THE IMPACT OF INTEGRATED HUMOR ON MEMORY RETENTION AND RECALL ASPECTS OF ADULT LEARNING

A Dissertation

by

ROBBIE REESE FITZPATRICK

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2010

Major Subject: Educational Psychology

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Approved by:

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ABSTRACT

The Impact of Integrated Humor on

Memory Retention and Recall Aspects of Adult Learning. (August 2010)

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The present study tested the hypothesis that humor directly integrated with targeted material positively impacts memory retention and recall. The rationale underlying the hypothesis is based on findings of neurological studies and behavioral research on humor. Participants were 56 students in three online Freshman English classes at a local community college. Building on the information learned from previous empirical research and incorporating evidence revealed by neurological inquiries, this project provided each class of students with one of three different versions of declarative grammar material presented as an interactive pronoun instruction module: without humor, with non-integrated humor, or with integrated humor. Assessments included a pre-test to determine prior knowledge. Following review of the module, the recall of students' memory of the targeted material was tested through an objective exam. After a longer period of time (five weeks), which included using the newly learned material in writing assignments unrelated to the study, students were tested again to evaluate their longer-term retention. The analysis of the scores was a two-way 2X3 analysis of variance (ANOVA).

A significant difference in improvement of memory with a 95% confidence level was shown for participants in the Integrated Humor condition as compared to those in either the No Humor or the Non-Integrated Humor conditions in both the Immediate Post-Test (0.00, 0.02) and the Delayed Post-Test (0.00, 0.00). Although the sample was small, the results support the hypothesis that humor integrated with learning material can beneficially impact memory and recall.

DEDICATION

I dedicate my work in this study to Florence Alberta Wandell Reese, my mother, who taught me to believe in myself, to value learning, and to finish whatever I start.

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CHAPTER I

INTRODUCTION: WHY STUDY HUMOR AND MEMORY

As the advance of technology has opened more avenues of access, research has revealed beneficial impacts of humor. Psychologically, humor can improve mental functioning (Berk, 2001). Physically, it can stimulate circulation and improve respiration. Research has shown that the use of humor can contribute to improved immune systems, and the release of endorphins from laughter has even been shown to reduce pain (Berk, 2001). Socially, humor is used to both define and control groups (Fine & De Soucey, 2005), and in the classroom, the use of humor can reduce anxiety and help develop a sense of community (Rhem, 1998). Humor has also been shown as a tool for coping (Goodenough & Ford, 2005).

Statement of the Problem

In the continuing study of humor, however, its use to enhance learning still remains a relatively understudied issue (Krishnan & Chakravarti, 2003). Despite the intuitive belief that humor is conducive to learning, the results of behavioral research on the effects of humor on memory are inconclusive. A review of this research suggests that the mere introduction of humor into the learning environment is insufficient to ensure an improved outcome but humor presented in specific ways is likely to improve memory and recall.

This dissertation follows the style of *American Education Research Journal*.

Definition of Learning as Utilized in This Study

In order to discuss the role of humor in learning, it is important to specify the definition of “learning” applied in this study, isolating it from a multitude of interpretations, particularly within the educational arena. The definition of "learning" employed in this investigation is best stated as "the act, process, or experience of gaining knowledge or skill" (*learning, 2000).* Other areas of behavioral study may apply alternative definitions in order to focus on various aspects of learning, education, or behavior. However, at a basic cognitive level, learning is interpreted as the acquisition of new information. A strong rationale for focusing on this fundamental level of learning is found within Bloom's taxonomy of educational objectives, which constitutes the organization of what should be part of instructional curriculums (Krathwohl, 2002). In the complete table, Bloom divides learning into the cognitive, affective, and psychomotor domains. Within the cognitive domain, there are six categories: knowledge, comprehension, application, analysis, synthesis, and evaluation (Bloom**,** Englehart, Furst, Hill, & Krathwohl, 1956). Not only are the categories ordered from simple to complex and concrete to abstract, but they also represent a hierarchy, each level mastered becoming more and more complex (Krathwohl, 2002). On a practical level, there needs to be some information "learned" before higher level thinking is carried out. A central objective of education is to provide students with the tools necessary to carry out reasoning and problem solving. A major contributor to success in both these areas is sufficient domain-specific knowledge, or information that is particularly relevant to the area in study (domain) (Gagne, Yekovich, C., & Yekovich, F., 1993). A second reason for concentrating on such a basic definition of learning involves the cognitive definition,

in which new information cannot be merely acquired; it must also be retained. Once retained, it is there for higher level thinking, problem solving, or transfer.

Summary of the Process of Acquiring Knowledge. Since much of the rationale for the treatment in this research study is taken from research of how the brain works, especially how it learns, a very brief summary of how the brain acquires information is appropriate. While preferences for types of instruction, personal abilities, and levels and diversity of experiences may differ among individuals, particular brain achievements, including the production of speech and the acquisition of information, are convincingly inherited. In other words, how people learn, on a cognitive level, is all the same (Carter, 1999; Klemm, 2004).

There are two types of knowledge that we learn: 1) declarative, or factual, and 2) procedural, or how to do something. Although there are some similarities between the two areas, this study focuses on declarative knowledge, which includes the learning of facts, definitions, and rules.

While the process of acquiring knowledge is complex and still not completely understood, at a truly basic level, the progression is straightforward: information is received through any of the five senses and registered in immediate memory. Selective perception determines what information remains active in working memory and what information will be lost (Gagne et al, 1993). Either information selected to stay in working memory is held and rehearsed until it can be moved to long-term memory, where it is stored for later use, or it is not rehearsed and so dissipates within about 10 seconds (Gagne et al, 1993).

The steps of this process may appear to be straightforward, but the factors influencing the process are incredibly intricate, and so the actual progression becomes complicated. For example, the brain is discriminatory about what it commits to memory, using selective attention to filter out incoming material, thus allowing the storage of information tied to what is being held in working memory (Gagne et al, 1993; Leahy & Harris, 2001; Soto, Hodsoll, Rotshtein, & Humphreys, 2008) or what is important to survival (Carter, 1999). Selective processing can be influenced either by factors people are born with or by knowledge learned through experience or study. Information moved from working memory to long-term memory is what is paid particular attention to; the amount or the necessary focus of that attention is still being studied. The assertion that increasing the attention on input can amplify the memorization, or learning, of that information has been and continues to be crucial in education, psychology, cognitive science, and neurology.

Once in long-term memory, without any use or further rehearsal, information may still be lost (Gagne et al, 1993). Questions about memory that have been answered only recently or are still being investigated include the precise location of memory storage, what factors impinge or enhance memory storage, what factors affect elaboration, how emotion impacts memory, and what improvements, either behavioral, mechanical, or chemical could improve memory. As science has progressed, much has been learned about how the brain "learns," and many of the discoveries have altered early theories of memory.

One revised position involves new information received by one or more of the senses and then held in working memory before being moved to long-term memory.

Long-held theories about the necessity of attention are being challenged and investigated. In his book on memory, Klemm (2004) stresses how important paying attention is to the encoding of memory, which, in turn, impacts memory establishment. Although attention may be divided, with the increase of complexity of information held in working memory, i.e., memory load, the encoding process is affected (Lozito & Mulligan, 2006). The limited resources of the working memory, when stretched by this load, have fewer resources left to address to guiding attention (Soto et al., 2008).

Another significant discovery is that memories involve many areas of the brain rather than just one area. It is the map of connections laid out in encoding that creates memories. A very simple overview may explain that the frontal lobe mediates the control and direction of the memories and includes the prefrontal cortex. This area is also involved in emotional processing (Stuss & Levine, 2002). The amygdala adjusts the strength of conscious memory needed for events influence by emotion, either pleasant (e.g., humorous) or aversive (e.g, fear, anger) (Hamann, Ely, Grafton, & Kilts, 1999). Recent imaging studies suggest that the level of involvement of the amygdala during encoding relates closely to succeeding recall (McGaugh, 2004). Finally, the hippocampus works to put down and retain memories, which are stored in the cortex in the temporal lobe (Carter, 1999).

A second realization is that new information being committed to memory is first based on information that is already there. This existing knowledge is called up from long-term memory to aid in the recognition, comprehension, or analysis of new information as a part of problem solving (Leahey & Harris, 2001). The brain is constantly working to "make sense" of new information in relation to what it already

"knows" (Carter, 1999). It is categorizing information and establishing relational links to other information, or encoding (Commission on Behavioral and Social Sciences and Education, 2000; Carter, 1999).

