1 = 32.35$
Group Mean	$\overline{AB}_{21} = 33.56$	$\overline{AB}_{11} = 39.20$	$\overline{AB}_{01} = 24.40$	
B_0	55.00 22.00 63.50 41.00 22.00 10.50 22.00 41.00 41.00 63.50 10.50	28.00 59.50 13.50 46.00 59.50 28.00 28.00 46.00 13.50 2.00 46.00 46.00 46.00	5.50 31.00 3.00 15.50 5.50 31.00 15.50 50.00 50.00 50.00 31.00	$\overline{B}_0 = 32.63$
Group Mean	$\overline{AB}_{20} = 35.64$	$\overline{AB}_{10} = 35.54$	$\overline{AB}_{00} = 26.18$	
Marginal Mean	$\overline{A}_2 = 34.70$	$\overline{A}_1 = 37.13$	$\overline{A}_0 = 25.33$	$\overline{X} = 32.50$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.126
Calculation of Adjusted Raw Scores of Females Exposed to Storytelling for Fifth Grade Expository Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{21} + \overline{AB}_{10} + \overline{AB}_{00}}{3}$	=	Adjusted Raw Score
5	Storytelling	Female	4	-	6.09	=	-2.09
5	Storytelling	Female	6	-	6.09	=	-0.09
5	Storytelling	Female	6	-	6.09	=	-0.09
5	Storytelling	Female	7	-	6.09	=	0.91
5	Storytelling	Female	6	-	6.09	=	-0.09
5	Storytelling	Female	7	-	6.09	=	0.91
5	Storytelling	Female	8	-	6.09	=	1.91
5	Storytelling	Female	6	-	6.09	=	-0.09
5	Storytelling	Female	5	-	6.09	=	-1.09

Note. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{00}$ = Group mean of males Exposed to Silent Reading.

Table 4.127
Calculation of Adjusted Raw Scores of Males Exposed to Storytelling for Fifth Grade Expository Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{20} + \overline{AB}_{11} + \overline{AB}_{01}}{3}$	=	Adjusted Raw Score
5	Storytelling	Male	7	-	5.77	=	1.23
5	Storytelling	Male	6	-	5.77	=	0.23
5	Storytelling	Male	6	-	5.77	=	0.23
5	Storytelling	Male	4	-	5.77	=	-1.77
5	Storytelling	Male	6	-	5.77	=	0.23
5	Storytelling	Male	6	-	5.77	=	0.23
5	Storytelling	Male	5	-	5.77	=	-0.77
5	Storytelling	Male	7	-	5.77	=	1.23
5	Storytelling	Male	7	-	5.77	=	1.23
5	Storytelling	Male	6	-	5.77	=	0.23
5	Storytelling	Male	4	-	5.77	=	-1.77

Note. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading.

Table 4.128
Calculation of Adjusted Raw Scores of Females Exposed to Reading Aloud for Fifth Grade Expository Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{11} + \overline{AB}_{20} + \overline{AB}_{00}}{3}$	=	Adjusted Raw Score
5	Reading Aloud	Female	6	-	5.97	=	0.03
5	Reading Aloud	Female	4	-	5.97	=	-1.97
5	Reading Aloud	Female	8	-	5.97	=	2.03
5	Reading Aloud	Female	5	-	5.97	=	-0.97
5	Reading Aloud	Female	7	-	5.97	=	1.03
5	Reading Aloud	Female	7	-	5.97	=	1.03
5	Reading Aloud	Female	6	-	5.97	=	0.03
5	Reading Aloud	Female	5	-	5.97	=	-0.97
5	Reading Aloud	Female	5	-	5.97	=	-0.97
5	Reading Aloud	Female	7	-	5.97	=	1.03

Note. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling. $\overline{AB}_{00}$ = Group mean of males exposed to Silent Reading.

Table 4.129
Calculation of Adjusted Raw Scores of Males Exposed to Reading Aloud for Fifth Grade Expository Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{10} + \overline{AB}_{21} + \overline{AB}_{01}}{3}$	=	Adjusted Raw Score
5	Reading Aloud	Male	5	-	5.90	=	-0.90
5	Reading Aloud	Male	7	-	5.90	=	1.10
5	Reading Aloud	Male	7	-	5.90	=	1.10
5	Reading Aloud	Male	6	-	5.90	=	0.10
5	Reading Aloud	Male	7	-	5.90	=	1.10
5	Reading Aloud	Male	5	-	5.90	=	-0.90
5	Reading Aloud	Male	6	-	5.90	=	0.10
5	Reading Aloud	Male	4	-	5.90	=	-1.90
5	Reading Aloud	Male	8	-	5.90	=	2.10
5	Reading Aloud	Male	4	-	5.90	=	-1.90
5	Reading Aloud	Male	8	-	5.90	=	2.10
5	Reading Aloud	Male	6	-	5.90	=	0.10
5	Reading Aloud	Male	6	-	5.90	=	0.10

Note. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading.

Table 4.130
Calculation of Adjusted Raw Scores of Females Exposed to Silent Reading for Fifth Grade Expository Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{01} + \overline{AB}_{10} + \overline{AB}_{20}}{3}$	=	Adjusted Raw Score
5	Silent Reading	Female	4	-	5.80	=	-1.80
5	Silent Reading	Female	5	-	5.80	=	-0.80
5	Silent Reading	Female	6	-	5.80	=	0.20
5	Silent Reading	Female	4	-	5.80	=	-1.80
5	Silent Reading	Female	6	-	5.80	=	0.20
5	Silent Reading	Female	6	-	5.80	=	0.20
5	Silent Reading	Female	5	-	5.80	=	-0.80
5	Silent Reading	Female	7	-	5.80	=	1.20
5	Silent Reading	Female	6	-	5.80	=	0.20
5	Silent Reading	Female	6	-	5.80	=	0.20

Note. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling.

Table 4.131
Calculation of Adjusted Raw Scores of Males Exposed to Silent Reading for Fifth Grade Expository Comprehension Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{00} + \overline{AB}_{11} + \overline{AB}_{21}}{3}$	=	Adjusted Raw Score
5	Silent Reading	Male	6	-	6.07	=	-0.07
5	Silent Reading	Male	7	-	6.07	=	0.93
5	Silent Reading	Male	5	-	6.07	=	-1.07
5	Silent Reading	Male	5	-	6.07	=	-1.07
5	Silent Reading	Male	3	-	6.07	=	-3.07
5	Silent Reading	Male	7	-	6.07	=	0.93
5	Silent Reading	Male	7	-	6.07	=	0.93
5	Silent Reading	Male	6	-	6.07	=	-0.07
5	Silent Reading	Male	6	-	6.07	=	-0.07
5	Silent Reading	Male	7	-	6.07	=	0.93
5	Silent Reading	Male	8	-	6.07	=	1.93

Note. $\overline{AB}_{00}$ = Group mean of males exposed to Silent Reading. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling.

Table 4.132
Fifth Grade Expository Comprehension Adjusted Raw Scores Transformed Into Ranks (ART)

	A_2			A_1			A_0		
	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART
B_1	-2.09	→	2.00	0.03	→	28.50	-1.80	→	6.50
	-0.09	→	22.50	-1.97	→	3.00	-0.80	→	18.50
	-0.09	→	22.50	2.03	→	62.00	0.20	→	36.00
	0.91	→	44.50	-0.97	→	14.00	-1.80	→	6.50
	-0.09	→	22.50	1.03	→	51.00	0.20	→	36.00
	0.91	→	44.50	1.03	→	51.00	0.20	→	36.00
	1.91	→	60.00	0.03	→	28.50	-0.80	→	18.50
	-0.09	→	22.50	-0.97	→	14.00	1.20	→	56.00
	-1.09	→	10.00	-0.97	→	14.00	0.20	→	36.00
				1.03	→	51.00	0.20	→	36.00
B_0	1.23	→	58.00	-0.90	→	16.50	-0.07	→	26.00
	0.23	→	41.00	1.10	→	54.00	0.93	→	47.50
	0.23	→	41.00	1.10	→	54.00	-1.07	→	11.50
	-1.77	→	8.50	0.10	→	31.50	-1.07	→	11.50
	0.23	→	41.00	1.10	→	54.00	-3.07	→	1.00
	0.23	→	41.00	-0.90	→	16.50	0.93	→	47.50
	-0.77	→	20.00	0.10	→	31.50	0.93	→	47.50
	1.23	→	58.00	-1.90	→	4.50	-0.07	→	26.00
	1.23	→	58.00	2.10	→	63.50	-0.07	→	26.00
	0.23	→	41.00	-1.90	→	4.50	0.93	→	47.50
	-1.77	→	8.50	2.10	→	63.50	1.93	→	61.00
				0.10	→	31.50			
				0.10	→	31.50			

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.133
Fifth Grade Expository Comprehension Adjusted Raw Scores Replaced by Ranks (ART)

	A_2	A_1	A_0	Marginal Mean
B_1	2.00 22.50 22.50 44.50 22.50 44.50 60.00 22.50 10.00	28.50 3.00 62.00 14.00 51.00 51.00 28.50 14.00 14.00 51.00	6.50 18.50 36.00 6.50 36.00 36.00 18.50 56.00 36.00 36.00	$\overline{B}_1 = 29.45$
Group Mean	$\overline{AB}_{21} = 27.89$	$\overline{AB}_{11} = 31.70$	$\overline{AB}_{01} = 28.60$	
B_0	58.00 41.00 41.00 8.50 41.00 41.00 20.00 58.00 58.00 41.00 8.50	16.50 54.00 54.00 31.50 54.00 16.50 31.50 4.50 63.50 4.50 63.50 31.50 31.50	26.00 47.50 11.50 11.50 1.00 47.50 47.50 26.00 26.00 47.50 61.00	$\overline{B}_0 = 35.03$
Group Mean	$\overline{AB}_{20} = 37.82$	$\overline{AB}_{10} = 35.15$	$\overline{AB}_{00} = 32.09$	
Marginal Mean	$\overline{A}_2 = 33.35$	$\overline{A}_1 = 33.65$	$\overline{A}_0 = 30.43$	$\overline{X} = 32.50$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Results of group means using the transformed ART ranks for fifth grade Narrative and Expository Comprehension are shown in Tables 4.125 and 4.133. These results are also denoted in Table 4.134, where fifth grade case summaries by group for Narrative and Expository Comprehension main effects are presented. A review of the

mean scores demonstrates a consistent trend. Students exposed to Reading Aloud (*M* = 37.13) achieved the highest mean score for Narrative Comprehension, followed by students exposed to Storytelling (*M* = 34.70), then by students exposed to Silent Reading (*M* = 25.33). This trend of highest to lowest mean scores was the same for Expository Comprehension, where students exposed to Reading Aloud (*M* = 33.65) produced a higher Expository Comprehension score than students exposed to Storytelling (*M* = 33.35) and Silent Reading (*M* = 30.43). Note that the Storytelling group's mean score was higher than that of the Silent Reading group for both Narrative and Expository Comprehension. Another uniqueness is that Narrative Comprehension scores for the Reading Aloud and Storytelling groups were higher than their Expository Comprehension scores. However, this was not the case for Silent Reading.

Table 4.134
Fifth Grade Case Summaries by Group for Narrative and Expository Comprehension Main Effects

Group		Narrative Comprehension	Expository Comprehension
Storytelling	N	20	20
	Mean	34.70	33.35
	Std. Deviation	19.654	18.477
Reading Aloud	N	23	23
	Mean	37.13	33.65
	Std. Deviation	16.855	20.436
Silent Reading	N	21	21
	Mean	25.33	30.43
	Std. Deviation	18.070	17.293
Total	N	64	64
	Mean	32.50	32.50
	Std. Deviation	18.597	18.598

Kruskal Wallis H test results reveal no significant main effect of group on fifth grade Expository Comprehension (H(2) = .391, *P* = .823) (Table 4.135). However,

Kruskal Wallis H test results show a significant main effect of group on fifth grade Narrative Comprehension (H(2) = 4.825, *P* = .090). Consequently, post hoc Wilcoxon Rank-Sum (Mann-Whitney U) tests were performed to determine which treatment levels contained significant Narrative Comprehension differences.

Table 4.135
Kruskal Wallis H Test Results by Group for Fifth Grade Narrative and Expository Comprehension Main Effects

	Narrative Comprehension	Expository Comprehension
Chi-Square	4.825	.391
df	2	2
Asymp. Sig.	.090**	.823

Note. **p < .10.

Post hoc Wilcoxon Rank-Sum (Mann-Whitney U) test results for Storytelling vs. Reading Aloud (Table 4.136) display no significant outcome (Z = -.537, *P* = .591). Nevertheless, post hoc assessments of the Storytelling group in opposition to the Silent Reading set (Z = -1.725, *P* = .085) as well as the Reading

Aloud cluster paired against the Silent Reading set (Z = -1.992, *P* = .046), did show a significant main effect of group on fifth grade Narrative Comprehension. As a result, there is sufficient evidence to reject the claim that there is no difference in fifth grade students' reading comprehension of narrative and expository texts as a result of employing two story performance techniques (H_1). What's more, there is sufficient evidence to reject the claim that there is no difference in fifth grade students' reading comprehension of narrative and expository texts due to the effects of a teacher's telling and a teacher's reading aloud of twenty-eight stories to the students (H_3).

Table 4.136
Post Hoc Wilcoxon Rank-Sum (Mann-Whitney U) Test Results for Fifth Grade Narrative Comprehension Main Effects

	Storytelling vs. Reading Aloud	Storytelling vs. Silent Reading	Reading Aloud vs. Silent Reading
Mann-Whitney U	208.000	144.000	157.000
Wilcoxon W	418.000	375.000	388.000
Z	-.537	-1.725	-1.992
Asymp. Sig. (2-tailed)	.591	.085**	.046**

Note. **p < .10.

As previously documented, calculation of fifth grade group means using the transformed ART ranks for Narrative and Expository Comprehension are revealed in Tables 4.96 and 4.107. These results are also represented in Table 4.137, where fifth grade case summaries by gender for Narrative and Expository Comprehension main effects are offered. Narrative Comprehension case summaries show that male participants produced the highest overall mean (*M* = 32.63) when compared to females (*M* = 32.35). This development is also true for Expository Comprehension, where males produced a higher score (*M* = 35.03) than their female peers (*M* = 29.45). Also note that females produced a higher mean result for Narrative Comprehension than Expository Comprehension, whereas male participants achieved a higher mean value in Expository Comprehension as opposed to Narrative Comprehension.