Even when information has moved from working to long-term memory, emigrating from the cortex to be stored as neural patterns in the hippocampus, that information will be stored beyond 2-3 years only if replayed, during either dreams or conscious recall (Carter, 1999). In other words, the brain needs to pay attention to information, selecting what will be allowed through the filter that prevents an overwhelming bombardment of input; it needs to elaborate or rehearse this information so as not to lose it due to the limited duration of short-term memory but rather encoded into long-term memory (Leahy & Harris, 2001), and the brain needs to replay or review long-term memories so they will not decay (Carter, 1999; Leahy & Harris, 2001; Commission on Behavioral and Social Sciences and Education, 2000).

Definition of Humor

The investigation of the effect of humor as addressed in this study is actually an analysis of what happens in response to humorous input. Humor is "that which is intended to induce laughter or amusement" (*humor, 2000).* Therefore, it is not the humor--which is actually external to the student--that critically impacts learning, but rather the cognitive response elicited by humor.

Because of the complexity or because of the elusiveness of the term, there exists a multitude of attempts to define and describe humor. The “humor” used in this study is defined by the “incongruity’ explanation, that an indispensable constituent of humor is

the contradiction of the recipient's expectations, causing a pause, a puzzle, and a sudden interest in what is but shouldn't be (Morreall, 1989).

There are three categories of humor theory: 1) relief theory, 2) superiority theory, and 3) incongruity theory. The relief theory contends that humor is a release or reduction of anxiety, and, thus, is physiological. It can also foster group empathy (Rhem, 1998). The superiority theory is psychological, sociological, and evolutionary and depends on domination, often through a "put down" (Rhem, 1998). The incongruity theory is cognitive and demands the capabilities of higher thinking, including imagination (Morreall, 1989) and problem solving (Morreall, 1989; Rhem, 1998).

The popular philosophical theory of humor as incongruity can be traced back to Aristotle (Morreall, 1989). The basis for this interpretation is the actual amusement or enjoyment of incongruity. As higher beings, humans show a curiosity for new experiences (Bennett, 1999). These experiences may be familiar, which are easily comprehended and integrated into our mental patterns (Morreall, 1989). The explanation is basic: the familiar is similar to what we already know. The unfamiliar is more difficult. It can be either a novelty, which arrives with no preconception, or an incongruity, which is not what was expected (Morreall, 1989). The reaction can be either negative or positive. A negative response (fear, anger, jealousy, regret, shame) may necessitate changing the answer, e.g., the situation. A positive response (amusement) changes our cognitive status, e.g., the "cognitive itch" (Morreall, 1989, p. 8).

Benefits of Humor. The benefits of humor span a diversity of areas. Humor can encourage the cultivation of methods for managing difficulties (Solomon, 1996). Humor can reduce stress (Rhem, 1998), help relieve emotional crises by decreasing anxiety and

depression (Granick, 1995), and increase self-esteem (Martin, Kuiper, Olinger, & Dance, 1993). Laughter can improve both mental and physical health (Douglas, 1996). In fact, laughter can actually reduce pain: the diaphragm moves, and in doing so massages the right side of the heart, causing the heartbeat rate to escalate and sending endorphins, a natural painkiller, into the blood stream (Cousins, 1979).

Impact of Humor on Education. Research has also shown that the use of humor can influence education in many areas. There is a highly positive relationship between successful teaching and the quantity of humor in a classroom (Check, 1997). Correctly used, humor can alleviate the pressure of the student workload and advance beneficial communication between learners and instructors (Combes, 1996). Humor can be used to ease tension, increase focus, and build a positive educational scenario (White, 2001). Humor has been shown to motivate, encourage creativity, and strengthen comprehension (White, 2001). In addition, it improves esteem and empathy for teachers who use humor prudently (Haigh, 1999) and encourages an impression of unity in the instructional group (Rhem, 1998).

Cognitive Impact of Humor. Most important to this study, the use of humor also cognitively affects learning. Recent advances in neuroscience have resulted in technology that can track the involvement of the various parts of the brain as humor is confronted, comprehended, and appreciated (Moran, Wig, Adams, Janata, & Kelley, 2004).

The more general category of the positive mood, as opposed to the specific focus of humor, has been one area of the focus of research. In their study, Moore and Oaksford's (2002) results initially support the theory that "heightened emotional states

enhance the consolidation of long-term memory" (p. 392). There was no significant difference in the short term, but over time and with continued mood elevation, those participants learned faster than those in the neutral group. In attempting to explain mood or emotion and to clarify the relationship of emotion and cognition, neurological study has worked to locate the sites of emotion and memory, hoping for a common locality. Some results are telling. For example, verbal working memory is connected to the activation of the left cerebral hemisphere (Davidson, 1992, 1998; Moore & Oaksford, 2002), and, although emotion is linked to both hemispheres, positive emotion is connected to the left cerebral hemisphere as well (Davidson, 1992, 1998; Moore & Oaksford, 2002). Emotions and memory are tied together even to being processed in the same area of the brain, the limbic system (Klemm, 2004): 1) The hippocampus consolidates memories from new learning; 2) the amygdala is engaged in emotions, and, in fact, is critical in strengthening long-term, emotional memories (Hamann, et. al, 1999); and 3) the hypothalamus is implicated in the expression of emotions (Klemm, 2004).

However, the involvement of humor in a learning situation may also result in distraction from the targeted learning material. In a study of the impact of mood states on cognitive processes (Oaksford, Morris, Grainger, & Williams, 1996), the conclusion supports the premise of integrated humor in that either negative or positive moods may exhaust working memory capability because either mood state can shift focus to irrelevant tasks. However, in an examination of seductive detail, Goetz & Sadowski concluded that the major studies they reviewed were unsuccessful in confirming the reality of a seductive detail effect (1995). Inasmuch as irrelevant information may divert a reader's attention from important information, there is also noteworthy support for the

inclusion of relevant humorous material. For example, Goetz and Sadowski (1995) cited a successful study that pointed out the reading advantage of text that includes pertinent information presented in an entertaining manner. As well, the idea of seductive detail fits with the premise that people remember that which is actually humorous (Collins, 1997; Thompson, 2000; Schmidt, 2002).

When not threatening distraction, humor can improve cognitive performance. For this conundrum to be understood, humor needs to be further understood. First, attention is attracted to the incongruity, which may be as simple as the appearance of something silly or funny in an otherwise serious study or as complicated as a riddle or joke to be solved. Then the humor itself involves detection and appreciation, i.e., reward or pleasure. The detection involves the resolving of the incongruity between the punch line and what is expected. "The posterior temporal and inferior frontal regions engaged during humor detection have previously been implicated in language tasks that encourage retrieval and appraisal of relevant semantic knowledge" (Moran et al, 2004, p. 1058). Wonder transpires when an incident is incongruent with anticipation set up by earlier experience. Then coherence must be restored in order for the individual to "get the joke" (Morreall, 1989, p. 1058). Humor also necessitates bringing up information already in memory in order to comprehend the new information. In other words, there is a telling resemblance between getting a joke and solving a problem (Derks, Gillikin, Bartolome-Rull, & Bogart, 1997). The most straightforward description of humor explains it as a three-step procedure: "cognitive arousal, problem solving, and resolution" (White, 2001, p. 27; see also Suls, 1972). The cognitive process of "getting a joke" replicates the problem solving progression. When the incongruity of a joke is identified, the problem is

identified. The resolution of the problem compares to the resolution of the joke, i.e., "getting the joke" (Berk, 2001). From the coincidence of the congruity and its solution arises the meaning and thus the amusement.

Insights from Neurological and Cognitive Research on Humor and Learning: The Case for Integrated Humor

In order for learning material to be better remembered, it must be presented in such a way to take advantage of the aspects of memory revealed by neurological and cognitive research. The points made include gaining attention (Soto et al, 2008), "encoding," or tying new information to what is already known (Commission on Behavioral and Social Sciences and Education, 2000; Carter, 1999), and elaborating on new information in order to maintain it in long-term memory (Leahy & Harris, 2001).

The effective use of humor can help memory retention and recall by addressing some of these very points. The surprise of the incongruity of a joke attains attention (Berk, 2001). The working out of that incongruity, which approximates solving a problem, engages the brain (Berk, 2001). Evidence also shows that because of how memories are processed, within the same system as emotions, those tied to emotion may be retained longer (Moore & Oaksford, 2002; Hamann, et. al, 1999). What this all leads to, since the connection is made from emotions to what is to be remembered (Ziv, 1988), the humor should not be merely adjacent to the targeted material, nor just related to the material; it needs to actually be made a part of it, integrated into it.

Purpose of the Study

The purpose of this study is to specifically investigate the impact of humor, carefully integrated with targeted learning material, on adult learning. The theoretical

foundation for this effort included analysis of recent investigations in the cognitive science and neurological fields and a review of research on the use of humor in instruction. This inquiry provided the direction and rationale for the treatment in this project, which concentrates on the cognitive process of memory by presenting the targeted content as humorous material carefully designed to augment learning.