Table 4.137
Fifth Grade Case Summaries by Gender for Narrative and Expository Comprehension Main Effects

Gender		Narrative Comprehension	Expository Comprehension
Female	N	29	29
	Mean	32.35	29.45
	Std. Deviation	18.832	17.722
Male	N	35	35
	Mean	32.63	35.03
	Std. Deviation	18.675	19.176
Total	N	64	64
	Mean	32.50	32.50
	Std. Deviation	18.597	18.598

Kruskal Wallis H test results reveal no significant main effect of gender on fifth grade Narrative (H(1) = .004, *P* = .952) and Expository (H(1) = 1.428, *P* = .232) Comprehension (Table 4.138). Because of this, there is insufficient evidence to reject the claim that there is no difference in fifth grade students' reading comprehension of narrative and expository texts as a result of employing two story performance techniques irrespective of a student's gender *(H_1)*. What's more, there is insufficient evidence to reject the claim that there is no difference in fifth grade students' reading comprehension of narrative and expository texts due to the effects of a teacher's telling and a teacher's reading aloud of twenty-eight stories to the students irrespective of their gender *(H_3)*.

Table 4.138
Kruskal Wallis H Test Results by Gender for Fifth Grade Narrative and Expository Comprehension Main Effects

	Narrative Comprehension	Expository Comprehension
Chi-Square	.004	1.428
df	1	1
Asymp. Sig.	.952	.232

Note. Alpha (α) = .10.

Parametric Analysis (MANOVA) of Fifth Grade Narrative and Expository Oral Reading Fluency

Table 4.139 identifies descriptive figures for overall fifth grade narrative QRI-3 oral reading fluency results. It is organized by assessment type (Narrative Fluency), treatment level (Storytelling, Reading Aloud, or Silent Reading), gender (male or female), mean (*M*), standard deviation (*SD*), and number of participants (*N*).

Table 4.139
Fifth Grade Narrative Oral Reading Fluency Descriptive Statistics

QRI-3 Assessment	Group	Gender	*M*	*SD*	*N*
Narrative Fluency	Storytelling	Female	126.56	32.396	9
		Male	121.27	36.111	11
		Total	123.65	33.697	20
	Reading Aloud	Female	123.40	22.016	10
		Male	124.77	28.391	13
		Total	124.17	25.267	23
	Silent Reading	Female	126.90	31.381	10
		Male	128.45	37.372	11
		Total	127.71	33.795	21
	Total	Female	125.59	27.836	29
		Male	124.83	32.972	35
		Total	125.17	30.516	64

Descriptive statistics for fifth grade Narrative Oral Reading Fluency show that students exposed to Silent Reading achieved the highest Narrative Oral Reading Fluency mean (*M* = 127.71), followed by students exposed to Reading Aloud (*M* = 124.17) and students exposed to Storytelling (*M* = 123.65). Note that female participants produced a higher overall mean result (*M* = 125.59) than their male peers (*M* = 124.83). With regard to all treatment levels of students by gender, male participants exposed to Silent Reading produced the highest Narrative Oral Reading Fluency result (*M* = 128.45), trailed by females of the same group (*M* = 126.90). Similarly, males (*M* = 124.77) also produced a higher average than their female peers (*M* = 123.40) in the Reading Aloud group. However, females (*M* = 126.56) exposed to Storytelling managed to attain a higher mean than males (*M* = 121.27) of the same group.

Table 4.140 presents descriptive statistics involving fifth grade students' scores on the Expository Oral Reading Fluency sub-test of the QRI-3. Once again, it is organized by assessment type (Expository Fluency), treatment level (Storytelling, Reading Aloud, or Silent Reading), gender (male or female), mean (*M*), standard deviation (*SD*), and number (*N*) of participants.

Table 4.140
Fifth Grade Expository Oral Reading Fluency Descriptive Statistics

QRI-3 Assessment	Group	Gender	*M*	*SD*	*N*
Expository Fluency	Storytelling	Female	173.44	45.103	9
		Male	163.45	48.576	11
		Total	167.95	46.092	20
	Reading Aloud	Female	162.90	27.815	10
		Male	167.62	35.441	13
		Total	165.57	31.739	23
	Silent Reading	Female	164.70	38.503	10
		Male	167.91	42.517	11
		Total	166.38	39.669	21
	Total	Female	166.79	36.436	29
		Male	166.40	40.904	35
		Total	166.58	38.640	64

Mean scores for fifth grade Expository Oral Reading Fluency features an aggregate result of 166.58, which is higher than the previously cited Narrative Oral Reading Fluency mean (*M* = 125.17). As with Narrative Oral Reading Fluency, female participants (*M* = 166.79) attained a higher mean result in Expository Oral Reading Fluency than their male peers (*M* = 166.40). Further review of the mean scores also show that students exposed to Storytelling (*M* = 167.95) attained an overall higher score than students exposed to Silent Reading (*M* = 166.38) and Reading Aloud (*M* = 165.57). However, note that the Silent Reading group's mean score was slightly higher than that of the Reading Aloud group. Another notable outcome is that females exposed to Storytelling (*M* = 173.44) produced the highest overall Expository Oral Reading Fluency result in comparison to all other fifth grade groups, while females exposed to Reading Aloud (*M* = 162.90) produced the lowest overall fifth grade group mean. As for male participants, those who were exposed to Silent Reading (*M* = 167.91) attained the

highest mean score for their respective gender, followed by Reading Aloud (*M* = 167.62) and Storytelling (*M* = 163.45).

In order to find out if the differences between any of the Narrative and Expository Oral Reading Fluency mean scores of the groups was statistically significant, MANOVA was employed with gender (female, male) and treatment (Storytelling, Reading Aloud, and Silent Reading) serving as between-subjects factors (Table 4.141).

The multivariate main effect of gender on fifth grade Narrative and Expository Oral Reading Fluency was not significant ($F(4, 55) = .066$, $p = .992$, partial $\eta^2 = .005$). Similarly, multivariate results also show no a significant main effect of group ($F(8, 112) = .898$, $p = .520$, partial $\eta^2 = .060$) on fifth grade Narrative and Expository Oral Reading Fluency. Finally, there was no significant multivariate interaction between gender and treatment ($F(8, 112) = .289$, $p = .968$, partial $\eta^2 = .020$).

Table 4.141
Multivariate and Univariate Analyses of Variance for Fifth Grade Oral Reading Fluency

				Univariate					
	Multivariate			Narrative Fluency			Expository Fluency		
Source	*F*[c,d]	*p*	Partial η^2	*F*[e,f]	*p*	Partial η^2	*F*[e,f]	*p*	Partial η^2
Gender (G)[a]	.066	.992	.005	.010	.922	.000	.005	.946	.000
Group (Gr.)[a]	.898	.520	.060	.094	.910	.003	.034	.966	.001
G × Gr.[b]	.289	.968	.020	.077	.926	.003	.209	.812	.007

Note. Multivariate *F* ratios were generated from Pillai's Trace. [a]Alpha (α) = .10. [b]Alpha (α) = .05. [c]Multivariate df for G = 4, 55. [d]Multivariate df for Gr. and G × Gr. = 8, 112. [e]Univariate df for G = 1, 58. [f]Univariate df for Gr. and G × Gr. = 2, 58.

Univariate main effect results of gender on fifth grade Narrative ($F(1, 58) = .010$, $p = .922$, partial $\eta^2 = .000$) and Expository ($F(1, 58) = .005$, $p = .946$, partial $\eta^2 = .000$) Oral Reading Fluency were not significant. Similarly, univariate results also show no significant main effect of group on fifth grade Narrative ($F(2, 58) = .094$, $p = .910$, partial $\eta^2 = .003$) and Expository ($F(2, 58) = .034$, $p = .966$, partial $\eta^2 = .001$) Oral Reading

Fluency. Lastly, there was no significant univariate interaction between gender and treatment in fifth grade Narrative $F(2, 58) = .077$, $p = .926$, partial $\eta^2 = .003$) and Expository $F(2, 58) = .209$, $p = .812$, partial $\eta^2 = .007$) Oral Reading Fluency.

On the basis of the MANOVA analysis, there is insufficient evidence to reject the claim that there is no difference in fifth grade students' oral reading fluency of narrative and expository texts as a result of employing two story performance techniques *(H_2)*. Additionally, there is not enough evidence to reject the claim that there is no difference in fifth grade students' oral reading fluency of narrative and expository texts due to the effects of a teacher's telling and a teacher's reading aloud of twenty-eight stories to the students *(H_4)*. Lastly, there is insufficient evidence to reject the claim that there is no significant interaction among two story performance techniques held constant across the factor of gender *(H_5)*.

Nonparametric Analysis of Interactions for Fifth Grade Narrative and Expository Oral Reading Fluency

Due to small sample sizes and unbalanced groups, nonparametric tests, identical to the ones described for fifth grade Narrative and Expository Comprehension interactions (Figure 4.1), were also used for Narrative Oral Reading Fluency interactions. Table 4.142 illustrates how marginal means were computed using the raw data; this procedure was used to isolate interactions by removing all main effects (as seen in Tables 4.143, 4.144, 4.145, 4.146, 4.147, and 4.148) (Leys & Schumann, 2010; Sawilowsky, 1990, 2000). Then, students' adjusted scores were pooled together to form one set so that ranks could be appropriately assigned. This result was reached by arranging all students' scores in an increasing order, assigning a rank ranging from one

to sixty-four, and adapting the rank for all ties by assigning equal average ranks to each one (Table 4.149). Finally, a 2×3 factorial ANOVA was computed using the transformed ART scores.

Table 4.142
Fifth Grade Narrative Oral Reading Fluency Raw Scores

	A_2	A_1	A_0	Marginal Mean
B_1	161 127 60 155 127 131 161 116 101	125 143 77 132 125 144 126 150 107 105	126 114 188 149 85 122 100 163 120 102	$\overline{B}_1 = 125.59$
Group Mean	$\overline{AB}_{21} = 126.56$	$\overline{AB}_{11} = 123.40$	$\overline{AB}_{01} = 126.90$	
B_0	87 149 155 138 140 127 124 81 176 101 56	147 120 119 165 126 116 119 161 133 62 111 152 91	92 145 64 110 168 173 111 109 188 120 133	$\overline{B}_0 = 124.83$
Group Mean	$\overline{AB}_{20} = 121.27$	$\overline{AB}_{10} = 124.77$	$\overline{AB}_{00} = 128.45$	
Marginal Mean	$\overline{A}_2 = 123.65$	$\overline{A}_1 = 124.17$	$\overline{A}_0 = 127.71$	$\overline{X} = 125.21$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.143
Calculation of Adjusted Raw Scores of Females Exposed to Storytelling for Fifth Grade Narrative Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_2$	-	$\overline{B}_1$	=	Adjusted Raw Score
5	Storytelling	Female	161	-	123.65	-	125.59	=	-88.24
5	Storytelling	Female	127	-	123.65	-	125.59	=	-122.24
5	Storytelling	Female	60	-	123.65	-	125.59	=	-189.24
5	Storytelling	Female	155	-	123.65	-	125.59	=	-94.24
5	Storytelling	Female	127	-	123.65	-	125.59	=	-122.24
5	Storytelling	Female	131	-	123.65	-	125.59	=	-118.24
5	Storytelling	Female	161	-	123.65	-	125.59	=	-88.24
5	Storytelling	Female	116	-	123.65	-	125.59	=	-133.24
5	Storytelling	Female	101	-	123.65	-	125.59	=	-148.24

Note. $\overline{A}_2$ = Storytelling marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.144
Calculation of Adjusted Raw Scores of Males Exposed to Storytelling for Fifth Grade Narrative Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_2$	-	$\overline{B}_0$	=	Adjusted Raw Score
5	Storytelling	Male	87	-	123.65	-	124.83	=	-161.48
5	Storytelling	Male	149	-	123.65	-	124.83	=	-99.48
5	Storytelling	Male	155	-	123.65	-	124.83	=	-93.48
5	Storytelling	Male	138	-	123.65	-	124.83	=	-110.48
5	Storytelling	Male	140	-	123.65	-	124.83	=	-108.48
5	Storytelling	Male	127	-	123.65	-	124.83	=	-121.48
5	Storytelling	Male	124	-	123.65	-	124.83	=	-124.48
5	Storytelling	Male	81	-	123.65	-	124.83	=	-167.48
5	Storytelling	Male	176	-	123.65	-	124.83	=	-72.48
5	Storytelling	Male	101	-	123.65	-	124.83	=	-147.48
5	Storytelling	Male	56	-	123.65	-	124.83	=	-192.48

Note. $\overline{A}_2$ = Storytelling marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.145
Calculation of Adjusted Raw Scores of Females Exposed to Reading Aloud for Fifth Grade Narrative Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_1$	-	$\overline{B}_1$	=	Adjusted Raw Score
5	Reading Aloud	Female	125	-	124.17	-	125.59	=	-124.76
5	Reading Aloud	Female	143	-	124.17	-	125.59	=	-106.76
5	Reading Aloud	Female	77	-	124.17	-	125.59	=	-172.76
5	Reading Aloud	Female	132	-	124.17	-	125.59	=	-117.76
5	Reading Aloud	Female	125	-	124.17	-	125.59	=	-124.76
5	Reading Aloud	Female	144	-	124.17	-	125.59	=	-105.76
5	Reading Aloud	Female	126	-	124.17	-	125.59	=	-123.76
5	Reading Aloud	Female	150	-	124.17	-	125.59	=	-99.76
5	Reading Aloud	Female	107	-	124.17	-	125.59	=	-142.76
5	Reading Aloud	Female	105	-	124.17	-	125.59	=	-144.76

Note. $\overline{A}_1$ = Reading Aloud marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.146
Calculation of Adjusted Raw Scores of Males Exposed to Reading Aloud for Fifth Grade Narrative Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_1$	-	$\overline{B}_0$	=	Adjusted Raw Score
5	Reading Aloud	Male	147	-	124.17	-	124.83	=	-102.00
5	Reading Aloud	Male	120	-	124.17	-	124.83	=	-129.00
5	Reading Aloud	Male	119	-	124.17	-	124.83	=	-130.00
5	Reading Aloud	Male	165	-	124.17	-	124.83	=	-84.00
5	Reading Aloud	Male	126	-	124.17	-	124.83	=	-123.00
5	Reading Aloud	Male	116	-	124.17	-	124.83	=	-133.00
5	Reading Aloud	Male	119	-	124.17	-	124.83	=	-130.00
5	Reading Aloud	Male	161	-	124.17	-	124.83	=	-88.00
5	Reading Aloud	Male	133	-	124.17	-	124.83	=	-116.00
5	Reading Aloud	Male	62	-	124.17	-	124.83	=	-187.00
5	Reading Aloud	Male	111	-	124.17	-	124.83	=	-138.00
5	Reading Aloud	Male	152	-	124.17	-	124.83	=	-97.00
5	Reading Aloud	Male	91	-	124.17	-	124.83	=	-158.00