Research Question. Since the goal of learning is to retain improved knowledge over time, learning should incorporate both improved knowledge and improved retention. The specific question addressed in this study asks:

Can the inclusion of humor integrated with learning material improve the memory retention and recall of that material better than information presented with either non-related humor or without humor as revealed when results of delayed assessments are compared with results of immediate assessments?

CHAPTER II

INTEGRATING HUMOR INTO LEARNING MATERIAL

In order to benefit from the work of those empirical studies having already addressed the impact of humor on memory, this study reviewed research in this area, limiting the review to adult learning and focusing on the issue of the affect of humor on the improvement of learning, rather than motivation, interpersonal skills, creativity, or student-teacher relationships. From nearly a hundred reviews considered, only a few have been referenced.

Review of Empirical Studies

To provide the study with a sound theoretical foundation, a review of existing research was carried out. There was no consensus that the existence of humor in the presentation of new material is beneficial to learning. A closer look at the studies, however, revealed a diversity of approaches and an assortment of methodologies that could account for the lack of consistent results and provide guidance for inclusion of humor in the actual instruction. In order to maintain a replicable focus on adult education, the review was limited to those studies involving humor and learning in an adult environment and in an empirical study.

Lessons Learned from Studies of Humor and Learning Showing Significant Results. The studies with statistical evidence supporting the beneficial impact of humor included a diverse group of approaches and methodologies. In addition to providing support to the premise in the more obvious sense of positive results, the differentiation in approach or methodology also provided input for the inclusion of humor.

One obvious characteristic of several studies with statistical evidence that humor enhances the retention of learned material was the point of the research. While several of the studies did test memory of humor, there was no other learning material other than the humor itself. Therefore, while the studies showed that the memory for humor is notable, the tie between the use of humor and new targeted information was not addressed. These studies simply illustrated that people remember what is humorous, in itself an important concept. For example, Collins' (1997) research was one of the most straightforward presentations. The purpose of the study was to determine if the participants, students in an introductory collegiate psychology class, would remember humorous sentences better than non-humorous sentences. In a simple exercise, the participants were given humorous and non-humorous sentences to read within a five- to seven-minute time limit after which they were to complete a distracting task, completing eight computational math problems in three minutes. Following this task, they were tested on how many of the sentences they remembered by completing the sentences after the first few words were provided as clues. The results showed that students remembered significantly more humorous than non-humorous sentences. This was an uncomplicated experiment testing the ability to better remember humorous material than non-humorous material. There was no other information or designated learning material.

Thompson (2000) tested the impact of humor on memory and meta-memory through the use of cartoons and captions. The memory assessment involved recall, cued recall, and recognition. The meta-memory assessment centered on feeling of knowing (FOK) and judgment of learning (JOL). Both of these were tested in a delayed context. Participants consisted of 24 students in a university psychology course who viewed

single-panel cartoons with either humorous or non-humorous captions. They were tested immediately and then again after a delay of two weeks. In both the immediate and delayed recall tests, the humorous items were remembered significantly better than the non-humorous. The results showed that delay negatively impacted recall and humor improved recall.

In Thompson's (2000) study, the recall results were used in conjunction with the research that addressed the impact of humor on FOK and JOL. The telling aspect for this research is that the cartoons themselves were the only information presented rather than any other targeted learning material; what was humorous was remembered.

A third study, by Schmidt (2002) added support to the same conclusion, that humorously presented information is better remembered. Schmidt conducted two experiments. In both experiments, Schmidt's (2002) participants were undergraduate psychology students. In the first experiment, the students were shown slides that were humorous, "weird," or non-humorous, after which they were to rate the slides as to familiarity, humor, bizarreness, and comprehensibility. The participants were told that the trial dealt with the connection between humor and mathematics, and the slides themselves presented arithmetic tasks. At the end of the presentation, the students were requested to perform calculations for five minutes and then were given ten minutes to take a memory test, which consisted of describing each cartoon picture recalling every caption. The students remembered the humorous cartoons best.

In Schmidt's second experiment, the purpose differed in that the role of the list structure in producing humor and the examination of the effect of incongruity on memory was investigated. In this experiment, only two types of cartoons were used. The

combinations were 1) a set with humorous and non-humorous cartoons, 2) a set with humorous and weird cartoons, and 3) a set with weird and non-humorous cartoons. Each participant viewed only two types of cartoons. The procedure was the same as in the first experiment except that students had only to rate the cartoons rather than classify them according to type. In this second experiment as well, the humorous cartoons were remembered best. However, Schmidt also noted that although the cartoon humor resulted in improved recall of the substance of the cartoon, it did not improve the recall of the detailed wording of the caption of the cartoon.

A study by Kaplan and Pascoe (1977), although conducted some years earlier than the studies just reviewed, makes a couple of important points about tying insertions of humor to questions included in assessments and that the greater impact of humor may be in the longer-term retention. Kaplan and Pascoe studied humor's influence on the retention of lecture material. Over 500 university psychology students watched videotapes of a lecture about Freudian personality theory. In some versions of the lecture humor was directly related to the concepts, whereas in others humor was unrelated to the concepts, and in still other versions there was no humor. One assessment of comprehension and retention was conducted immediately after the lecture, and another was repeated six weeks later. The results revealed a slight benefit to the related humor on the first test. However, the largest impact was to the related humor on the second, or delayed, assessment. Notably, information not tied to humor was also tested, so the research also demonstrated that only those test questions tied to concepts related to humor insertions showed a significant improvement.

Mitchell (2005) addressed content-related humor, supporting the theory that the relationship between the humor and the learning material abets memory. Mitchell also used humor in an online venue, making use of the technology available for educators, and, more importantly, making the use of humor available to those instructors who may feel they are unable to create humorous material themselves. The stated purpose of the research was to investigate the influence of humor through the use of interactive videos and describe student perceptions of the humor, the means of delivery, and the structure of the humor itself. A second stated goal was to explore the impact of content-related humor versus no humor at all. The participants were members of two classes of childcare givers in training classes that utilized interactive video and two other classes of support staff from a university in the southern part of the United States. Humor was presented before the presentation and imbedded into instructional material as well. The humorous material included cartoons, comical stories, and funny applications, and the differences between each were addressed. As well, the proven suggestions of limiting the amount of humor and making it relevant were maintained. Two groups viewed versions with humor, one interactive, and two groups viewed versions without humor, one interactive. The results showed that the humor made a part of the material positively and significantly improved learning. Comments included remarks on improved favorability of the instructor, more ease in the class, and increased learning.

A recent study by Strick, Holland, van Baaren, and van Knippenberg (2009) did not directly address the impact of humor on learning but did investigate the issue of the cognitive processing of the incongruity aspect of humor and the results of that demand on resources. Strick et al (2009) proposed that the cognitive demands necessary for the

processing of the incongruity of humor depletes resources to the extent that existing negative emotions are decreased. The study used 90 university students in an experimental design of 2 (treatment: positive or humorous; within participants) X 3 (picture negativity; neutral, mildly negative, or strongly negative; within participants). Participants first received an online cover story with triads of pictures. After either a neutral or negative picture, a positive or humorous picture followed. Students then rated how unpleasant they felt, using a 9-point scale. The results indicate that for both strong and mild negative instances, examples with humor rather than positive pairings, the final emotions were less negative. Thus, their data confirms the working memory model of distraction of humor over negative mood.

Strick and colleagues (Strick, Holland, van Baaren, & van Knippenberg, 2009) more recently investigated the "humor effect," the concept that humorous information is readily recalled at the cost of remembering non-humorous material that was encoded at the same time. The hypothesis pursued was that humor receives enhanced attention during encoding, which, in turn, lessens attention for adjacent information. Using eye-tracking technology, Strick and her team (2009) conducted two experiments, using a pool of 58 students, varying type of text (humorous, positive, or neutral) as a within-subjects factor. Although the texts in both experiments were the same, in the second experiment the number of brands within each condition was increased, and the length of the presentations was lengthened from 1 second to 8 seconds. For both experiments, the analysis revealed a significant effect of type of text, such that more time was spent on humorous text than either positive or control texts. There was no difference between positive and control texts. The eye-tracking technology shows that humor gets more

attention than either non-humorous positive or neutral material, which can diminish the encoding of adjacent non-humorous information.

Garner's (2006) research underscores the importance of presenting versions of material that are equitable regarding length and content. In Garner's research, the stated purpose was to examine the influence of content-related humor on memory. The participants were 117 undergraduate volunteer students at a four-year university who were divided into two groups. Each group viewed a 40-minute video on statistics; one had no humor, and the other had had humor inserted into it; thus it was longer. The humor consisted of "a humorous story, example, or metaphor which had been inserted at the beginning of the lecture and at points approximately fifteen and thirty-five minutes into the lecture, depending on the content" (Garner, 2006, p. 178). Garner's results showed that the group given humor remembered the material significantly better than those in the group without humor. However, although in his methodology Garner did describe the difference in the length of the versions, in his discussion he did not mention the difference in the time spent on the topic, which could have affected the results.