Note. $\overline{A}_1$ = Reading Aloud marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.147
Calculation of Adjusted Raw Scores of Females Exposed to Silent Reading for Fifth Grade Narrative Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_0$	-	$\overline{B}_1$	=	Adjusted Raw Score
5	Silent Reading	Female	126	-	127.71	-	125.59	=	-127.30
5	Silent Reading	Female	114	-	127.71	-	125.59	=	-139.30
5	Silent Reading	Female	188	-	127.71	-	125.59	=	-65.30
5	Silent Reading	Female	149	-	127.71	-	125.59	=	-104.30
5	Silent Reading	Female	85	-	127.71	-	125.59	=	-168.30
5	Silent Reading	Female	122	-	127.71	-	125.59	=	-131.30
5	Silent Reading	Female	100	-	127.71	-	125.59	=	-153.30
5	Silent Reading	Female	163	-	127.71	-	125.59	=	-90.30
5	Silent Reading	Female	120	-	127.71	-	125.59	=	-133.30
5	Silent Reading	Female	102	-	127.71	-	125.59	=	-151.30

Note. $\overline{A}_0$ = Silent Reading marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.148
Calculation of Adjusted Raw Scores of Males Exposed to Silent Reading for Fifth Grade Narrative Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_0$	-	$\overline{B}_0$	=	Adjusted Raw Score
5	Silent Reading	Male	92	-	127.71	-	124.83	=	-160.54
5	Silent Reading	Male	145	-	127.71	-	124.83	=	-107.54
5	Silent Reading	Male	64	-	127.71	-	124.83	=	-188.54
5	Silent Reading	Male	110	-	127.71	-	124.83	=	-142.54
5	Silent Reading	Male	168	-	127.71	-	124.83	=	-84.54
5	Silent Reading	Male	173	-	127.71	-	124.83	=	-79.54
5	Silent Reading	Male	111	-	127.71	-	124.83	=	-141.54
5	Silent Reading	Male	109	-	127.71	-	124.83	=	-143.54
5	Silent Reading	Male	188	-	127.71	-	124.83	=	-64.54
5	Silent Reading	Male	120	-	127.71	-	124.83	=	-132.54
5	Silent Reading	Male	133	-	127.71	-	124.83	=	-119.54

Note. $\overline{A}_0$ = Silent Reading marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.149
Fifth Grade Narrative Oral Reading Fluency Adjusted Raw Scores Transformed Into Ranks (ART)

	A_2			A_1			A_0		
	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART
B_1	-88.24	→	56.50	-124.76	→	31.50	-127.30	→	30.00
	-122.24	→	36.50	-106.76	→	46.00	-139.30	→	20.00
	-189.24	→	2.00	-172.76	→	5.00	-65.30	→	63.00
	-94.24	→	53.00	-117.76	→	41.00	-104.30	→	48.00
	-122.24	→	36.50	-124.76	→	31.50	-168.30	→	6.00
	-118.24	→	40.00	-105.76	→	47.00	-131.30	→	26.00
	-88.24	→	56.50	-123.76	→	34.00	-153.30	→	11.00
	-133.24	→	23.00	-99.76	→	50.00	-90.30	→	55.00
	-148.24	→	13.00	-142.76	→	17.00	-133.30	→	22.00
				-144.76	→	15.00	-151.30	→	12.00
B_0	-161.48	→	8.00	-102.00	→	49.00	-160.54	→	9.00
	-99.48	→	51.00	-129.00	→	29.00	-107.54	→	45.00
	-93.48	→	54.00	-130.00	→	27.50	-188.54	→	3.00
	-110.48	→	43.00	-84.00	→	60.00	-142.54	→	18.00
	-108.48	→	44.00	-123.00	→	35.00	-84.54	→	59.00
	-121.48	→	38.00	-133.00	→	24.00	-79.54	→	61.00
	-124.48	→	33.00	-130.00	→	27.50	-141.54	→	19.00
	-167.48	→	7.00	-88.00	→	58.00	-143.54	→	16.00
	-72.48	→	62.00	-116.00	→	42.00	-64.54	→	64.00
	-147.48	→	14.00	-187.00	→	4.00	-132.54	→	25.00
	-192.48	→	1.00	-138.00	→	21.00	-119.54	→	39.00
				-97.00	→	52.00			
				-158.00	→	10.00			

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.150 depicts results of group and marginal means using the transformed ART rank. These results are also signified in Table 4.151, which exhibits descriptive statistics involving students' ART scores from the Narrative Oral Reading Fluency sub-test of the QRI-3 and consists of Mean (*M*), Standard Deviation (*SD*), and number of participants (*N*) organized by treatment group and gender.

Table 4.150
Fifth Grade Narrative Oral Reading Fluency Adjusted Raw Scores Replaced by Ranks (ART)

	A_2	A_1	A_0	Marginal Mean
	56.50	31.50	30.00	
	36.50	46.00	20.00	
	2.00	5.00	63.00	
	53.00	41.00	48.00	
	36.50	31.50	6.00	
B_1	40.00	47.00	26.00	$\overline{B}_1 = 32.00$
	56.50	34.00	11.00	
	23.00	50.00	55.00	
	13.00	17.00	22.00	
		15.00	12.00	
Group Mean	$\overline{AB}_{21} = 35.22$	$\overline{AB}_{11} = 31.80$	$\overline{AB}_{01} = 29.30$	
	8.00	49.00	9.00	
	51.00	29.00	45.00	
	54.00	27.50	3.00	
	43.00	60.00	18.00	
	44.00	35.00	59.00	
	38.00	24.00	61.00	
B_0	33.00	27.50	19.00	$\overline{B}_0 = 32.91$
	7.00	58.00	16.00	
	62.00	42.00	64.00	
	14.00	4.00	25.00	
	1.00	21.00	39.00	
		52.00		
		10.00		
Group Mean	$\overline{AB}_{20} = 32.27$	$\overline{AB}_{10} = 33.77$	$\overline{AB}_{00} = 32.55$	
Marginal Mean	$\overline{A}_2 = 33.60$	$\overline{A}_1 = 32.91$	$\overline{A}_0 = 31.00$	$\overline{X} = 32.50$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Examination of ART interaction scores for fifth grade Narrative Oral Reading Fluency demonstrate varied results. As a case in point, females exposed to Storytelling (M = 35.22) achieved the highest overall Narrative Oral Reading Fluency score,

followed by males exposed to Reading Aloud (*M* = 33.77) and males exposed to Storytelling (*M* = 32.27). Further analysis of mean scores show that males exposed to Reading Aloud attained the highest mean result for their respective gender, followed by males exposed to Silent Reading (*M* = 32.55) and males exposed to Storytelling (*M* = 32.27). As previously indicated, the treatment level that generated the highest Narrative Oral Reading Fluency score for female participants was Storytelling. Next highest for fifth grade females was Reading Aloud (*M* = 31.80) and then Silent Reading (*M* = 29.30).

Table 4.151
Descriptive Statistics for Fifth Grade Narrative Oral Reading Fluency Interactions

Gender	Group	*M*	*SD*	*N*
Female	Storytelling	35.22	19.347	9
	Reading Aloud	31.80	15.177	10
	Silent Reading	29.30	19.647	10
	Total	32.00	17.636	29
Male	Storytelling	32.27	21.289	11
	Reading Aloud	33.77	17.606	13
	Silent Reading	32.55	22.020	11
	Total	32.91	19.641	35
Total	Storytelling	33.60	19.960	20
	Reading Aloud	32.91	16.258	23
	Silent Reading	31.00	20.467	21
	Total	32.50	18.618	64

Interaction results for fifth grade students' Narrative Oral Reading Fluency ART scores are reported in Table 4.152. As previously indicated, a 2×3 univariate ANOVA was employed for the analysis, with gender (female, male) and group (Storytelling, Reading Aloud, Storytelling) as between-subjects factors. Univariate outcomes revealed no significant interaction for between-subjects factors (Gender × Group) in fifth

grade students' Narrative Oral Reading Fluency ($F(2, 58) = .146$, $p = .865$, partial $\eta^2 = .005$).

Table 4.152
Factorial ANOVA for Fifth Grade Narrative Oral Reading Fluency Interactions

Source	Type III Sum of Squares	df	*F*	Sig.	Partial η^2
Gender × Group	108.596	2	.146	.865	.005
Error	21642.472	58			
Total	89438.000	64			

Note. Being irrelevant, main effects are not presented. Alpha (α) = .05.

Results of the above analysis designate that there is insufficient evidence to reject the claim that there is no significant interaction among two story performance techniques held constant across the factor of gender (H_5).

Identical nonparametric procedures previously described for fifth grade Narrative Oral Reading Fluency interactions were simulated for Expository Oral Reading Fluency interactions. Again, student raw scores were adjusted by subtracting marginal means from each row and column (Table 4.153) characterizes how marginal means were calculated using the raw data); this procedure was used to isolate interactions by removing all main effects (as seen in Tables 4.154, 4.155, 4.156, 4.157, 4.158, and 4.159) (Leys & Schumann, 2010; Sawilowsky, 1990, 2000). Next, students' adjusted scores were pooled together to form one set so that ranks could be properly assigned. This outcome was reached by arranging all students' scores in an increasing order, assigning a rank ranging from one to sixty-four, and adapting the rank for all tie values by assigning equal average ranks to each one (Table 4.160). Lastly, a 2×3 factorial ANOVA was computed using the transformed ART dataset.

Table 4.153
Fifth Grade Expository Oral Reading Fluency Raw Scores

	A_2	A_1	A_0	Marginal Mean
B_1	236 171 78 210 180 185 199 157 145	171 156 118 182 155 178 152 217 170 130	156 126 228 199 123 159 159 219 155 123	$\overline{B}_1 = 166.79$
Group Mean	$\overline{AB}_{21} = 173.44$	$\overline{AB}_{11} = 162.90$	$\overline{AB}_{01} = 164.70$	
B_0	119 204 202 191 191 177 163 121 231 133 66	195 202 154 204 165 171 151 199 171 86 144 208 129	121 178 79 155 208 231 152 180 206 157 180	$\overline{B}_0 = 166.40$
Group Mean	$\overline{AB}_{20} = 163.45$	$\overline{AB}_{10} = 167.62$	$\overline{AB}_{00} = 167.91$	
Marginal Mean	$\overline{A}_2 = 167.95$	$\overline{A}_1 = 165.57$	$\overline{A}_0 = 166.38$	$\overline{X} = 166.59$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.154
Calculation of Adjusted Raw Scores of Females Exposed to Storytelling for Fifth Grade Expository Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_2$	-	$\overline{B}_1$	=	Adjusted Raw Score
5	Storytelling	Female	236	-	167.95	-	166.79	=	-98.74
5	Storytelling	Female	171	-	167.95	-	166.79	=	-163.74
5	Storytelling	Female	78	-	167.95	-	166.79	=	-256.74
5	Storytelling	Female	210	-	167.95	-	166.79	=	-124.74
5	Storytelling	Female	180	-	167.95	-	166.79	=	-154.74
5	Storytelling	Female	185	-	167.95	-	166.79	=	-149.74
5	Storytelling	Female	199	-	167.95	-	166.79	=	-135.74
5	Storytelling	Female	157	-	167.95	-	166.79	=	-177.74
5	Storytelling	Female	145	-	167.95	-	166.79	=	-189.74

Note. $\overline{A}_2$ = Storytelling marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.155
Calculation of Adjusted Raw Scores of Males Exposed to Storytelling for Fifth Grade Expository Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_2$	-	$\overline{B}_0$	=	Adjusted Raw Score
5	Storytelling	Male	119	-	167.95	-	166.40	=	-215.35
5	Storytelling	Male	204	-	167.95	-	166.40	=	-130.35
5	Storytelling	Male	202	-	167.95	-	166.40	=	-132.35
5	Storytelling	Male	191	-	167.95	-	166.40	=	-143.35
5	Storytelling	Male	191	-	167.95	-	166.40	=	-143.35
5	Storytelling	Male	177	-	167.95	-	166.40	=	-157.35
5	Storytelling	Male	163	-	167.95	-	166.40	=	-171.35
5	Storytelling	Male	121	-	167.95	-	166.40	=	-213.35
5	Storytelling	Male	231	-	167.95	-	166.40	=	-103.35
5	Storytelling	Male	133	-	167.95	-	166.40	=	-201.35
5	Storytelling	Male	66	-	167.95	-	166.40	=	-268.35

Note. $\overline{A}_2$ = Storytelling marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.156
Calculation of Adjusted Raw Scores of Females Exposed to Reading Aloud for Fifth Grade Expository Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_1$	-	$\overline{B}_1$	=	Adjusted Raw Score
5	Reading Aloud	Female	171	-	165.57	-	166.79	=	-161.36
5	Reading Aloud	Female	156	-	165.57	-	166.79	=	-176.36
5	Reading Aloud	Female	118	-	165.57	-	166.79	=	-214.36
5	Reading Aloud	Female	182	-	165.57	-	166.79	=	-150.36
5	Reading Aloud	Female	155	-	165.57	-	166.79	=	-177.36
5	Reading Aloud	Female	178	-	165.57	-	166.79	=	-154.36
5	Reading Aloud	Female	152	-	165.57	-	166.79	=	-180.36
5	Reading Aloud	Female	217	-	165.57	-	166.79	=	-115.36
5	Reading Aloud	Female	170	-	165.57	-	166.79	=	-162.36
5	Reading Aloud	Female	130	-	165.57	-	166.79	=	-202.36

Note. $\overline{A}_1$ = Reading Aloud marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.157
Calculation of Adjusted Raw Scores of Males Exposed to Reading Aloud for Fifth Grade Expository Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_1$	-	$\overline{B}_0$	=	Adjusted Raw Score
5	Reading Aloud	Male	195	-	165.57	-	166.40	=	-136.97
5	Reading Aloud	Male	202	-	165.57	-	166.40	=	-129.97
5	Reading Aloud	Male	154	-	165.57	-	166.40	=	-177.97
5	Reading Aloud	Male	204	-	165.57	-	166.40	=	-127.97
5	Reading Aloud	Male	165	-	165.57	-	166.40	=	-166.97
5	Reading Aloud	Male	171	-	165.57	-	166.40	=	-160.97
5	Reading Aloud	Male	151	-	165.57	-	166.40	=	-180.97
5	Reading Aloud	Male	199	-	165.57	-	166.40	=	-132.97
5	Reading Aloud	Male	171	-	165.57	-	166.40	=	-160.97
5	Reading Aloud	Male	86	-	165.57	-	166.40	=	-245.97
5	Reading Aloud	Male	144	-	165.57	-	166.40	=	-187.97
5	Reading Aloud	Male	208	-	165.57	-	166.40	=	-123.97
5	Reading Aloud	Male	129	-	165.57	-	166.40	=	-202.97

Note. $\overline{A}_1$ = Reading Aloud marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.158
Calculation of Adjusted Raw Scores of Females Exposed to Silent Reading for Fifth Grade Expository Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_0$	-	$\overline{B}_1$	=	Adjusted Raw Score
5	Silent Reading	Female	156	-	166.38	-	166.79	=	-177.17
5	Silent Reading	Female	126	-	166.38	-	166.79	=	-207.17
5	Silent Reading	Female	228	-	166.38	-	166.79	=	-105.17
5	Silent Reading	Female	199	-	166.38	-	166.79	=	-134.17
5	Silent Reading	Female	123	-	166.38	-	166.79	=	-210.17
5	Silent Reading	Female	159	-	166.38	-	166.79	=	-174.17
5	Silent Reading	Female	159	-	166.38	-	166.79	=	-174.17
5	Silent Reading	Female	219	-	166.38	-	166.79	=	-114.17
5	Silent Reading	Female	155	-	166.38	-	166.79	=	-178.17
5	Silent Reading	Female	123	-	166.38	-	166.79	=	-210.17

Note. $\overline{A}_0$ = Silent Reading marginal mean. $\overline{B}_1$ = Female marginal mean.

Table 4.159
Calculation of Adjusted Raw Scores of Males Exposed to Silent Reading for Fifth Grade Expository Oral Reading Fluency Interactions

Grade	Group	Gender	Raw Score	-	$\overline{A}_0$	-	$\overline{B}_0$	=	Adjusted Raw Score
5	Silent Reading	Male	121	-	166.38	-	166.40	=	-211.78
5	Silent Reading	Male	178	-	166.38	-	166.40	=	-154.78
5	Silent Reading	Male	79	-	166.38	-	166.40	=	-253.78
5	Silent Reading	Male	155	-	166.38	-	166.40	=	-177.78
5	Silent Reading	Male	208	-	166.38	-	166.40	=	-124.78
5	Silent Reading	Male	231	-	166.38	-	166.40	=	-101.78
5	Silent Reading	Male	152	-	166.38	-	166.40	=	-180.78
5	Silent Reading	Male	180	-	166.38	-	166.40	=	-152.78
5	Silent Reading	Male	206	-	166.38	-	166.40	=	-126.78
5	Silent Reading	Male	157	-	166.38	-	166.40	=	-175.78
5	Silent Reading	Male	180	-	166.38	-	166.40	=	-152.78

Note. $\overline{A}_0$ = Silent Reading marginal mean. $\overline{B}_0$ = Male marginal mean.

Table 4.160
Fifth Grade Expository Oral Reading Fluency Adjusted Raw Scores Transformed Into Ranks (ART)

	A_2			A_1			A_0		
	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART
B_1	-98.74	→	64.00	-161.36	→	34.00	-177.17	→	25.00
	-163.74	→	32.00	-176.36	→	26.00	-207.17	→	11.00
	-256.74	→	2.00	-214.36	→	6.00	-105.17	→	61.00
	-124.74	→	57.00	-150.36	→	43.00	-134.17	→	49.00
	-154.74	→	39.00	-177.36	→	24.00	-210.17	→	9.50
	-149.74	→	44.00	-154.36	→	40.00	-174.17	→	28.50
	-135.74	→	48.00	-180.36	→	19.00	-174.17	→	28.50
	-177.74	→	23.00	-115.36	→	59.00	-114.17	→	60.00
	-189.74	→	15.00	-162.36	→	33.00	-178.17	→	20.00
				-202.36	→	13.00	-210.17	→	9.50
B_0	-215.35	→	5.00	-136.97	→	47.00	-211.78	→	8.00
	-130.35	→	52.00	-129.97	→	53.00	-154.78	→	38.00
	-132.35	→	51.00	-177.97	→	21.00	-253.78	→	3.00
	-143.35	→	45.50	-127.97	→	54.00	-177.78	→	22.00
	-143.35	→	45.50	-166.97	→	31.00	-124.78	→	56.00
	-157.35	→	37.00	-160.97	→	35.50	-101.78	→	63.00
	-171.35	→	30.00	-180.97	→	17.00	-180.78	→	18.00
	-213.35	→	7.00	-132.97	→	50.00	-152.78	→	41.50
	-103.35	→	62.00	-160.97	→	35.50	-126.78	→	55.00
	-201.35	→	14.00	-245.97	→	4.00	-175.78	→	27.00
	-268.35	→	1.00	-187.97	→	16.00	-152.78	→	41.50
				-123.97	→	58.00			
				-202.97	→	12.00			

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.161 depicts the calculation of group and marginal means using the transformed ART ranks. These results are also represented in Table 4.162, which displays descriptive statistics involving students' ART scores from the Expository Oral Reading Fluency sub-test of the QRI-3 and consists of Mean (*M*), Standard Deviation (*SD*), and number of participants (*N*) organized by treatment group and gender.

Table 4.161
Fifth Grade Expository Oral Reading Fluency Adjusted Raw Scores Replaced by Ranks (ART)

	A_2	A_1	A_0	Marginal Mean
B_1	64.00 32.00 2.00 57.00 39.00 44.00 48.00 23.00 15.00	34.00 26.00 6.00 43.00 24.00 40.00 19.00 59.00 33.00 13.00	25.00 11.00 61.00 49.00 9.50 28.50 28.50 60.00 20.00 9.50	$\overline{B}_1 = 31.83$
Group Mean	$\overline{AB}_{21} = 36.00$	$\overline{AB}_{11} = 29.70$	$\overline{AB}_{01} = 30.20$	
B_0	5.00 52.00 51.00 45.50 45.50 37.00 30.00 7.00 62.00 14.00 1.00	47.00 53.00 21.00 54.00 31.00 35.50 17.00 50.00 35.50 4.00 16.00 58.00 12.00	8.00 38.00 3.00 22.00 56.00 63.00 18.00 41.50 55.00 27.00 41.50	$\overline{B}_0 = 33.06$
Group Mean	$\overline{AB}_{20} = 31.82$	$\overline{AB}_{10} = 33.39$	$\overline{AB}_{00} = 33.91$	
Marginal Mean	$\overline{A}_2 = 33.70$	$\overline{A}_1 = 31.78$	$\overline{A}_0 = 32.14$	$\overline{X} = 32.50$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Very much like Narrative Oral Reading Fluency, descriptive statistics for fifth grade Expository Oral Reading Fluency interactions (Table 4.70) varied across the factors of gender and treatment. To be more specific, females exposed to Storytelling

(*M* = 36.00) produced the highest Expository Oral Reading Fluency mean. Next best were males exposed to Silent Reading (*M* = 33.91), followed by males in the Reading Aloud set (*M* = 33.39). As can be seen, females exposed to Reading Aloud (*M* = 29.70) produced the lowest overall mean result for fifth grade Expository Oral Reading Fluency. However, males exposed to Storytelling (M = 31.82) achieved the lowest mean score for their respective gender. Additionally, observe that females exposed to Storytelling produced the highest overall Narrative (*M* = 35.22) and Expository (*M* = 36.00) Oral Reading Fluency results. Also take notice that male participants in the Silent Reading and Reading Aloud clusters each outperformed their female peers in Narrative and Expository Oral Reading Fluency.

Table 4.162
Descriptive Statistics for Fifth Grade Expository Oral Reading Fluency Interactions

Gender	Group	*M*	*SD*	*N*
Female	Storytelling	36.00	20.075	9
	Reading Aloud	29.70	15.535	10
	Silent Reading	30.20	19.868	10
	Total	31.83	18.104	29
Male	Storytelling	31.82	21.664	11
	Reading Aloud	33.39	18.112	13
	Silent Reading	33.91	19.951	11
	Total	33.06	19.278	35
Total	Storytelling	33.70	20.524	20
	Reading Aloud	31.78	16.768	23
	Silent Reading	32.14	19.500	21
	Total	32.50	18.618	64

Interaction results for fifth grade students' Expository Oral Reading Fluency ART scores are reported in Table 4.163. Once more, a 2×3 univariate ANOVA was employed for the analysis, with gender (female, male) and group (Storytelling, Reading Aloud, Storytelling) as between-subjects factors. Univariate outcomes revealed no

significant interaction for between-subjects factors (Gender × Group) in fifth grade students' Expository Oral Reading Fluency ($F(2, 58) = .284$, $p = .754$, partial $\eta^2 = .010$).

Table 4.163
Factorial ANOVA for Fifth Grade Expository Oral Reading Fluency Interactions

Source	Type III Sum of Squares	df	*F*	Sig.	Partial η^2
Gender × Group	211.222	2	.284	.754	.010
Error	21558.822	58			
Total	89437.500	64			

Note. Being irrelevant, main effects are not presented. Alpha (α) = .05.

Based upon the analysis, there is not enough evidence to reject the claim that there is no significant interaction among two story performance techniques held constant across the factor of gender (H_5).

Nonparametric Analysis of Main Effects for Fifth Grade Narrative and Expository Oral Reading Fluency

Analogous to Narrative and Expository Comprehension, main effect results for fifth grade Narrative and Expository Oral Reading Fluency were assessed through one-way Kruskal-Wallis H and Wilcoxon Rank-Sum (Mann-Whitney U) tests. The Kruskal-Wallis H test, which is a nonparametric test equivalent to a one-way ANOVA, was chosen to compare three or more sets of scores that come from different groups. It also allows the assessment of more than two independent groups. If significant differences between cell means are detected using the Kruskal-Wallis H test, post hoc Wilcoxon Rank-Sum (Mann-Whitney U) tests, if necessary, will be employed. This nonparametric procedure will test hypotheses H_2 and H_4 and identify the location of any significant differences.

Before running the analysis, the Blair-Sawilowsky Salter-Fawcett adjusted rank transformation test (ART) procedure for main effects was carried out for both Narrative

and Expository Oral Reading Fluency datasets (please see Table 4.142 for Narrative Oral Reading Fluency and 4.153 for Expository Oral Reading Fluency group and marginal mean computations). This procedure involved isolating main effects by subtracting the interaction from the raw data (Leys & Schumann, 2010; Sawilowsky, 1990, 2000). In order for main effects to be calculated without being affected by the interaction (Figure 4.2), the interaction (i.e., $\frac{\overline{AB}_{21} + \overline{AB}_{10} + \overline{AB}_{00}}{3} \rightarrow \frac{126.56 + 124.77 + 128.45}{3} = 126.59$) was deducted from each raw score by subtracting the mean of the three diagonal group means (please see Narrative Oral Reading Fluency Tables 4.164, 4.165, 4.166, 4.167, 4.168, and 4.169; Expository Oral Reading Fluency Tables 4.172, 4.173, 4.174, 4.175, 4.176, and 4.177). Next, students' adjusted raw scores were pooled together to form one set so that ranks could be properly assigned (please see Narrative Oral Reading Fluency Table 4.170; Expository Oral Reading Fluency Table 4.178). This outcome was reached by arranging all students' scores in an increasing order, assigning a rank ranging from one to sixty-four, and adapting the rank for all tie values by assigning equal average ranks to each one. Finally, one-way Kruskal-Wallis H and, if need be, post hoc Wilcoxon Rank-Sum (Mann-Whitney U) tests were computed using the transformed ART scores.

Table 4.164
Calculation of Adjusted Raw Scores of Females Exposed to Storytelling for Fifth Grade Narrative Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{21} + \overline{AB}_{10} + \overline{AB}_{00}}{3}$	=	Adjusted Raw Score
4	Storytelling	Female	161	-	126.59	=	34.41
4	Storytelling	Female	127	-	126.59	=	0.41
4	Storytelling	Female	60	-	126.59	=	-66.59
4	Storytelling	Female	155	-	126.59	=	28.41
4	Storytelling	Female	127	-	126.59	=	0.41
4	Storytelling	Female	131	-	126.59	=	4.41
4	Storytelling	Female	161	-	126.59	=	34.41
4	Storytelling	Female	116	-	126.59	=	-10.59
4	Storytelling	Female	101	-	126.59	=	-25.59

Note. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{00}$ = Group mean of males Exposed to Silent Reading.

Table 4.165
Calculation of Adjusted Raw Scores of Males Exposed to Storytelling for Fifth Grade Narrative Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{20} + \overline{AB}_{11} + \overline{AB}_{01}}{3}$	=	Adjusted Raw Score
4	Storytelling	Male	87	-	123.86	=	-36.86
4	Storytelling	Male	149	-	123.86	=	25.14
4	Storytelling	Male	155	-	123.86	=	31.14
4	Storytelling	Male	138	-	123.86	=	14.14
4	Storytelling	Male	140	-	123.86	=	16.14
4	Storytelling	Male	127	-	123.86	=	3.14
4	Storytelling	Male	124	-	123.86	=	0.14
4	Storytelling	Male	81	-	123.86	=	-42.86
4	Storytelling	Male	176	-	123.86	=	52.14
4	Storytelling	Male	101	-	123.86	=	-22.86
4	Storytelling	Male	56	-	123.86	=	-67.86

Note. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading.

Table 4.166
Calculation of Adjusted Raw Scores of Females Exposed to Reading Aloud for Fifth Grade Narrative Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{11} + \overline{AB}_{20} + \overline{AB}_{00}}{3}$	=	Adjusted Raw Score
4	Reading Aloud	Female	125	-	124.37	=	0.63
4	Reading Aloud	Female	143	-	124.37	=	18.63
4	Reading Aloud	Female	77	-	124.37	=	-47.37
4	Reading Aloud	Female	132	-	124.37	=	7.63
4	Reading Aloud	Female	125	-	124.37	=	0.63
4	Reading Aloud	Female	144	-	124.37	=	19.63
4	Reading Aloud	Female	126	-	124.37	=	1.63
4	Reading Aloud	Female	150	-	124.37	=	25.63
4	Reading Aloud	Female	107	-	124.37	=	-17.37
4	Reading Aloud	Female	105	-	124.37	=	-19.37

Note. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling. $\overline{AB}_{00}$ = Group mean of males exposed to Silent Reading.

Table 4.167
Calculation of Adjusted Raw Scores of Males Exposed to Reading Aloud for Fifth Grade Narrative Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{10} + \overline{AB}_{21} + \overline{AB}_{01}}{3}$	=	Adjusted Raw Score
4	Reading Aloud	Male	147	-	126.08	=	20.92
4	Reading Aloud	Male	120	-	126.08	=	-6.08
4	Reading Aloud	Male	119	-	126.08	=	-7.08
4	Reading Aloud	Male	165	-	126.08	=	38.92
4	Reading Aloud	Male	126	-	126.08	=	-0.08
4	Reading Aloud	Male	116	-	126.08	=	-10.08
4	Reading Aloud	Male	119	-	126.08	=	-7.08
4	Reading Aloud	Male	161	-	126.08	=	34.92
4	Reading Aloud	Male	133	-	126.08	=	6.92
4	Reading Aloud	Male	62	-	126.08	=	-64.08
4	Reading Aloud	Male	111	-	126.08	=	-15.08
4	Reading Aloud	Male	152	-	126.08	=	25.92
4	Reading Aloud	Male	91	-	126.08	=	-35.08

Note. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading.