Of all the studies, Ziv (1988) established the seminal research in this area in addition to being extensively cited though not widely replicated. In addition to using an educational setting, he employed relevant humor and spaced the humor carefully. Ziv's hypothesis was that students instructed with material containing relevant humor would learn more than students instructed with material without humor. The participants were students in an introductory statistics course. The same teacher taught two groups of students, 82 in the control group without humor and 79 in the group with humor, for an entire semester. The assessment instrument was the final exam at the end of the semester,

a test with 50 multiple choice questions. The humor was limited to three or four jokes per lesson, and the procedure included presenting the concept, illustrating the concept with a joke or cartoon, and then paraphrasing the concept learned. He was also interested to see if there was a difference in the learning between the genders. The results of a 2 X 2 ANOVA (Group X Sex) showed an effect only of group.

In his second experiment, Ziv replicated the research with a different teacher and a different set of students in a different introductory statistics class. In both experiments, learning was significantly improved for the humor group. Ziv explained, "When planning a course, the main concepts should be delineated and the humor related to those concepts (Ziv, 1988, p. 13). In other words, the humor only affects those theories involved in the humor used. Ziv also pointed out the importance of the preparation of the material to be taught, including the relevance of the humor, the "dosage" of the humor instances, and the training of the instructor.

The two most important implications of Ziv's research for the present study are the importance of using humorous examples that are relevant to the material to be learned, and the spacing and timing of the humorous examples. An overuse of humor invalidates its effectiveness. Uncommon material, such as humor, necessitates the activation of more background knowledge than does familiar or expected material to understand new information (Waddill & McDaniel, 1998). Hence, the efficacy of the incongruity of humor deteriorates if everything is humorous since nothing stands out. It is also this elaboration, the "getting the joke" or the "solving of the problem" that benefits the material that is part of the humor rather than information situated close by (Derks et al, 1997; Morreall, 1989).

Lessons Learned from Studies of Humor and Learning Showing Non-Significant Results. In addition to those studies achieving significant results, some of the studies not statistically supporting their hypotheses nevertheless provide important lessons. Like those with significant results, the research questions and methodologies used in the studies varied.

Sheppard (2002) achieved positive results for the use of humor, but the effect was minor. Her own conclusions point out important aspects: humor must be closely related to subject matter and must not take the place of carefully designed instruction. Specifically, Sheppard's study focused on the inclusion of humor in educational texts and the resulting impact on learning, motivation, and pleasure. Her ultimate goal was to show that when the material is the same, the addition of humor will make the content more enjoyable, thus motivating the student to pay closer attention to the information in the same way that people pay attention to enjoyable leisure reading texts.

The participants in the study were 104 undergraduate students from university psychology and education classes. The students were divided into two groups, one of which read the humorous version and one, the non-humorous version, of two chapters--ideas for experiments and scientific fairness--from David W. Martin's *Doing Psychology Experiments,* the text that Sheppard chose for her material. Although she did try to keep the material the same length, the humorous chapters were 10 percent longer than those without humor. To assess the learning impact, there were two multiple-choice quizzes and one short-answer quiz. She noted that the information questioned was adjacent to the humorous insertions, rather than related or integrated with the humor itself. One assessment was conducted immediately following the treatment, and a second assessment

was conducted two weeks later. Although her results were significant for both immediate and delayed learning, the effect sizes were too small for the correlations to be of any value. There was no significant relationship between enjoyment and learning for the scientific fairness chapter. Studies referenced earlier point out that it is the humor that is remembered; it may be that a more direct relationship between the material and the humor is necessary for an appreciable impact.

In another example, Whisonant's (1998) dissertation demonstrated that humor presented prior to the instruction is not effectual. His study targeted a computer-based environment. Participants were undergraduate education and psychology students who were divided into three groups. One group read humorous comic strips prior to the treatment, another group read non-humorous comic strips prior to the treatment, and the third group, the control group, was not provided with any reading prior to the treatment. After an instructional unit on the human heart, each group was administered an assessment to test the students' recall of terminology, identification of positions and parts of the heart, comprehension, and criterion. The statistical results did not support the hypothesis that humor increased learning. However, because the samples were very small after the students not meeting the author's criteria were dropped (12, 15, 15 in the respective groups), the results became less robust.

The importance of equitable distribution of a sample and dealing with prior knowledge is underscored by Burt's (1998) dissertation, which studied the impact of content-related humor on short-term recall. The study used 62 undergraduate students who participated in a cardiopulmonary resuscitation (CPR) class. The students were divided into three groups which viewed, respectively, 1) a version of the presentation

with humorous cartoons unrelated to the content, 2) a version with humorous cartoons related to the content, and 3) a version without humor. A one-factor ANOVA was used to analyze the post-test scores of the three groups; there was no significant interaction established for the use of content-related humor and tested for the short term. While the author noted that those participants with previous CPR training scored higher on the assessment, it was not reported that of the three groups, the groups with related humor had half as many participants with previous training (3, 15%) as the non-related humor group (6, 30%), or the no humor group (6, 27%). The study did not result in a statistically significant difference for the related humor group. In fact, the non-related humor group scored the highest. Although the difference in knowledge may have been too great to handle even in an analysis of covariance, the requirement of not having anyone take CPR within the last three years perhaps did not go far enough to eliminate the unevenness in prior knowledge.

The research documented in the article by Fisher (1997) underlines the error of inserting too much humor into an instructional module at intervals also too close together. In his study, Fisher used fast-paced, content-related humor in a non-educational environment. The research was carried out at a planetarium, and the participants were 495 adult visitors. The participants viewed one of two versions of a taped show about astronomy. One version had no humor, and the second version contained humorous inserts every 90 seconds. Directly following the viewing, fill-in-the blank tests with 20 questions were administered. Thee results of a t-test showed a significant difference, unexpectedly, one that favored the non-humorous group over the humorous group. Although the research itself was sound, the basis for the treatment varied from the

evidence presented in the author's own literature review. The most effective time interval between humor insertions had been reported in an earlier study at 100 seconds; this project pushed the time interval to 90 seconds. Possible explanations include 1) the time between humor insertions is too short for processing the humor and elaborating cognitive links to the new material, or 2) there are too may humor insertions so none stood out as unusual enough to require extra processing or elaboration (Ziv, 1988).

Casper's (1999) dissertation addressed an assortment of questions. Her study of humor included a review of humor that affected memory through arousal, but focused on relevant and irrelevant humor and laughter only and no laughter, establishing several hypotheses. The participants comprised two university introductory psychology classes, which studied four instructional sessions, each with a version of irrelevant humor, relevant humor, laughter, and no-laughter. The analysis sought to answer whether laughter alone influences learning, whether there is a difference in the impact of relevant versus irrelevant humor, and the moderating effect of the need for cognition. The results were broken down by gender, and the females scored higher on the assessment of material presented with irrelevant humor.

Her research and conclusions did make several points about the impact of arousal on memory, including some regarding humor. For instance, arousal can impact memory by signaling to the nervous system that whatever is happening is important (Radtke & Jensen, 1996), which may or may not result in the improved retention of targeted learning material. However, Cahill and McGaugh's (1995) results underscore the premise that the impact of arousal is limited to those items that are arousing.

A study by Tribble (2001) investigated the relationship of humor included in instruction and amount of invested mental effort (AIME). This study adds to the argument that humor needs to be presented to engage cognition. The hypothesis in this research was that the addition of humor could lessen the perception of mental effort required for learning. The investigation employed six classes of education with 100 participants. The classes were divided into two groups of three each; one group viewed a video instruction without humor, and the other group viewed a version containing humor. The humor added to the script was not relevant, but rather added on. Directly following the instruction, students first took a quiz questioning their perceived self-efficacy and amount of invested mental effort. Students also took an achievement test over the material. The participants rated themselves as being more efficacious with the humorous material than with the non-humorous material. There was no difference in the perceived amount of AIME. Neither was there any statistically significant difference between the groups in the achievement test scores.

The study by Snetsinger and Grabowski (1994) supports the same point, the importance of the relationship between the humor and the learning material. Their study hypothesized that the use of humor would create a positive atmosphere more conducive for learning and would motivate students to pay attention to the new material. Participating in the study were 100 students from a statistics class who were subdivided into three groups. The instruction was presented in a computer-based instruction (CBI) module in two versions, one with humor and one without. A third group did not receive any instruction and served as the control group. The humor was related but was a "light-hearted presentation of material rather than a facts-only scientific presentation; inclusion

of whimsical, content-related cartoons and animation; the use of a theme that is ridiculous, exaggerated and narrated by a character using an informal, conversational style" (863). A week after the instruction, all three groups were given a print-based examination over the content of the CBI. The results of the ANOVA showed no statistical significant difference between the humorous and non-humorous groups. Although this does not support the theory of Snetsinger and Grabowski (1994), it does support the theory of the present study.

Summary

The lessons ascertained from a close review of previous behavioral research of the impact of humor on learning reveals ideas that align with premises discovered in the continuing progress of neurological/cognitive research. The processing of humor resembles the processing of problem solving, which, in turn, is similar to learning. What is necessary for the improved use of humor are guidelines that not only improve the impact but also the repeatability of the use of humor. Those guidelines should combine the study of the two areas, neurological/cognitive research and behavioral research. Both areas begin with integrated humor, placed at spaced intervals, and not overused. The assessments, designed to question only those items tied to humor, should then show an improvement in learning as revealed by better recall.

Rationale for Using Grammar as a Prototype

Writing, and particularly grammar, is an advantageous subject for the study of humor's impact on learning Neurological and psychological research continues to highlight the complexity of cognitive aspects of writing and the roles that long-term and working memory play in the writing process (Baddeley, 2000; Carter, 1999; Olive, 2003;

Kellogg, 2001; Olive & Kellogg, 2002). Accompanying the awareness of the roles of long-term and working memory is the recognition that students must have sufficient knowledge in order to write well. In other words, "in addition to being an action, writing is a matter of knowledge, knowledge about writing" (Cooper & Holzman, 1983, p. 285). Results of empirical research involving assessment of domain knowledge of college students indicate that both domain knowledge and verbal ability affect the quality of the writing, both in grammatical mistakes and in the more subjective judgments of quality (Kellogg, 2001;).Acceptance of the importance of both maintaining an elaborately structured language and assuring that students have the ability to communicate effectively in the written form of that language depends on the beliefs that such a language is critical and that grammatical skills underlie good writing.

The development of a complex language, particularly a written language (i.e. complex grammar), that allows humans to share profound ideas, using language to develop social constructs, behavioral codes, legal systems, and religious ideologies (Carter, 1999).

Putting Answers to Work

With the theoretical background of neurological and cognitive science research combined with what has been learned through behavioral research, this study has developed the concept of Integrated Humor and a methodology to test it.

CHAPTER III

METHODS

Participants

The participants were students of three online classes of Freshman English composition at a local community college. Since all degree-oriented students are required to take this course, these classes provided a diversity of students representing the college population in ethnicity, background, gender, and age. The sample included students from China, Germany, India, Nigeria, and Vietnam, as well as several U. S. states and backgrounds. Participants' chosen areas of study included Accounting, Art, Business, Dentistry, Education, Engineering, Fashion Design, Music, Nursing, Education, and Occupational Therapy. The three classes provided an initial pool of 75 volunteers, and the students were 60% female. The average age of this sample was 27 years, with a range of 18 to 48.

Research Design

The design of the study was quasi-experimental. Although the sample of participants was convenience sampling and entailed complete classes assigned to specific versions of the module, the assignment of classes to one of the three treatment groups was random. The study comprised a pre-test, treatment, immediate post-test, and delayed post-test. Each class of students comprised a group that studied one of three versions of the treatment, a pronoun module that contained No Humor (NH) (also the Control group); Non-Integrated humor (NI); or Integrated Humor (IH). Because their performance on this module contributed to their final grade in the course and students within a class are

scored on a curve, all students within a class were assigned to the same version of the module in order to avoid putting some students in a class at a disadvantage due to the difference in the versions.

Initially, there were 25 students registered in each class, for a total of 75. After classes began, one student in NI, two in NH, and one in IH failed to log on and thus were dropped as "no shows." All of the remaining 71 students volunteered to participate. By the end of the semester, 9 students in NH, 5 students in NI, and 5 students in IH had dropped for reasons unrelated to the research; the number is typical for this type of course. A final total of 56 students completed the research (see Table 1).

Table 1

Sample Size and Group Allocation

Group	Beginning	Attrition	Final
NH	25	-9	16
NI	25	-5	20
IH	25	-5	20
Total	75	-19	56

Materials

The treatment aspect of the study encompassed an online instruction module which presented declarative information delineating the rules and definitions necessary for the correct selection of personal pronouns.

Design and Procedure. The instruction module was developed in three different versions—one without humor, one with non-integrated humor, and one with integrated

humor, and was created in Macromedia Flash. There were 55 screens in the presentation, including the title page, table of contents, introduction, instructional content, and closing. Students could move forward and backward through the screens at their own pace. With a reading rate averaging 50 words per minute, allowing for on-screen reading, review, and study (Beach, 2008), it was estimated to take a student approximately 40 minutes to go through the presentation. In order to control the possible learning effect of unintentional visual or text variations, all three versions contained the same amount and quality of information. In other words, every insertion included similar length text and graphics, whether humorous or not.

Following are the definitions of content-integrated humor and non-integrated humor as utilized by this study:

- Integrated humor – refers to humor actually made a part of new information/material or directly tied to it as a part of the joke.
- Non-integrated humor - is humorous material that is not linked (by ideas or word choice) to the information to be learned although it is either next or close to it.

While both versions of the material containing humorous insertions do have the commonality of humor, the relationship between the humor and the material varies. In the non-integrated humor version, the insertions have words/graphics, but the graphics and text used center around "Grammarman,"[1] a cartoon used in English grammar online whose author provided permission . For example, in the explanation of the basic rule for

selecting the proper gender of a pronoun ("The gender of a pronoun must agree with its antecedent"), the insertion is: "This is an easy rule, but one too often overlooked."[1] The accompanying graphic is a cartoon of Grammarman as shown in Figure 1.

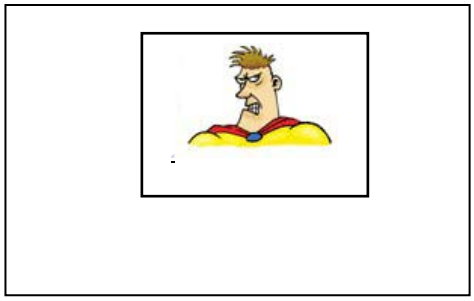

Figure 1. **Drawing: Example of Graphic for Non-Integrated Humor**

While the saying involving "Grammarman," may bring a smile, it does not directly relate to the rule itself other than his enforcement of it.

On the other hand, the integrated humor version provides an example directly tied to the material. The example also uses both text and a graphic, and the saying with the graphic directly involves the rule itself: "'"A gentleman always agrees with his Auntie Cici." For each Integrated Humor example, the accompanying graphic (Figure 2) was more appropriate; in this example, it was a "gentleman" with his "Auntie Cici."

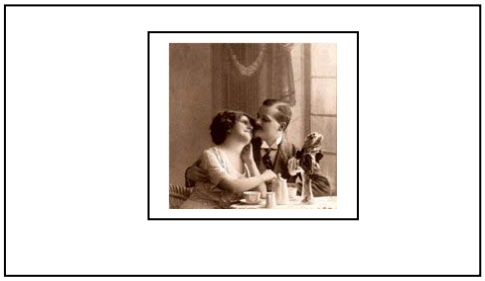

Figure 2. **Drawing: Example of Graphic for Integrated Humor**

[1] [1] 1 From "Grammarman: EFL/ESL Comics for Students and Teachers," by B. Boyd, 2005. <http:222.grammarmancomic.com/ Adapted with permission.

To ensure that the material designated as humorous would be amusing to targeted college students, prior to the study, the material was reviewed and rated by a sample of 18 students in the same course in an earlier semester. A five-point scale (from very serious, not-at all humorous, somewhat humorous, enjoyably humorous, to very humorous) was used to rate the material. Following the review of the material, students were instructed to indicate their opinion of the material. Both Integrated Humor (IH) and Non-Integrated Humor (NI) examples were rated. The average of the results was 3.8 out of a possible 5 points . Table 2 shows a comparison of both the individual examples for the two types of humor for each insertion.

Table 2

Comparison of Student Ratings of Integrated and Non-Integrated Humor Examples

Insertion	Mean	SD	Insertion	Mean	SD
GenAgree-NI	3.72	0.75	GenAgree-IH	3.78	0.88
BreakNo-NI	3.89	1.02	BreakNo-IH	3.72	0.96
ModInter-I	3.67	0.91	ModInter-IH	3.89	0.96
IndefPro-NI	4.06	0.73	IndefPro-IH	3.78	0.88
Case-NI	3.72	0.89	Case-IH	3.56	0.86
GerPoss-NI	3.83	0.92	GerPoss-IH	3.94	1.06
Avg Mean-NI	**3.82**		**Avg Mean-IH**	**3.78**	

To statistically evaluate the relation of the two types of humor (NI, IH), a paired samples t test was conducted. The results indicated that the means were not significantly different (means=3.72, 3.80; SD=0.87, 0.86; t(107)=0.85). The standardized effect size was 0.08. The 95% confidence interval for the mean difference between the two ratings was -0.10 to 0.25.