Table 4.168
Calculation of Adjusted Raw Scores of Females Exposed to Silent Reading for Fifth Grade Narrative Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{01} + \overline{AB}_{10} + \overline{AB}_{20}}{3}$	=	Adjusted Raw Score
4	Silent Reading	Female	126	-	124.31	=	1.69
4	Silent Reading	Female	114	-	124.31	=	-10.31
4	Silent Reading	Female	188	-	124.31	=	63.69
4	Silent Reading	Female	149	-	124.31	=	24.69
4	Silent Reading	Female	85	-	124.31	=	-39.31
4	Silent Reading	Female	122	-	124.31	=	-2.31
4	Silent Reading	Female	100	-	124.31	=	-24.31
4	Silent Reading	Female	163	-	124.31	=	38.69
4	Silent Reading	Female	120	-	124.31	=	-4.31
4	Silent Reading	Female	102	-	124.31	=	-22.31

Note. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling.

Table 4.169
Calculation of Adjusted Raw Scores of Males Exposed to Silent Reading for Fifth Grade Narrative Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{00} + \overline{AB}_{11} + \overline{AB}_{21}}{3}$	=	Adjusted Raw Score
4	Silent Reading	Male	92	-	126.14	=	-34.14
4	Silent Reading	Male	145	-	126.14	=	18.86
4	Silent Reading	Male	64	-	126.14	=	-62.14
4	Silent Reading	Male	110	-	126.14	=	-16.14
4	Silent Reading	Male	168	-	126.14	=	41.86
4	Silent Reading	Male	173	-	126.14	=	46.86
4	Silent Reading	Male	111	-	126.14	=	-15.14
4	Silent Reading	Male	109	-	126.14	=	-17.14
4	Silent Reading	Male	188	-	126.14	=	61.86
4	Silent Reading	Male	120	-	126.14	=	-6.14
4	Silent Reading	Male	133	-	126.14	=	6.86

Note. $\overline{AB}_{00}$ = Group mean of males exposed to Silent Reading. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling.

Table 4.170
Fifth Grade Narrative Oral Reading Fluency Adjusted Raw Scores Transformed Into Ranks (ART)

	A_2			A_1			A_0		
	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART
B_1	34.41	→	55.50	0.63	→	34.50	1.69	→	37.00
	0.41	→	32.50	18.63	→	45.00	-10.31	→	22.00
	-66.59	→	2.00	-47.37	→	5.00	63.69	→	64.00
	28.41	→	53.00	7.63	→	42.00	24.69	→	49.00
	0.41	→	32.50	0.63	→	34.50	-39.31	→	7.00
	4.41	→	39.00	19.63	→	47.00	-2.31	→	29.00
	34.41	→	55.50	1.63	→	36.00	-24.31	→	12.00
	-10.59	→	21.00	25.63	→	51.00	38.69	→	58.00
	-25.59	→	11.00	-17.37	→	16.00	-4.31	→	28.00
				-19.37	→	15.00	-22.31	→	14.00
B_0	-36.86	→	8.00	20.92	→	48.00	-34.14	→	10.00
	25.14	→	50.00	-6.08	→	27.00	18.86	→	46.00
	31.14	→	54.00	-7.08	→	24.50	-62.14	→	4.00
	14.14	→	43.00	38.92	→	59.00	-16.14	→	18.00
	16.14	→	44.00	-0.08	→	30.00	41.86	→	60.00
	3.14	→	38.00	-10.08	→	23.00	46.86	→	61.00
	0.14	→	31.00	-7.08	→	24.50	-15.14	→	19.00
	-42.86	→	6.00	34.92	→	57.00	-17.14	→	17.00
	52.14	→	62.00	6.92	→	41.00	61.86	→	63.00
	-22.86	→	13.00	-64.08	→	3.00	-6.14	→	26.00
	-67.86	→	1.00	-15.08	→	20.00	6.86	→	40.00
				25.92	→	52.00			
				-35.08	→	9.00			

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.171
Fifth Grade Narrative Oral Reading Fluency Adjusted Raw Scores Replaced by Ranks (ART)

	A_2	A_1	A_0	Marginal Mean
B_1	55.50 32.50 2.00 53.00 32.50 39.00 55.50 21.00 11.00	34.50 45.00 5.00 42.00 34.50 47.00 36.00 51.00 16.00 15.00	37.00 22.00 64.00 49.00 7.00 29.00 12.00 58.00 28.00 14.00	$\overline{B}_1 = 32.69$
Group Mean	$\overline{AB}_{21} = 33.56$	$\overline{AB}_{11} = 32.60$	$\overline{AB}_{01} = 32.00$	
B_0	8.00 50.00 54.00 43.00 44.00 38.00 31.00 6.00 62.00 13.00 1.00	48.00 27.00 24.50 59.00 30.00 23.00 24.50 57.00 41.00 3.00 20.00 52.00 9.00	10.00 46.00 4.00 18.00 60.00 61.00 19.00 17.00 63.00 26.00 40.00	$\overline{B}_0 = 32.34$
Group Mean	$\overline{AB}_{20} = 31.82$	$\overline{AB}_{10} = 32.15$	$\overline{AB}_{00} = 33.09$	
Marginal Mean	$\overline{A}_2 = 32.60$	$\overline{A}_1 = 32.35$	$\overline{A}_0 = 32.57$	$\overline{X} = 32.50$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.172
Calculation of Adjusted Raw Scores of Females Exposed to Storytelling for Fifth Grade Expository Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{21} + \overline{AB}_{10} + \overline{AB}_{00}}{3}$	=	Adjusted Raw Score
4	Storytelling	Female	236	-	169.66	=	66.34
4	Storytelling	Female	171	-	169.66	=	1.34
4	Storytelling	Female	78	-	169.66	=	-91.66
4	Storytelling	Female	210	-	169.66	=	40.34
4	Storytelling	Female	180	-	169.66	=	10.34
4	Storytelling	Female	185	-	169.66	=	15.34
4	Storytelling	Female	199	-	169.66	=	29.34
4	Storytelling	Female	157	-	169.66	=	-12.66
4	Storytelling	Female	145	-	169.66	=	-24.66

Note. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{00}$ = Group mean of males Exposed to Silent Reading.

Table 4.173
Calculation of Adjusted Raw Scores of Males Exposed to Storytelling for Fifth Grade Expository Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{20} + \overline{AB}_{11} + \overline{AB}_{01}}{3}$	=	Adjusted Raw Score
4	Storytelling	Male	119	-	163.68	=	-44.68
4	Storytelling	Male	204	-	163.68	=	40.32
4	Storytelling	Male	202	-	163.68	=	38.32
4	Storytelling	Male	191	-	163.68	=	27.32
4	Storytelling	Male	191	-	163.68	=	27.32
4	Storytelling	Male	177	-	163.68	=	13.32
4	Storytelling	Male	163	-	163.68	=	-0.68
4	Storytelling	Male	121	-	163.68	=	-42.68
4	Storytelling	Male	231	-	163.68	=	67.32
4	Storytelling	Male	133	-	163.68	=	-30.68
4	Storytelling	Male	66	-	163.68	=	-97.68

Note. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading.

Table 4.174
Calculation of Adjusted Raw Scores of Females Exposed to Reading Aloud for Fifth Grade Expository Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{11} + \overline{AB}_{20} + \overline{AB}_{00}}{3}$	=	Adjusted Raw Score
4	Reading Aloud	Female	171	-	164.75	=	6.25
4	Reading Aloud	Female	156	-	164.75	=	-8.75
4	Reading Aloud	Female	118	-	164.75	=	-46.75
4	Reading Aloud	Female	182	-	164.75	=	17.25
4	Reading Aloud	Female	155	-	164.75	=	-9.75
4	Reading Aloud	Female	178	-	164.75	=	13.25
4	Reading Aloud	Female	152	-	164.75	=	-12.75
4	Reading Aloud	Female	217	-	164.75	=	52.25
4	Reading Aloud	Female	170	-	164.75	=	5.25
4	Reading Aloud	Female	130	-	164.75	=	-34.75

Note. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling. $\overline{AB}_{00}$ = Group mean of males exposed to Silent Reading.

Table 4.175
Calculation of Adjusted Raw Scores of Males Exposed to Reading Aloud for Fifth Grade Expository Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{10} + \overline{AB}_{21} + \overline{AB}_{01}}{3}$	=	Adjusted Raw Score
4	Reading Aloud	Male	195	-	168.59	=	26.41
4	Reading Aloud	Male	202	-	168.59	=	33.41
4	Reading Aloud	Male	154	-	168.59	=	-14.59
4	Reading Aloud	Male	204	-	168.59	=	35.41
4	Reading Aloud	Male	165	-	168.59	=	-3.59
4	Reading Aloud	Male	171	-	168.59	=	2.41
4	Reading Aloud	Male	151	-	168.59	=	-17.59
4	Reading Aloud	Male	199	-	168.59	=	30.41
4	Reading Aloud	Male	171	-	168.59	=	2.41
4	Reading Aloud	Male	86	-	168.59	=	-82.59
4	Reading Aloud	Male	144	-	168.59	=	-24.59
4	Reading Aloud	Male	208	-	168.59	=	39.41
4	Reading Aloud	Male	129	-	168.59	=	-39.59

Note. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading.

Table 4.176
Calculation of Adjusted Raw Scores of Females Exposed to Silent Reading for Fifth Grade Expository Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{01} + \overline{AB}_{10} + \overline{AB}_{20}}{3}$	=	Adjusted Raw Score
4	Silent Reading	Female	156	-	165.26	=	-9.26
4	Silent Reading	Female	126	-	165.26	=	-39.26
4	Silent Reading	Female	228	-	165.26	=	62.74
4	Silent Reading	Female	199	-	165.26	=	33.74
4	Silent Reading	Female	123	-	165.26	=	-42.26
4	Silent Reading	Female	159	-	165.26	=	-6.26
4	Silent Reading	Female	159	-	165.26	=	-6.26
4	Silent Reading	Female	219	-	165.26	=	53.74
4	Silent Reading	Female	155	-	165.26	=	-10.26
4	Silent Reading	Female	123	-	165.26	=	-42.26

Note. $\overline{AB}_{01}$ = Group mean of females exposed to Silent Reading. $\overline{AB}_{10}$ = Group mean of males exposed to Reading Aloud. $\overline{AB}_{20}$ = Group mean of males exposed to Storytelling.

Table 4.177
Calculation of Adjusted Raw Scores of Males Exposed to Silent Reading for Fifth Grade Expository Oral Reading Fluency Main Effects

Grade	Group	Gender	Raw Score	-	$\frac{\overline{AB}_{00} + \overline{AB}_{11} + \overline{AB}_{21}}{3}$	=	Adjusted Raw Score
4	Silent Reading	Male	121	-	168.08	=	-47.08
4	Silent Reading	Male	178	-	168.08	=	9.92
4	Silent Reading	Male	79	-	168.08	=	-89.08
4	Silent Reading	Male	155	-	168.08	=	-13.08
4	Silent Reading	Male	208	-	168.08	=	39.92
4	Silent Reading	Male	231	-	168.08	=	62.92
4	Silent Reading	Male	152	-	168.08	=	-16.08
4	Silent Reading	Male	180	-	168.08	=	11.92
4	Silent Reading	Male	206	-	168.08	=	37.92
4	Silent Reading	Male	157	-	168.08	=	-11.08
4	Silent Reading	Male	180	-	168.08	=	11.92

Note. $\overline{AB}_{00}$ = Group mean of males exposed to Silent Reading. $\overline{AB}_{11}$ = Group mean of females exposed to Reading Aloud. $\overline{AB}_{21}$ = Group mean of females exposed to Storytelling.

Table 4.178
Fifth Grade Expository Oral Reading Fluency Adjusted Raw Scores Transformed Into Ranks (ART)

	A_2			A_1			A_0		
	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART	Adjusted Raw Score	→	ART
B_1	66.34	→	63.00	6.25	→	36.00	-9.26	→	26.00
	1.34	→	32.00	-8.75	→	27.00	-39.26	→	12.00
	-91.66	→	2.00	-46.75	→	6.00	62.74	→	61.00
	40.34	→	58.00	17.25	→	44.00	33.74	→	51.00
	10.34	→	38.00	-9.75	→	25.00	-42.26	→	9.50
	15.34	→	43.00	13.25	→	41.00	-6.26	→	28.50
	29.34	→	48.00	-12.75	→	21.00	-6.26	→	28.50
	-12.66	→	22.00	52.25	→	59.00	53.74	→	60.00
	-24.66	→	15.00	5.25	→	35.00	-10.26	→	24.00
				-34.75	→	13.00	-42.26	→	9.50
B_0	-44.68	→	7.00	26.41	→	45.00	-47.08	→	5.00
	40.32	→	57.00	33.41	→	50.00	9.92	→	37.00
	38.32	→	54.00	-14.59	→	19.00	-89.08	→	3.00
	27.32	→	46.50	35.41	→	52.00	-13.08	→	20.00
	27.32	→	46.50	-3.59	→	30.00	39.92	→	56.00
	13.32	→	42.00	2.41	→	33.50	62.92	→	62.00
	-0.68	→	31.00	-17.59	→	17.00	-16.08	→	18.00
	-42.68	→	8.00	30.41	→	49.00	11.92	→	39.50
	67.32	→	64.00	2.41	→	33.50	37.92	→	53.00
	-30.68	→	14.00	-82.59	→	4.00	-11.08	→	23.00
	-97.68	→	1.00	-24.59	→	16.00	11.92	→	39.50
				39.41	→	55.00			
				-39.59	→	11.00			

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Table 4.179
Fifth Grade Expository Oral Reading Fluency Adjusted Raw Scores Replaced by Ranks (ART)

	A_2	A_1	A_0	Marginal Mean
B_1	63.00 32.00 2.00 58.00 38.00 43.00 48.00 22.00 15.00	36.00 27.00 6.00 44.00 25.00 41.00 21.00 59.00 35.00 13.00	26.00 12.00 61.00 51.00 9.50 28.50 28.50 60.00 24.00 9.50	$\overline{B}_1 = 32.35$
Group Mean	$\overline{AB}_{21} = 35.67$	$\overline{AB}_{11} = 30.70$	$\overline{AB}_{01} = 31.00$	
B_0	7.00 57.00 54.00 46.50 46.50 42.00 31.00 8.00 64.00 14.00 1.00	45.00 50.00 19.00 52.00 30.00 33.50 17.00 49.00 33.50 4.00 16.00 55.00 11.00	5.00 37.00 3.00 20.00 56.00 62.00 18.00 39.50 53.00 23.00 39.50	$\overline{B}_0 = 32.63$
Group Mean	$\overline{AB}_{20} = 33.73$	$\overline{AB}_{10} = 31.92$	$\overline{AB}_{00} = 32.36$	
Marginal Mean	$\overline{A}_2 = 34.60$	$\overline{A}_1 = 31.39$	$\overline{A}_0 = 31.71$	$\overline{X} = 32.50$

Note. A_2 = Storytelling. A_1 = Reading Aloud. A_0 = Silent Reading.
B_1 = Female. B_0 = Male.