In addition, the placement of the humorous material took into consideration what was learned in the literature review. The efficacy of the humor would be compromised by too many insertions (Ziv, 1988); therefore, the number of insertions was limited. By using the humor for the most important concepts, the instruction should have the most effective and pervasive results. The quantity of insertions was limited to two insertions for each category of pronoun study (gender, number, case) for a total of six. The insertions were also placed with varied amounts of material between them so as to allow for an "incongruity" effect to take place (Schmidt, 2002; Ziv, 1988). The layout of the material was designed to allow between two and five screens between the insertions. Table 3 shows the layout of the insertions, and a copy of the instructional material, showing all three versions, can be found in Appendix F.

Table 3

Spacing of Humorous/Non-Humorous Insertions

Section	Screen #s	# for Insertion	Subject for Insertion
Opening	1-13		
Person	14-19		
Gender	20-30	21	Gender linked to antecedent
		27-29	Avoid breaking number rules
Number	31-45	33	Avoid getting distracted by modifiers
		36-44	Singular Indefinite Pronouns
Case	46-53	47	Case linked to role of pronoun
		52	Gerund take possessive pronoun
Closing	54-55		

Outcome Measures. The pronoun assessments were the means to determine the dependent variable: content knowledge. Although those assessments were not part of the treatment, the method by which the questions are developed has a direct impact on the results of the analysis, according to the literature reviewed. The principles referenced

included (1) humor has a greater impact on longer-term memory than short-term memory so testing should be delayed in addition to being carried out immediately following the treatment (Burt, 1998, Casper, 1999); and (2) humor inserted into instructional material impacts only those ideas involved in the humor; consequently, test items must address items tied to humor in order to affect statistical variation (Kaplan & Pascoe, 1977). Therefore, in order to obtain meaningful test results, the tests were designed according to these principles.

The assessments consisted of the pre-test and two tests following the presentation of the instructional pronoun material. One of the tests followed the material immediately (Immediate Post-Test), and the second occurred at the end of the semester (Delayed Post-Test), approximately five weeks after the instruction. All three instruments consisted of multiple choice questions, and the questions were designed to address those points presented by the humor or non-humor insertions. Each assessment included fifteen questions: two questions focusing on insertions (shown in Table 3) 1 , 2, 3, and 6; three questions targeting insertion 4; and four questions concentrating on insertion 5. By assuring the balance of the questions was comparable on all three assessments, the analysis of the results was more robust.

The questions either asked for direct knowledge of the pronoun rule described with the humor/non-humor insertion or posed a problem requiring that knowledge of the pronoun rule. For example, the first insertion explains that a pronoun must agree in gender with its antecedent. One question asks the student to:

Indicate which of the following decides the selection of gender of a pronoun.

a. The gender of the pronoun must match its antecedent and also agree with the number.

b. The pronoun must match its antecedent whether or not it conflicts with the number.
c. The pronoun must follow political correctness and use neutral pronouns above all else.
d. The gender of a pronoun is decided by its function in the sentence.

In another gender-related question, the student needs to remember the rule in order to respond to:

> From the following sentences, indicate which is an example of INCORRECT determination of the gender of the pronoun.
>
> a. Sara Young invited her son to join the company's staff.
> b. Old Faithful spews its columns of water, each of them over 225 feet high.
> c. The wolf has little contact with people, even its own keeper, during the year of his captivity.

Test Validity. The validation of the assessments was established by two methods. First, the sentence examples used in all three assessments were modeled after questions used in approved English composition workbooks (McWhorter et al, 2000; Reinking et al, 2005). Second, from an earlier section of the same English composition class with 25 students, results from a version of the final pronoun quiz (Delayed Post-Test) were compared to the grades of final research papers. This comparison showed a noticeable alignment between scores on the pronoun assessment and writing achievement, $r = .72$, $p < .01$. While this comparison is certainly not completely free of bias from incidental variables (prior knowledge, additional writing skills), it does show a relationship, and since pronouns are a major source of errors, can be at least considered. (For more information see the table in Appendix G.)

Score Reliability. To assure that the assessments had internal consistency, Cronbach's alpha analysis was conducted on a sample of the "Pronoun Quiz" (Immediate Post-Test) with the full 15 items, scored correct or incorrect. From the previous section

of the same class, the sample of 20 students completed the exam directly after reviewing a Non-related Humor version of the Treatment (pronoun module). The resulting alpha was 0.75.

Uncontrolled Variables. Since the research is conducted within an educational setting, there are uncontrolled variables that will affect the research. Fortunately, these variables should affect all three groups without confounding the results. The most obvious extraneous variable to threaten the internal validity has to do with testing. Although the questions on the Pre-Test, Immediate Post-Test, and Delayed Post-Test were designed to assess the same information in as varied a manner as possible, there is an evident similarity in the material. By the third assessment, a familiarity with the material could account for a gain in the scores.

A second threat to validity is the uncontrolled variable of "history," or what takes place during the research time frame that may or may not affect the results but should be considered. In this particular study, since it takes place in an educational setting, during the time period between the treatment and the Delayed Post-Test, students were studying the information presented. In addition, during those five weeks, students in every group were writing the same number of essays and receiving the same feedback. Therefore, the results of the Delayed Post-Test should actually show an improvement rather than a loss of memory as they might in a situation where they did not revisit the information at all during the five-week time lapse. Therefore, the goal of the treatment and following assessments is to find differences in improvement of knowledge, according to the types of humor, rather than minimal retention.

Procedures

In order to avoid any effect from the participants' knowledge that the research depends on student response to humor, some deception was employed. The Information Sheet (Appendix A) explained that the study was to test a prototype of a module on pronouns. Students received online copies of the form; by adding their names to the form and signing and returning it, they provided their consent and assurance that they understood and agreed to the research. Following the course, participants received the explanation that the research was an evaluation of the humor presentation module as a proposed tool for the English composition courses (Appendix B). Nothing was required of them that was not within the confines of normal course work. As participants, however, they agreed to let the results of their assessments be analyzed to evaluate the module. The forms they signed not only indicated their voluntary, informed consent, but also described how the information was to be used and kept anonymous. For the analysis, their names were removed from the data. As the form indicates, students did not have to participate in the research study, and if they did decide to withdraw, they could do so at any time, with no impact whatsoever on their grades or class treatment. The information forms were submitted to a designated third party other than the researcher and were not available to the researcher until after the final course grades were submitted, thus assuring that there were no ramifications from student participation or lack thereof. At the end of the course, students received full explanation of the purpose and goals of the research (Appendix B).

Treatment. The treatment used in the study was a pronoun module. Since the study of pronouns is a normal element of the grammar section of the course curriculum, it

provided an effective instrument for the presentation. The module was presented to the online students as a part of the pronoun unit, along with discussion and textbook reading assignments. The students could view the module as often as they chose, studying it at their own pace since the interactive nature allowed them to move back and forth through the screens and to stop and pick up where they left off. The constraint imposed was the one-week deadline for the study unit.

Assessments. The Pre-Test (Appendix C) was incorporated into the Grammar Assessment taken by students at the beginning of the course. The Immediate Post-Test (Appendix D), also known as the "Pronoun Quiz," occurred immediately following the pronoun module and was an objective exam; the Delayed Post-Test (Appendix E), the "Final Pronoun Exam," carried out at the end of the semester, was also objective and was part of an overall final grammar examination. While analysis of the results of the Immediate Post-Test administered directly following the module assessed the impact of the humorous content on learning, the analysis of the results of the Delayed Post-Test administered at the end of the course assessed the impact of humor on longer-term memory retention. The length of time between the treatment and the final assessment set to test longer-term recall was set at the maximum length available in the semester, which worked out to be five weeks.

Data Analysis

An analysis of variance (ANOVA) was used to test if the Pre-Test scores of the groups were equivalent at outset, eliminating the threat of any prior knowledge bias. Then a 2X3 ANOVA analyzed the data to determine any main or interaction effects for the three versions of the Treatment variable and the two Tests. The post hoc test was the Scheffe Test.