Computation results of group means using the transformed ART ranks for Narrative and Expository Oral Reading Fluency are shown in Tables 4.171 and 4.179. These results are also represented in Table 4.180, where fifth grade case summaries by group for Narrative and Expository Oral Reading Fluency main effects are presented.

As can be seen, fifth grade Narrative and Expository Oral Reading Fluency results produce the same patterns. Students exposed to Storytelling attained the highest Narrative (M = 32.60) and Expository (M = 34.60) Oral Reading Fluency results, ensued by students exposed to Silent Reading group (with a Narrative Oral Reading Fluency mean of 32.57 and an Expository Oral Reading Fluency score of 31.71). Interestingly enough, students exposed to Reading Aloud produced the lowest Narrative and Expository Oral Reading Fluency (where the mean score for Narrative Oral Reading Fluency was 32.35 and Expository Oral Reading Fluency was 31.39). Note that fifth grade students exposed to Reading Aloud produced higher mean results for Narrative Oral Reading Fluency than Expository Oral Reading Fluency. Conversely, however, students exposed to Storytelling managed a higher Expository Oral Reading Fluency score than Narrative Oral Reading Fluency.

Table 4.180
Fifth Grade Case Summaries by Group for Narrative and Expository Oral Reading Fluency Main Effects

Group		Narrative Oral Reading Fluency	Expository Oral Reading Fluency
Storytelling	N	20	20
	Mean	32.60	34.60
	Std. Deviation	20.044	20.957
Reading Aloud	N	23	23
	Mean	32.35	31.39
	Std. Deviation	16.490	16.233
Silent Reading	N	21	21
	Mean	32.57	31.71
	Std. Deviation	20.275	19.451
Total	N	64	64
	Mean	32.50	32.50
	Std. Deviation	18.618	18.618

Kruskal Wallis H test results reveal no significant main effect of group on fifth grade Narrative (H(2) = .002, *P* = .999) and Expository (H(2) = .373, *P* = .830) Oral Reading Fluency (Table 4.181). As a result, there is insufficient evidence to reject the claim that there is no difference in fifth grade students' reading oral reading fluency of narrative and expository texts as a result of employing two story performance techniques (H_2). Furthermore, there is insufficient evidence to reject the claim that there is no difference in fifth grade students' reading oral reading fluency of narrative and expository texts due to the effects of a teacher's telling and a teacher's reading aloud of twenty-eight stories to the students (H_4).

Due to the aforesaid outcomes, post hoc Wilcoxon Rank-Sum (Mann-Whitney U) tests were not performed for Narrative or Expository Oral Reading Fluency main effects by group.

Table 4.181
Kruskal Wallis H Test Results by Group for Fifth Grade Narrative and Expository Oral Reading Fluency Main Effects

	Narrative Oral Reading Fluency	Expository Oral Reading Fluency
Chi-Square	.002	.373
df	2	2
Asymp. Sig.	.999	.830

Note. Alpha (α) = .10.

As previously referred to, computation results of group means using the transformed ART ranks for Narrative and Expository Oral Reading Fluency are revealed in Tables 4.171 and 4.179. Furthermore, these results are also represented in Table 4.182, where fifth grade case summaries by gender for Narrative and Expository Oral Reading Fluency main effects are offered. Narrative Oral Reading Fluency case

summaries show that female participants attained the highest overall mean (*M* = 32.69) when compared to males (*M* = 32.34). On the other hand, male participants produced the highest overall Expository Oral Reading Fluency mean (*M* = 32.63) when contrasted against their female peers (*M* = 32.35). Note that fifth grade female participants had a slightly higher mean in Narrative Oral Reading Fluency in comparison to Expository Oral Reading Fluency. The exact opposite was true for males, who managed a somewhat higher mean in Expository Oral Reading Fluency as opposed to Narrative Oral Reading Fluency.

Table 4.182
Fifth Grade Case Summaries by Gender for Narrative and Expository Oral Reading Fluency Main Effects

Gender		Narrative Oral Reading Fluency	Expository Oral Reading Fluency
Female	N	29	29
	Mean	32.69	32.35
	Std. Deviation	17.616	17.998
Male	N	35	35
	Mean	32.34	32.63
	Std. Deviation	19.664	19.378
Total	N	64	64
	Mean	32.50	32.50
	Std. Deviation	18.618	18.618

Kruskal Wallis H test results failed to demonstrate a main effect of gender on fifth grade Narrative (H(1) = .006, *P* = .941) and Expository (H(1) = .004, *P* = .952) Oral Reading Fluency (Table 4.183). These outcomes confirm that there is insufficient evidence to reject the claim that there is no difference in fifth grade students' reading oral reading fluency of narrative and expository texts as a result of employing two story performance techniques (H_2). Moreover, there is insufficient evidence to reject the claim that there is no difference in fifth grade students' reading oral reading fluency of

narrative and expository texts due to the effects of a teacher's telling and a teacher's reading aloud of twenty-eight stories to the students (H_4).

Table 4.183
Kruskal Wallis H Test Results by Gender for Fifth Grade Narrative and Expository Oral Reading Fluency Main Effects

	Narrative Oral Reading Fluency	Expository Oral Reading Fluency
Chi-Square	.006	.004
df	1	1
Asymp. Sig.	.941	.952

Note. Alpha (α) = .10.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study was undertaken as an attempt to assess the effects of storytelling and reading aloud on fourth and fifth grade children's comprehension and oral reading fluency of both narrative and expository texts. As previously described, the independent variable for this study involved two strategies for introducing stories to children (storytelling and story reading) and a comparison strategy (silent reading). For the purposes of this study, each treatment (or strategy) was used, in part, to differentiate literacy instruction. Each treatment was identified and described as follows:

Treatment 1 (Storytelling) - Over the course of seven weeks, twenty-eight teacher-storytelling performances of narrative and expository texts (fourteen narrative and fourteen expository) were employed by the principal investigator with fourth and fifth grade students. All of the narratives told were fiction, while the rest of the selections were fictionalized biographies that were basically fictional in nature. Each week's story selections consisted of two narratives and two expository texts from grades 3-8 MEAP Released Items Reading Selections (see Figures 3.3 and 3.4). Because some of these selections were below, at, or above the student participants' grade level, each selection was reviewed and approved by an expert storyteller/educator for their appropriateness. Moreover, in order to hold the storytelling process constant, each story category alternated every other day (i.e., Day 1 = Narrative, Day 2 = Expository, Day 3 = Narrative, etc.).

During the treatment's timeframe, fourth and fifth grade students from each grade level (assigned to Treatment 1) were combined in a cluster and told one single story per day—four times a week. These storytelling sessions occurred in the same classroom environment for each telling, which were scheduled to last for approximately thirty to forty-five minutes. No student discussions ensued upon conclusion of each storytelling performance and a multiple-choice assessment was given to students at the end of each telling. Each assessment consisted of only eight questions and was recorded on a DataDirector bubble-sheet, which was ultimately turned into the principal investigator by the students. These answer documents were then scanned into a DataDirector database by the principal investigator using a Fujitsu fi-6130 Sheet-Fed TWAIN scanner.

Treatment 2 (Reading Aloud) - In the same manner as Treatment 1, twenty-eight teacher-story reading aloud performances of narrative and expository texts (the same stories used in Treatment 1) were employed by a fourth grade certified teacher with the group of fourth and fifth grade students assigned to Treatment 2 over the course of seven weeks. Before the onset of the study, the principal investigator met with the fourth grade certified teacher who volunteered to administer Treatment 2 so as to discuss her role in the study. During this meeting, the principal investigator exposed all of the study's materials to the fourth grade teacher (i.e., MEAP story selections, story schedule, multiple-choice assessments, students' answer sheets, and multiple-choice assessments' answer keys) and explained that she would be required to read aloud each selection only once per session to the students in Treatment 2. The principal investigator also explained to the certified teacher that each week's story selections

would consist of two narrative and two expository passages from MEAP 2005, 2006, 2007, and 2008 released item reading selections (see Figures 3.3 and 3.4). In order to hold the story reading aloud performance process constant, each story category alternated every other day (i.e., Day 1 = Narrative, Day 2 = Expository, Day 3 = Narrative, etc.) and followed the same story selection schedule as Treatments 1 and 3 (see Figures 3.3 and 3.4).

On a daily basis, during the treatment's timeframe, fourth and fifth grade participants were combined to form a cluster and were read the same story that was told by the principal investigator in Treatment 1 or read silently by students in the comparison group (Treatment 3). Likewise, each session occurred simultaneously, while Treatment 1 and Treatment 3 were being administered, students in Treatment 2 listened to a story being read aloud to them by the fourth grade certified teacher. Each story scheduled for each day was read only once. This process occurred four times a week. Unlike Treatment 1, where student participants were expected to visualize/comprehend all aspects of the story, student participants in Treatment 2 were exposed to all illustrations provided in each selection. As a result, pictures from each selection were revealed to student participants by the fourth grade certified teacher during each reading. Moreover, all story reading aloud sessions for Treatment 2 occurred in the same classroom environment for each reading and were scheduled to last for approximately thirty to forty-five minutes. No student discussions ensued upon conclusion of each story reading aloud performance. Finally, a multiple-choice assessment was given to student participants at the end of each reading. Each assessment consisted of the same eight questions answered by students assigned to

Treatment 1. These documents were also recorded on a DataDirector bubble-sheet, which was eventually turned into the fourth grade certified teacher by the students. Answer documents were subsequently given to the principal investigator who ultimately scanned them into a DataDirector database using a Fujitsu fi-6130 Sheet-Fed TWAIN scanner.

Treatment 3 (Silent Reading) - The comparison group; no narrative/expository text storytelling or story reading aloud performances were employed. Students read silently each scheduled selection. Within the contents of each story selection, pictures were left inside for students to view. Upon conclusion of reading each selection independently, students answered eight multiple-choice questions. Each assessment consisted of the same eight questions answered by students assigned to Treatment levels 1 and 2. In addition, these documents were recorded on a DataDirector bubble-sheet, which was turned into the fifth grade certified teacher by the students at the end of each session. Answer documents were then scanned into a DataDirector database by the principal investigator using a Fujitsu fi-6130 Sheet-Fed TWAIN scanner.

The sample for the study consisted of one-hundred-twenty-six fourth and fifth grade students from the same elementary school located in Macomb County, Michigan. Within this sample, there were sixty-six male (52.4%) and sixty female participants (47.6%) (see Table 3.2). With regard to grade level, sixty-two students were from fourth grade (49.2%), while sixty-four were from fifth grade (50.8%). According to school personnel, the socioeconomic status of these children ranged from lower- to upper-middle class and their ability levels ranged from below to above average throughout

each grade level. Female and male students from each grade level were randomly assigned separately to each of three treatment groups.

Upon conclusion of the fourteen week study, a QRI-3 oral reading fluency reading rate, as measured in words-per-minute (WPM), was determined by a Literacy Coach using fourth and fifth grade narrative and expository reading passages from the QRI-3. In addition, a measure of comprehension was carried out by the same Literacy Coach using the same narrative and expository reading passages used to calculate students' oral reading fluency rates for each posttest. For this, the Literacy Coach asked two types of questions: Explicit and implicit. Explicit questions required students' to recall factual information stated in the passage. In order to correctly answer implicit questions, students were required to make inferences from clues inside the passage (Leslie & Caldwell, 2001). Finally, both explicit and implicit responses to questions were combined to formulate a total comprehension raw score.

As denoted earlier in Chapter 4, the framework for this study was a 2×3 factorial design employing two student variable levels (female and male) and three independent treatment variable levels (Storytelling and Reading Aloud to the students by an adult and Silent Reading by the students). The design was employed independently for each of the two grade levels of students (fourth and fifth grades) involved in this research. This analysis stratification was necessary since the criterion variables in the study for the QRI-3 assessments used for narrative and expository comprehension and oral reading fluency were unique for each grade level; their validity and reliability were established independent of each other.

Again, for this study, the third treatment, Silent Reading by the students, served as the base-line treatment level to which the other two treatments were compared. In the typical reading program, Silent Reading is a common instructional strategy employed by teachers in fourth and fifth grades. Likewise, during standardized testing, students are expected to read passages independently. As such, it was important to determine if Storytelling and/or Reading Aloud had any significant effect on the narrative and expository comprehension and fluency of fourth and fifth grade students as compared to the effect Silent Reading had on these criterion variables.

The data was analyzed for statistical differences among the means and also for any significant interaction among combinations of the various factors. Parametric tools, including MANOVA, were employed initially. Nonetheless, due to small and unequal sample sizes, nonparametric tests, which are known to be more statistically powerful if the normality assumption of the parametric MANOVA is violated, were also employed. These tests include the Blair-Sawilowsky Salter-Fawcett adjusted rank transformation test (ART), Kruskal-Wallis H tests, and Wilcoxon rank-sum tests (Mann-Whitney U).

Conclusions

Narrative and Expository Comprehension

Explicit results from this study involving fourth and fifth grade students offer some comparable outcomes with regard to narrative and expository comprehension. For fourth grade students, the evidence suggests that there is no differential effect of a teacher's storytelling or reading aloud on students' comprehension of narrative or expository texts as compared to simply having the students read stories silently. Similarly, there appears to be no differential effect on their comprehension regardless of

whether a teacher tells ro reads stories to students. In addition, the impact of the treatments on comprehension did not vary regardless of whether the student was female or male.

The same implications can be drawn from the data analysis regarding comprehension of expository texts for the fifth graders. That is to say, neither storytelling nor reading aloud made a difference in their comprehension as compared to having the students read texts silently. Nor was there any differential effect when comparing the impact of the two strategies, one against the other. As was true for the fourth grade students, neither females nor males were affected differently regarding their comprehension of expository text.

The findings with regard to expository text comprehension are not at all surprising. Considering the fact that the treatment stories were either fiction or biographical fiction, it makes sense to assume that, given this treatment, there would be less of an impact on expository comprehension than narrative comprehension.