CHAPTER IV

RESULTS

In this study to determine whether integrated humor impacts learning, a one-way analysis of variance (ANOVA) was first used to analyze the impact of any prior knowledge, as indicated by the results of the pretest. Then a two-way 2X3 ANOVA was conducted with the independent variables being treatment type (No Humor, Non-Integrated Humor, and Integrated Humor presentation of the pronoun module) and test type (Immediate Post-Test and Delayed Post-Test). The dependent variable was the students' learning scores. The results of the ANOVA showed a significant effect of the Integrated Humor treatment on both the Immediate Post-Test and Delayed Post-Test.

For a clear look at the trends of the results, Table 4 provides the General Descriptive Statistics of Results. The means (25.00, 25.80, 25.75) for the Pre-Test reflect the lack of significant difference in prior knowledge of the three groups. The upward trend of the means of the groups allows for further interpretation of impact of the treatment.

Table 4

General Descriptive Statistics of Results

		N	Mean	Std. Deviation	Std. Error
Pre-Test	NI	20	25.80	6.80	1.52
	NH	16	25.00	11.82	2.95
	IH	20	25.75	9.90	2.21
	Total	56	25.55	9.39	1.25
Immediate Post-Test	NI	20	28.25	11.50	2.57
	NH	16	25.38	6.06	1.52
	IH	20	36.50	8.29	1.85
	Total	56	30.38	10.10	1.35
Delayed Post-Test	NI	20	28.00	5.59	1.25
	NH	16	25.94	11.14	2.79
	IH	20	48.00	14.91	3.33
	Total	56	34.55	14.98	2.00

In order to establish a group equivalence at the starting point, an analysis of variance (ANOVA) was used to determine if the treatment groups showed any difference in prior knowledge of the subject matter. Table 5 displays the results of the one-way ANOVA analyzing the Pre-Test scores, which show no significant-difference between the groups (0.96). The effect size, shown as Partial Eta Squared, is 0.88.

Table 5

ANOVA Summary Table Showing Lack of Difference Among Groups in Pre-Test

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	6.89	2	3.45	0.04	0.96
Within Groups	4838.95	53	91.30		
Total	4845.84	55			

Effect Size: Partial Eta Squared = 0.88

After any lack of bias from prior knowledge was established, a two-way 2X3 ANOVA was used to analyze the impact of the independent variables on the dependent variable; this type of analysis allows consideration of interaction between the two independent variables as well as the main effects. Table 6 shows the summary of the analysis with the two independent variables, 1) the treatment groups, and 2) the two test assessments, the Immediate Post-Test and the Delayed Post-Test, as well as the interaction of these two variables.

Table 6

Two-Way ANOVA Summary Table Displaying Results of Analysis of Immediate Post-Test and Delayed Post-Test Scores

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Treatment	6066.76	2	3033.38	22.73	0.00	0.45
Timing of Test	429.34	1	429.34	6.23	0.02	0.02
Interaction of Treatment * Timing of Test	836.76	2	418.38	6.07	0.01	0.19
Total	10984,20	112				

Note: Effect Size = Partial Eta Squared = 0.92

Table 6 shows a significant main effect of Treatment Group [$F(2,106)=22.73$, $p < .05$] and a main effect of Timing of Test [$F(1,106)=6.23$, $p <.05$]. The interaction of Treatment Type and Timing of Test also showed a level of significance [$F(2,106)=6.07$, ($p<.05$)]. The effect size, computed as Partial Eta Squared, is 0.92.

One of the questions asked by the two-way ANOVA regarding the Treatment Main Effect is, "Do the means in scores differ among the three treatments?" The means are averaged across Immediate Post-Test and Delayed Post-Test. The answer shown by Table 6 indicates that the means in Scores do differ among NH, NI, and IH treatments.

The second question asked by the two-way ANOVA regarding the Test Main Effect is, "Do the means in scores differ between the Tests, the Immediate Post-Test and the Delayed Post-Test?" The answer shown by Table 6 indicates that the means in Scores do differ between the Immediate Post-Test and Delayed Post-Test.

The third question of the two-way ANOVA regarded the Treatment X Test Interaction Effect, "Do the differences in the scores change among the three treatments vary as function of the test? The lack of significance indicates that they do (0.02). Another method of displaying or clarifying the interaction results is a graph of the Treatment main effects, which should exhibit a lack of parallelism. Figure 3 shows the varied progress in the three groups.

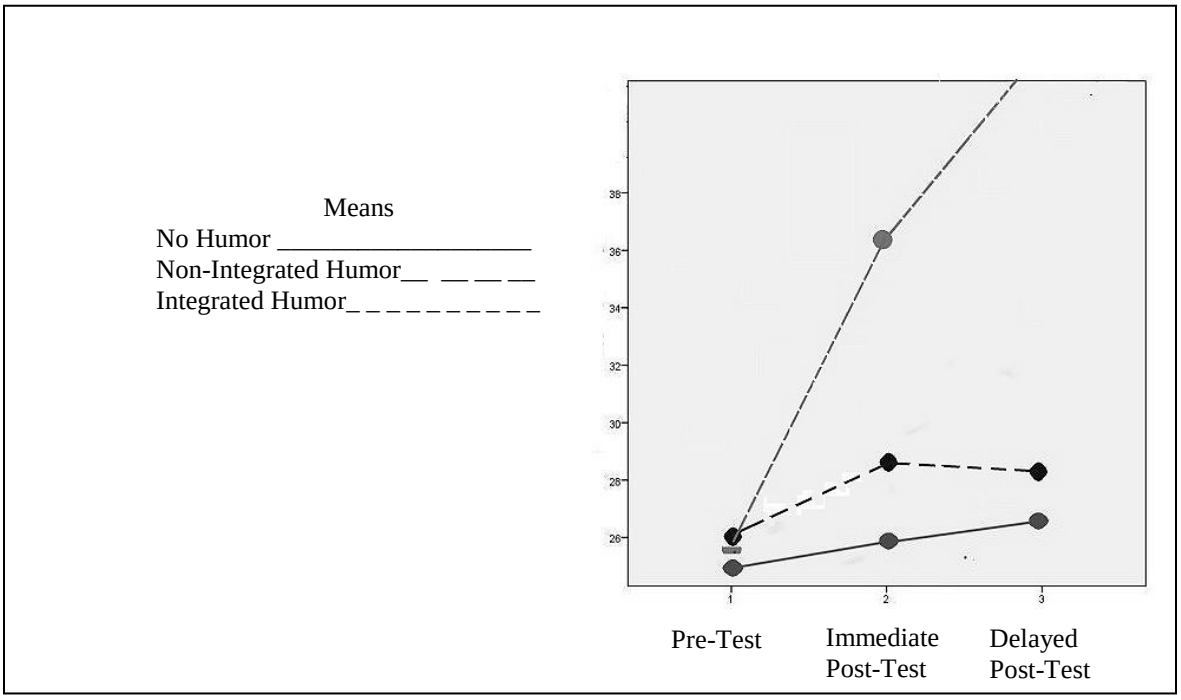

Figure 3. **Line Chart: Scores of Three Treatments by Three Assessments**

Although the results of the three treatments do not show intercepts at the two post-tests, either Immediate or Delayed, the NI group did surpass the NH group after a small deficit on the Pre-Test. In addition, the progress of all three groups was irregular, showing a definite advantage for the IH group.

The indication of significance in the Treatment Main Effect necessitated a post hoc test, so a Scheffe Post Hoc test was run. The results are displayed in Table 7.

Table 7

Results of Scheffe Post Hoc Test Showing Significance for Treatment

Dependent Variable	(I) Treatment	(J) Treatment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Immediate PostTest	NI	NH	2.88	3.03	0.64	-4.80	10.55
		IH	-8.25*	2.87	0.02	-15.48	-1.02
	NH	NI	-2.88	3.05	0.64	-10.55	4.80
		IH	-11.13*	3.05	**0.00**	-18.80	-3.45
	IH	NI	8.25*	2.87	**0.02**	1.02	15.48
		NH	11.13*	3.05	**0.00**	3.45	18.80
Delayed PostTest	NI	NH	2.06	3.77	0.86	-7.42	11.55
		IH	-20.00*	3.55	0.00	-28.94	-11.06
	NH	NI	-2.06	3.77	0.86	-11.55	7.42
		IH	-22.06*	3.77	0.00	-31.55	-12.58
	IH	NI	20.00*	3.55	**0.00**	11.06	28.94
		NH	22.06*	3.77	**0.00**	12.58	31.55

Note: The mean difference is significant at the 0.05 level.

The results of the Scheffe Post Hoc Test revealed that the Integrated Humor (IH) group achieved significantly better scores than both the Non Humor (NH) group and the Non-Integrated Humor (NI) group in both the Immediate Post-Test (0.00, 0.02) and the Delayed Post-Test (0.00, 0.00).