The major finding from this study involves fifth graders' comprehension of narrative texts. With the employment of non-parametric statistical analysis, the study reveals that both reading aloud and telling stories by a teacher did significantly impact for the better the students' comprehension of narrative text as compared to simply having the students read stories silently.

Regarding the impact of a teacher's reading aloud to students, this outcome is consistent with the findings of many researchers whose studies have substantiated the efficacy of reading aloud to students (Anderson, et al., 1985; Flood, et al., 2003; Hall & Moats, 2000; Hoffman, et al., 1993; McCormick, 1977; Roney, 2005; Short, 1995;

Whitehurst, 1988). Moreover, the findings of the current study augments research which has already shown that during the beginning stages of reading development, the practice of reading aloud by the teacher introduces children to the basic properties of the English writing system—properties which are essential in gaining meaning from print. In addition, reading aloud tends to help children move toward the task of learning to read in a manner that is consistent with the way in which they learn to speak; as has been theorized by numerious individuals from Chomsky (1972), Vygotsky (1986), and Cambourne (1988) to Roney (2005) and Haven (2007). It is also interesting to note that research conducted by Feitelson, Kita, and Goldstein (1986), identified the critical value of reading aloud to underprivileged or “at risk” children as an aid to mastering reading comprehension (Feitelson, et al., 1986; Roney, 2005). Furthermore, Anderson, Hiebert, Scott, and Wilkinson (1985) consider reading aloud as, “The single most important activity for building the knowledge required for eventual success in reading..." (p. 23) Unsurprising, these findings hold true in this research study, due to the fact that sixty-two percent of all students attending the school qualify for Federal free or reduced-price meal benefits.

Without question, the most significant finding of this study involves the impact of a teacher’s storytelling on students’ ability to comprehend narrative text. This is so since the results establish for the first time, a direct causal link between a teacher's employment of Storytelling and its impact on students’ ability to comprehend narrative text. To date, the vast majority of research regarding the effects of storytelling in classroom settings has been qualitative in design that, by its very nature, cannot be cited to establish a definitive causal link between storytelling by a teacher and its effect

on the academic achievement of students. Moreover, the relevant quantitative research, as was revealed in the literature review, has been shown to be either fundamentally flawed design-wise or inconsequential regarding the results. However, as a result of the current study, we now have evidence of the direct impact of a teacher's telling stories on students' ability to comprehend literature and of the use of storytelling as a viable teaching strategy that can be used to differentiate literacy instruction.

Narrative and Expository Oral Reading Fluency

Results for fourth and fifth grade students yielded no perceptible differences in their oral reading fluency of narrative and expository texts as a result of employing two story performance techniques. Similarly, there were no differences in fourth and fifth grade students' oral reading fluency of narrative and expository texts due to the effects of a teacher's telling or reading stories aloud; also, neither females' nor males' oral reading fluency was affected differentially as a result of the use of the two story performance strategies. The aforesaid findings insinuate that listening to a fluent speaker or fluent reader has no influence on fourth and fifth grade students' oral reading fluency as compared to having the students read texts silently. These outcomes were a bit unanticipated, due to the fact that meaning of text is also carried through cadence, expression, phrasing, and pausing; all of which are essential components to fluent reading (Cohen, 1968; LeBerge & Samuels, 1974; Pinnell, 1995; Rasinski, 2003). Nonetheless, more quantitative studies are needed to address this compound issue.

Recommendations for Further Research

For years, there has been a dearth of empirical evidence that clearly demonstrates a valid causal link between storytelling and some aspect of student achievement (i.e., reading, writing, speaking, listening, viewing, etc.). The vast majority of research to date on storytelling reflects qualitative designs that attempt to establish relationships between storytelling and other dependent variables (e.g., comprehension, oral language development, writing ability, memory/recall, story structure, critical thinking, feelings/emotions, etc.). All have fallen short of establishing causality, which spawns scientifically unsubstantiated theory or opinion. Consequently, more quantitative research is needed to authenticate storytelling as a useful teaching/learning strategy to differentiate instruction. Fortunately, as a result of this study, a causal link has been established using quantitative research methodologies. Because of this, further research should be conducted using a similar design as the one used in the current research. Such studies can corroborate and/or add to the current findings, particularly regarding the practical impact of Storytelling, since there is a dearth of empirical research. The research should focus on all grade levels, but particularly fifth grade and above, given that comprehension becomes more important then than in earlier grades where word recognition is viewed as equally or more important. On the other hand, additional studies involving students younger than fourth graders could focus on word recognition and comprehension as dependent variables. Future researchers may also want to consider even longer treatment periods with more stories told since we know from the reading aloud research that more extensive treatment is more likely to yield significant results. With regard to oral reading fluency, results of this

study suggest that there is no significant connection between story performance (Storytelling and Reading Aloud) and fourth and fifth grade oral reading fluency. However, this is the first study to include fluency as a dependent variable. While nothing significant came of the investigation, fluency was included because no one has ever investigated it before under these circumstances. As a final point, since experimental research in the field of education routinely relies on the use of parametric statistical analysis, even when the assumptions underlying the use of these tests are not met, researchers may want to consider using nonparametric alternatives such as those employed in this study. As has been mentioned previously, earlier valid research designs of a quantitative nature involving the impact of storytelling have exclusively employed parametric statistics, yet resulted in no significant findings. Perhaps, by using non-parametric statistical designs in the future, researchers will be able to substantially increase our store of knowledge regarding the effectiveness of storytelling in the school curriculum.

APPENDIX A

Teacher Observations

Observation: 1
Treatment: Silent Reading Group
Story: Adding Up Clues
Summary: The students came in and sat in their seats. Once everyone was in their seat, the fifth grade teacher passed out the story, multiple choice questions, and answer sheets. After everyone had their materials, they were told to begin. As students finished, they turned their work into the fifth grade teacher.

Observation: 2
Treatment: Read Aloud Group
Story: Alice Evans' Quest for Safe Milk
Summary: The fourth grade teacher waited for all the students to come in and sit down and then she began reading. Students listened carefully as she read. Once she finished reading, she passed out the multiple choice questions, answer sheets and pencils. Once all the materials were passed out, she told students to begin answering multiple choice questions. After everyone was finished, she collected the materials and the students went back to class.

Observation: 3
Treatment: Storytelling Group
Story: The Flying V
Summary: The students came in and sat down. The principal investigator then began to tell the story to the students. The students sat and listened quietly. After the story, the principal investigator passed out the multiple choice questions and answer sheets. Once everyone was finished with the multiple choice questions, the principal investigator collected the materials.

Observation: 4
Treatment: Read Aloud Group
Story: New Heights: The Courage of Alice Eastwood
Summary: The students came in and sat in their seats. Once everyone was in their seat, the fourth grade teacher began reading. Once she finished, she passed out the multiple choice questions and answer sheets. After everyone had their materials, they were told to begin. Once everyone finished, the materials were collected and the students left.

Observation: 5
Treatment: Read Aloud Group
Story: King Midas
Summary: Students came in the classroom and sat down quietly. After everyone was in their seat, the fourth grade teacher introduced the story and began to read it aloud. Students sat and listened carefully as she read. After the fourth grade teacher finished the story, she handed out their multiple choice questions and answer sheets. Once all students had their materials, she told them to begin answering questions. Students worked quietly on their assessments. Once everyone was done, the fourth grade teacher collected their answer sheets.

Observation: 6
Treatment: Silent Reading Group
Story: Nellie Bly
Summary: Students came in and sat down in their seats. The fifth grade teacher began to pass out the answer sheets and story. Once everyone received their materials, he told them to begin reading silently. The students then started to read. While observing, I noticed that all the students were engaged in the reading. The students in this group had to read their story silently then answer the 8 multiple choice questions that pertained to the story. Once they finished, the students turned in their materials to the fifth grade teacher.

Observation: 7
Treatment: Storytelling Group
Story: The Hill
Summary: Students came in and sat in their assigned seats. Their pencils had already been passed out. Once all students were in the room, the principal investigator introduced the story and began telling it. While he was telling the story, the students were all listening attentively. After he finished telling the story, the principal investigator passed out the answer sheets and multiple choice questions. Once this was done, students began to work on the multiple choice questions. When everyone was done, the materials were collected by the principal investigator and the students left.

Observation: 8
Treatment: Silent Reading Group
Story: Rosa Parks
Summary: The students came in and sat down. The fifth grade teacher passed out the materials to the students. After all the students received their materials, the fifth grade teacher told students to start their reading. Students began to read and answer their multiple choice questions. After everyone was done, the fifth grade teacher collected that students' work and they went back to class.

Observation: 9
Treatment: Read Aloud Group
Story: A Birthday Riddle
Summary: Students came in and sat down. Once everyone was in a seat, the fourth grade teacher introduced the story to the students and began reading. Students were quiet and listened to the story. After the fourth grade teacher finished, she began to pass out the multiple choice questions and answers. Once all the students got their materials, she told them to begin. After everyone finished, she collected the materials and the students went back to class.

Observation: 10
Treatment: Silent Reading Group
Story: Beth Rodden: Rock Climber
Summary: The students came in and sat down in their seats. The fifth grade teacher then passed out the materials. Once the materials were distributed, he introduced the story and told the students to begin. The students read the story and answered the multiple choice questions. Once everyone was done, the fifth grade teacher collected the materials.

Observation: 11
Treatment: Storytelling Group
Story: Under the Shade of a Tree
Summary: The students came in and sat in their regular seats. Once everyone was seated, the principal investigator began to tell the story. The students listened while he told the story. The students seemed intrigued by the story. After the principal investigator finished, he passed out the multiple choice questions and answer sheets. Once students received their materials, they began to answer the multiple choice questions. When everyone was done, the materials were collected.

Observation: 12
Treatment: Storytelling Group
Story: Joy Ride
Summary: The students came in and sat in their seats. Once everyone was in the room and seated, the principal investigator began to tell the story to the students. The students listened carefully as he told the story. Once the principal investigator finished, he passed out the multiple choice questions and answer sheets. Once everyone had their materials, he told them to begin. After everyone finished, he collected the materials.

Observation: 13
Treatment: Storytelling Group
Story: The Snake in the Bottle
Summary: The students came in and sat down. Once everyone was seated, the principal investigator began telling the story as the students listened quietly. Once he was done telling the story, he passed out the answer sheets and multiple choice questions. Once all the materials were distributed, students quietly worked on answering the multiple choice questions. After that, the principal investigator collected the materials.

Observation: 14
Treatment: Silent Reading Group
Story: My Life with Bears
Summary: The students came in and sat down in their seats. Once everyone was seated, the fifth grade teacher passed out the stories and answer sheets. He picked a couple students to pass out pencils. Once everyone had all their materials, the students began to read silently. As students finished, they turned in their materials to the fifth grade teacher.

Observation: 15
Treatment: Read Aloud Group
Story: The Wise King
Summary: The Students came in and sat down at their regular seats. Once everyone was in the room and seated, the fourth grade teacher introduced the story and began to read aloud. The students listened as she read. Once she finished, she passed out the multiple choice questions and answer sheets to the students. Once all the students had their materials, she told them to begin answering the multiple choice questions. Once everyone was finished, she collected the materials.

Observation: 16
Treatment: Silent Reading Group
Story: Alvin Ailey, Modern Dancer
Summary: Students came in and sat down in their seats. Once everyone was seated, the fifth grade teacher passed out the materials to all the students. Once everyone had their materials, the fifth grade teacher told them to begin. Students read their story quietly and proceeded to answer the multiple choice questions when they finished reading. Once everyone was done, the fifth grade teacher collected the materials.

Observation: 17
Treatment: Read Aloud Group
Story: The Daisy
Summary: The students came in and sat down. Once everyone was in the room and seated, the fourth grade teacher introduced the story and began to read it aloud. The students listened as she read. Once she finished, she passed out the multiple choice questions and answer sheets to the students. Once all the students had their materials, she told them to begin answering the multiple choice questions. Once everyone was finished, she collected the materials.

Observation: 18
Treatment: Storytelling Group
Story: Pioneer Doctor of the Prairie
Summary: The students came in a sat down. Once everyone was in a seat, the principal investigator began to tell the students the story. The students sat and listened carefully. Once he was finished telling the story, the principal investigator passed out the testing materials to the students. Once everyone had their materials, he told them to begin. Once everyone finished, the materials were collected and the students left.

Observation: 19
Treatment: Silent Reading Group
Story: Eric's Lizard
Summary: The students came in and sat down in their seats. Once everyone was seated, the fifth grade teacher passed out the materials to all the students. Once everyone had their materials, the fifth grade teacher told them to begin. Students read the story quietly and proceeded to answer the multiple choice questions. Once everyone was done, the fifth grade teacher collected the materials.

Observation: 20
Treatment: Lessons in Baseball
Story: Eric's Lizard
Summary: The students came in and sat down. Once everyone was seated, the fourth grade teacher introduced the story and began reading aloud. Students listened as she read. Once she finished reading, she passed out the multiple choice questions and answer sheets. Once everyone had their materials, she told them to begin. Once everyone was finished, she collected the materials.

Observation: 21
Treatment: Storytelling Group
Story: Hannah
Summary: The students came in and sat down. The principal investigator then began to tell the story to the students. The students sat and listened quietly. After the story, the principal investigator passed out the multiple choice questions and answer sheets. Once everyone was finished with the multiple choice questions, the principal investigator collected the materials.

Observation: 22
Treatment: Read Aloud Group
Story: Sarah Bagley: Fighter for Rights
Summary: Students came in and sat in their regular seats. Once everyone was seated, the fourth grade teacher introduced the story and began reading it aloud. Students listened quietly as she read. Once she finished, she passed out multiple choice questions and answer sheets. Once all the students had their materials, the fourth grade teacher told them to begin. Students worked quietly on their multiple choice questions. After everyone finished, she collected the materials.

Observation: 23
Treatment: Read Aloud Group
Story: Song of Masefield
Summary: The fourth grade teacher waited for all the students to come in and sit down and then she began reading. Students listened carefully as she read. Once she finished reading, she passed out the multiple choice questions, answer sheets and pencils. Once all the materials were passed out, she told students to begin answering multiple choice questions. After everyone was finished, she collected the materials and the students went back to class.

Observation: 24
Treatment: Silent Reading Group
Story: Allen Jay: Conductor of the Underground Railroad
Summary: The students came in and sat in their seats. Once everyone was in their seat, the fifth grade teacher passed out the story, multiple choice questions, and answer sheets. After everyone had their materials, they were told to begin. As students finished, they turned their work into the fifth grade teacher.

Observation: 25
Treatment: Read Aloud Group
Story: Hisako: The Girl Who Would be Beautiful
Summary: The students came in as usual and sat in their seats. Once everyone was in their seat, the fourth grade teacher began reading. Once she finished, she passed out the multiple choice questions and answer sheets. After everyone had their materials, they were told to begin. Once everyone finished, the materials were collected and the students left.

Observation: 26
Treatment: Storytelling Group
Story: Sir Douglas Bader
Summary: The students came in a sat in their regular seats. Once everyone was in their seat, the principal investigator began to tell the students the story. The students sat and listened carefully. Once he was finished telling the story, the principal investigator passed out the testing materials to the students. Once everyone had their materials, he told them to begin. Once everyone finished, the materials were collected and the students left.

Observation: 27
Treatment: Silent Reading Group
Story: King Alfred and the Cakes
Summary: Students came in and sat down in their seats. Once everyone was seated, the fifth grade teacher passed out the materials to all the students. Once everyone had their materials, the fifth grade teacher told them to begin. Students read their story quietly and proceeded to answer the multiple choice questions when they finished reading. Once everyone was done, the fifth grade teacher collected the materials.

Observation: 28
Treatment: Storytelling Group
Story: A Special Gift - The Legacy of “Snowflake” Bentley
Summary: The students came in and sat in their regular seats. Once everyone was in the room and seated, the principal investigator began to tell the story to the students. The students listened carefully as he told the story. Once the principal investigator finished the story, he passed out the multiple choice questions and answer sheets. Once everyone had their materials, he told them to begin. After everyone finished he collected the materials.

APPENDIX B

Human Investigation Committee Approval

WAYNE STATE UNIVERSITY

HUMAN INVESTIGATION COMMITTEE
87 East Canfield, Second Floor
Detroit, Michigan 48201
Phone: (313) 577-1628
FAX: (313) 993-7122
http://hic.wayne.edu

Full AAHRPP Accreditation

NOTICE OF EXPEDITED APPROVAL

To: Shawn Wightman
College of Education

From: Dr. Scott Millis for D. Dehaan
Chairperson, Behavioral Institutional Review Board (B3)

Date: January 26, 2011

RE: HIC #: 012411B3E

Protocol Title: The Effects of Story Performance on 4th and 5th Grade Students' Comprehension and Oral Reading Fluency of Narrative/Expository Texts

Funding Source:

Protocol #: 1101009250

Expiration Date: January 25, 2012

Risk Level / Category: 45 CFR 46.404 - Research not involving greater than minimal risk

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The above-referenced protocol and items listed below (if applicable) were **APPROVED** following *Expedited Review* Category (#7)* by the Chairperson/designee *for* the Wayne State University Institutional Review Board (B3) for the period of 01/26/2011 through 01/25/2012. This approval does not replace any departmental or other approvals that may be required.

- Protocol Summary Form, revised 1-24-11.
- Parental Permission/Research Informed Consent/Information Sheet, dated 1-24-11.
- Child Oral Assent Script (ages 8-11), dated 1/24/11.
- Receipt of a research protocol

- Federal regulations require that all research be reviewed at least annually. You *may* receive a *"Continuation Renewal Reminder"* approximately two months prior to the expiration date; however, it is the Principal Investigator's responsibility to obtain review and continued approval ***before*** the expiration date. Data collected during a period of lapsed approval is unapproved research and can ***never*** be reported or published as research data.
- All changes or amendments to the above-referenced protocol require review and approval by the HIC **BEFORE** implementation.
- Adverse Reactions/Unexpected Events (AR/UE) must be submitted on the appropriate form within the timeframe specified in the HIC Policy (http://www.hic.wayne.edu/hicpol.html).

NOTE:

1. Upon notification of an impending regulatory site visit, hold notification, and/or external audit the HIC office must be contacted immediately.
2. Forms should be downloaded from the HIC website at ***each*** use.

*Based on the Expedited Review List, revised November 1998

APPENDIX C

Information Sheet

Title of Study: The Effects of Story Performance on 4th and 5th Grade Students' Comprehension and Oral Reading Fluency of Narrative/Expository Texts

PARENTAL PERMISSION/RESEARCH INFORMED CONSENT/INFORMATION SHEET

Title of Study: The Effects of Story Performance on 4th and 5th Grade Students' Comprehension and Oral Reading Fluency of Narrative/Expository Texts

Purpose:

You are being asked to allow your child to be in a research study at their school that is being conducted by Shawn K. Wightman from Wayne State University to study the effects of story performance on 4th and 5th grade students' comprehension and oral reading fluency of narrative/expository texts. Your child has been selected because he or she attends Fountain Elementary School and is currently enrolled in fourth or fifth grade.

Study Procedures:

If you decide to allow your child to take part in the study, your child will be asked to either read or listen to a series of stories and answer some multiple choice questions about them. At the end of the study, your child will also be given the *Qualitative Reading Inventory-3 (QRI-3)*, to determine what effects storytelling, reading aloud, or silent reading has on his or her comprehension and oral reading fluency of narrative/expository texts. All student data collected (e.g., multiple choice scores, *QRI-3* results, etc.) will be entered into an electronic database. In order to protect the identities of all students, a code number will be used to identify student information (e.g., 4M-11 = 4th grade male student #11; 4F-19 = 4th grade female student #19, etc.). Access to the study's database will only accessible to the principal investigator and will be stored on a secure application server requiring essential login information and password authentication. Finally, upon conclusion of the study, all hardcopy student data will be destroyed and electronic files deleted from the principal investigator's application server.

The study is expected to begin in January 2011 and last for seven consecutive weeks. Each week will consist of four story performance sessions lasting for approximately thirty to forty-five minutes each. During each session, only one narrative or expository story will be introduced per day. Student participants will either read a selection silently, listen to a story being read aloud to them by a certified teacher, or listen to a story being told to them by Mr. Wightman. All narrative/expository selections chosen for this study are MEAP Released Story Selections previously used by the Michigan Department of Education for the purposes of assessing students' reading abilities. If you would like to personally review these materials, copies are available in the school office.

Benefits:

There may be no direct benefit for your child. The possible benefits to your child for taking part in this study are improved comprehension and oral reading fluency of narrative/expository texts. Additionally, information from this study may benefit K-12 educators (i.e., teachers, administrators, etc.) now or in the future.

Risks:

There are no known risks at this time to your child for participation in this study.

Costs:

There are no costs to you or your child to participate in this study.

Title of Study: The Effects of Story Performance on 4th and 5th Grade Students' Comprehension and Oral Reading Fluency of Narrative/Expository Texts

Compensation:
You or your child will not be paid for taking part in this study.

Confidentiality:
All information collected about your child during the course of this study will be kept confidential to the extent permitted by law.

Your child will be identified in the research records by a code name or number. Information that identifies your child personally will not be released without your written permission. However, the study sponsor (if applicable), the Human Investigation Committee (HIC) at Wayne State University or federal agencies with appropriate regulatory oversight (Office for Human Research Protections [OHRP], Office of Civil Rights [OCR], etc.), may review your child's records.

Voluntary Participation/Withdrawal:
Your child's participation in this study is voluntary. You may decide that your child can take part in this study and then change your mind. You are free to withdraw your child at any time. Your decision about enrolling your child in the study will not change any present or future relationships with Wayne State University or its affiliates, your child's school, your child's teacher, your child's grades or other services you or your child are entitled to receive.

Questions:
If you have any questions about this study now or in the future, you may contact Mr. Wightman or one of his research team members at the following phone number (586) 445-5795. If you have questions or concerns about your rights as a research participant, the Chair of the Human Investigation Committee can be contacted at (313) 577-1628. If you are unable to contact the research staff, or if you want to talk to someone other than the research staff, you may also call (313) 577-1628 to ask questions or voice concerns or complaints.

Participation:
If you do not contact the principal investigator (PI) within a 2-week period, to state that you do not give permission for your child to be enrolled in the research trial, your child will be enrolled into the research. You may contact the PI by phone (586) 445-5795, fax (586) 293-2881, or email swightman@roseville.k12.mi.us.

APPROVAL PERIOD

JAN 26 '11 JAN 25 '12

HUMAN INVESTIGATION COMMITTEE

APPENDIX D

Child Oral Assent Script

The Effects of Story Performance on 4th and 5th Grade Students' Comprehension and Oral Reading Fluency of Narrative/Expository Texts

Child Oral Assent Script

(ages 8-11)

Title: The Effects of Story Performance on 4th and 5th Grade Students' Comprehension and Oral Reading Fluency of Narrative/Expository Texts

Study Investigator: Shawn K. Wightman

Why am I here?
This is a research study. Only people who choose to take part are included in research studies. You are being asked to take part in this study because you are in the fourth or fifth grade. Please take time to make your decision. Talk to your family about it and be sure to ask questions about anything you don't understand.

Why am I doing this study?
This study is being done to find out how well you comprehend, listen, and read narrative/expository texts.

What will happen to me?
If you choose to participate, you will be assigned to one of three learning groups. Each group will be expected to either silently read or listen to 28 story selections. Upon conclusion of each session, you will be given some multiple choice questions to answer. These questions are similar to the ones you have already answered during this year's MEAP test.

Will anything bad happen to me?
Absolutely nothing bad will happen to you during this study and your scores will not be shared with your teacher, which means that you will not be graded on your work. Nonetheless, you will be expected to do your very best during each story performance session (i.e., listening, following directions, reading, answering multiple choice questions, etc.).

How long will I be in the study?
You will be in the study for seven weeks. Each week will consist of only four stories. Only one story will be read silently by you, read aloud by a certified teacher, or told by Mr. Wightman per day.

Will the study help me?
I cannot promise you that being in this research study will help you, but you may learn something. For example, you may become a better reader or listener. In addition, information from this study may help teachers become better teachers.

Do my parents or guardians know about this?
This study was explained to your parents/guardian and they said that you could be in it. You can talk this over with them before you decide.

What about confidentiality?
Every reasonable effort will be made to keep your information private.

The Effects of Story Performance on 4th and 5th Grade Students' Comprehension and Oral Reading Fluency of Narrative/Expository Texts

Do I have to be in the study?

You don't have to be in this study if you don't want to or you can stop being in the study at any time. Please discuss your decision with your parents. No one will be angry if you decide to stop being in the study.

Do you have any questions?

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ABSTRACT

THE EFFECTS OF STORY PERFORMANCE ON FOURTH AND FIFTH GRADE STUDENTS' COMPREHENSION AND ORAL READING FLUENCY OF NARRATIVE AND EXPOSITORY TEXTS

by

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This study was undertaken as an attempt to assess the effects of storytelling and reading aloud on fourth and fifth grade children's comprehension and oral reading fluency of both narrative and expository texts. The independent variable involved two strategies for introducing stories to children (storytelling and story reading) and a comparison strategy (silent reading). Each treatment (or strategy) was used, in part, to differentiate literacy instruction over a period of seven weeks.

Treatment 1 consisted of twenty-eight teacher-storytelling performances (fourteen narrative and fourteen expository). Likewise, Treatment 2 consisted of twenty-eight teacher-story reading aloud performances of narrative and expository texts (the same stories used in Treatment 1), while Treatment 3 was used as a comparison group; no narrative/expository text storytellings or story readings were employed. Students silently read each of the same narrative and expository texts employed in Treatments 1 and 2.

During the study's timeframe, fourth and fifth grade students from each grade level (assigned to each treatment) were combined in a cluster and told one single story per day—four times a week. These storytelling sessions occurred in the same classroom environment for each telling, which were scheduled to last for approximately thirty to forty-five minutes. No student discussions ensued upon conclusion of each storytelling performance and a multiple-choice assessment was given to students at the end of each meeting.

Upon conclusion of the fourteen week study, a QRI-3 oral reading fluency reading rate, as measured in words-per-minute (WPM), was determined by a Literacy Coach using fourth and fifth grade narrative and expository reading passages from the QRI-3. In addition, a measure of comprehension was carried out by the same Literacy Coach using the same narrative and expository reading passages used to calculate students' oral reading fluency rates for each posttest.

The data was analyzed for statistical differences among the means and also for any significant interaction among combinations of the various factors. Parametric tools, including MANOVA, were employed initially. Nonetheless, due to small and unequal sample sizes, nonparametric tests, which are known to be more statistically powerful if the normality assumption of the parametric MANOVA is violated, were also employed. These tests include the Blair-Sawilowsky Salter-Fawcett adjusted rank transformation test (ART), Kruskal-Wallis H tests, and Wilcoxon rank-sum tests (Mann-Whitney U).

The major finding from this study involves fifth graders' comprehension of narrative texts. With the employment of non-parametric statistical analysis, the study reveals that both reading aloud and telling stories by a teacher did significantly impact

for the better the students' comprehension of narrative text as compared to simply having the students read stories silently.

AUTOBIOGRAPHICAL STATEMENT

SHAWN KEVIN WIGHTMAN

EDUCATION

Fall 2011 — *Wayne State University, Detroit, Michigan*
Doctorate of Education (Ed.D.) - Curriculum & Instruction

Fall 2000 — *Wayne State University, Detroit, Michigan*
Education Specialist Certificate (Ed.S.) - General Administration & Supervision

Spring 1998 — *Saginaw Valley State University, University Center, Michigan*
Master of Arts in Teaching (M.A.T.) - Elementary Education

Winter 1994 — *Western Michigan University, Kalamazoo, Michigan*
Bachelor of Science (B.S.) - Elementary Education

WORK HISTORY

2010-Present — *Michigan Elementary & Middle School Principals Association, Mason, Michigan*
MEMSPA Treasurer (REGION 6)

2010-Present — *Roseville Community Schools, Roseville, Michigan*
RPA Contract Negotiating Team

2005-Present — *Roseville Community Schools, Roseville, Michigan*
Principal

2001-2005 — *Detroit Public Schools, Detroit, Michigan*
DPS Office of Literacy/Instructional Training Cadre

2001-2005 — *Detroit Public Schools, Detroit, Michigan*
Instructional Specialist

1998-2001 — *Detroit Public Schools, Detroit, Michigan*
Title 1/Section 31a Coordinator

1995-1998 — *Wayne Elementary School, Detroit, Michigan*
Teacher

1994-1995 — *Homer Middle School, Homer, Michigan*
English Language Arts/Mathematics Instructor

PROFESSIONAL AFFILIATIONS

National Association for Elementary Principals … American Association of School Administrators … Michigan Association of School Administrators … Michigan Association of Elementary & Middle School Principals … Association for Supervision and Curriculum Development ... National Association for the Education of Young Children ... Michigan Association for Supervision and Curriculum Development ... Michigan Association for the Education of Young Children ... Michigan High School Athletic Association

HONORS

Booker T. Washington Teacher of The Year, 1996-1997 ... NCAA Degree Completion, 1993-1994 ... WMU Athletic Scholarship, 1989-1993 ... All-MAC Academic Team, 1991-1992 ... ISU Athletic Scholarship, 1988-1989