CHAPTER V

CONCLUSION: DISCUSSION

Summary

Although prior research has investigated the impact of humor on memory, no consensus has yet been reached. In an attempt to add to the knowledge and move the accumulated results closer to agreement, this study addressed the issue. A study of previous behavioral research, as well as a review of neurological research led to a change from a focus on what has been studied before, including concept-related humor, to a new premise: humor actually integrated with learning material. The results of the analysis of the data indicate that this approach to the use of humor may beneficially impact learning. This chapter provides interpretation of the results and suggestions for further research.

Interpretation of Results

The results of the analyses support the hypothesis that humor integrated into the learning material beneficially impacts memory, thus learning. The initial analysis of variance (ANOVA) to consider the Pre-Test, the two-way ANOVA to analyze the effects, both main and interactive, of the independent variables, the follow-up ANOVAs, and the Post Hoc Scheffe Test lead to the conclusion that Integrated Humor can beneficially impact learning both by impacting an immediate assessment and a delayed assessment. In both the Immediate Post-Test and the Delayed Post-Test, the Integrated Humor (IH) group scored significantly better than either the No Humor (NH) and Non-Integrated Humor (NI) group. The NI group did not score significantly better than the NH group in either test.

The results of an ANOVA of the Pre-Test scores showed a lack of significant differences, suggesting that the three groups possessed equivalent prior knowledge of the subject matter. In addition, the means of all three groups (NH, NI, IH) were visibly similar (25.00, 25.80, 25.55). Although intact classes were assigned to treatment groups rather than random individual students, the students had been arbitrarily assigned to the classes, thereby helping to create the desired randomness.

The research design involved an educational setting with its own set of variables that could possibly threaten either internal or external validity. The most noticeable uncontrolled variables were the study and practice that students carried out in the time between their review of the pronoun module and the Delayed Post-Test. On the other hand, the pronoun module was, after all, an instruction component, designed to assist students in remembering their lessons on the rules and definitions associated with correct pronoun usage. Since all three classes had the same amount of time and the same assignments, the impact should be equivalent. In other words, the results should not be compromised; the answer to the research question should still be revealed as that treatment which best helps the particular group achieve the highest scores on the assessments.

Indeed, the results from the Immediate Post-Test, showing that the IH scores were significantly better than those from both the NI and NH groups, support the theory that humor integrated with learning material improves its retention and recall. Building on the results of studies theorizing that we remember what is humorous (Collins, 1997; Schmidt, 2002; Thompson, 2000), these findings further the theory that by amalgamating

the new material with the humor, when one is remembered, the other should be remembered as well.

However, it is even more noteworthy that the IH scores are significantly better than both the other groups on the Delayed Post-Test. One of the lessons learned in the literature review is that while humor improves memory retention, delay hurts it (Thompson, 2000). However, the findings of this study support existing research that the more profound effect of humor is on delayed rather than immediate assessment (Kaplan & Pascoe, 1977). It is in these scores, then, that the true success of integrated humor is shown. If indeed the processing of humor is similar to learning and problem solving, meaning that the brain brings forward existing knowledge in order to understand the new material and make sense of it (Berk, 2001; Suls, 1972), that information should be held and rehearsed until it can be moved to long-term memory, where it is stored for later use (Gagne et al, 1993). The theory is that the mind further elaborates upon learning material made a part of that humorous or incongruous material; thus it is retained in memory all the better for it. The combination of remembering what is humorous and the increased elaboration should account for the improved retention and recall.

The failure of the NI group to achieve score significantly better than the NH group on either the Immediate Post-Test or the Delayed Post-Test actually reinforces the use of integrated humor. For example, it coincides with the lack of significance for the studies by Sheppard (2002) and Tribble (2001) in which the humor is adjacent to the learning material. A plausible explanation is the "humor effect," a current supposition that humorous material is recalled with little trouble to the detriment of adjacent non-humorous material (Strick et al, 2009). In other words, so much of the brain's attention is

focused on the humor, that what is presented near to it can often be slighted or overlooked. These results also concur with those studies, such as the research by Snetsinger & Grabowski (1994) or Tribble, 2001, in which the humor was added and the only slightly related to the material, and failed to show a significant results. A plausible explanation is the explanation of how material is learned and how humor is processed. If the learning material is only related to humor but not a part of it, the memory of humor would not always result in memory of the targeted learning material. However, if the new material were actually a part of the humor, it would become a part of the incongruity needed to be resolved.

On the Delayed Post-Test, the scores of the NI group were better than those of the NH group, although not to the extent of statistical significance. In light of the earlier mix of results with this type of humor, possible explanations for these inconsistencies should further an understanding of why the use of integrated humor is preferable to either humor related to the learning material or humor that sets the stage for the instruction. It should already be established that people remember what is humorous, so if the humor is not tied to the learning material, that targeted material may or may not be retained. Another possible explanation is that humor results in an emotional and/or physiological response, and research contends that emotion positively affects memory retention through arousal (Heuer & Reisberg, 1992). However, research also shows that the impact of that arousal is not always beneficial (Casper, 1999). Therefore, those studies like Sheppard's (2002), which added pleasantries to a text in order to motivate students to pay closer attention to the reading or like Whisonant's (1998), which included humor at the beginning of the presentation in order to put the participants in a good mood, achieved inconsistent results.

Contributions

In addition to providing noteworthy support to the premise that humor integrated with learning material can benefit the retention of that material, and hopefully providing an impetus in the work with cognitive science, this study also contributes to knowledge in three practical areas; (1) conceptually, it builds upon the idea of concept-related humor, taking it further, to integrated humor, in an attempt to avoid the distraction of arousal of humor and to utilize the aspect that we remember what is humorous; (2) the development of the treatment provides specific guidelines that can be replicated by either researchers attempting to repeat the research or by educators hoping to apply what was learned through the study; and (3) the research material also provides an example amenable to online or media presentation or for use by educators not comfortable or skilled with humor. In addition to the integration of the humor with the learning material, the lessons learned from both the behavioral studies and neurological research influenced the development of the material used in the study. The two most important aspects were the number of the humor insertions, limited to six, and the spacing, with uneven spaces between. Both characteristics were manipulated to increase cognitive involvement according to the theoretical premises of humor processing, increasing the incongruity, or surprise, of the humor, making it stand out as something that necessitates extra attention (Morreall, 1989, Waddill & McDaniel, 1998; Ziv, 1988). Because these attributes had already been demonstrated in earlier research, they were not focused on in this study but used as theoretical bases.

Limitations

Although the results did support the hypothesis, the generalization of the results is also limited. The size of the sample was smaller than originally planned due to the loss of withdrawn students (from three classes of 25 for a total of 75 to three classes of 20, 16, and 20 for a total of 56; 19 less than planned). In addition, an experimental design, with truly random assignment of participants to treatment groups would have lessened the threats to either internal or external validity. Because the research was accomplished in an educational setting—which also added to its value—there was the addition of confounding variables. Thus, all assumptions should be cautious.

Recommendations for Further Research

Recommendations for future research include repeating the research with an experimental design and a larger sample for improved generalization and with extended time frames to better assess longer retention. Possibilities for larger sample groups, still in keeping with collegiate/academic classes may include more classes during semesters or extending the research period to more than one semester. To extend the time frame could entail working with regular semesters rather than summer sessions and planning the module for the early part of the semester and the Delayed Post-Test for the end of the semester. To achieve a true experimental design, with random assignment of participants, the treatment would need to avoid any impact on students' grades, thus assuring that no group receive any advantage or disadvantage. Perhaps most importantly, the research should be applied to additional areas of study that involve information and/or rules and guidelines. The concept of learning declarative information can and should be

expanded into other academic subjects that either work with data or rules, e.g, history, social studies, math, or science.

> "*Humor enhances learning because human expectation does not match reality; it must be reconciled somehow…and we remember that.*"

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APPENDIX A

INFORMATION SHEET

The Cognitive Aspects of Memory and Recall in Adult Learning and Grammar

Introduction
The purpose of this form is to provide you (as a prospective research study participant) information that may affect your decision as to whether or not to participate in this research.

You have been asked to participate in a research study investigating methods to improve adult grammar instruction. The purpose of this study is test the instruction of personal pronouns and the resulting recall of the lessons. You were selected to be a possible participant because of your attendance in this particular class, not because of any personal attributes. This study is part of a student doctoral dissertation.

What will I be asked to do?
If you agree to participate in this study, you will be required to do nothing other than what you would do in the normal activities of your class work. However, you will be asked to allow the results of the grades of this pronoun module to be included in the research data analysis. For the research, your name and any identifying aspects will be removed, ensuring anonymity. In other words, no one will ever know what grades you made or what answers you selected.

What are the risks involved in this study?
The risks associated with this study are minimal and are not greater than risks ordinarily encountered in daily life. Since the information will be kept anonymous, there will be no risks associated with the data.

What are the possible benefits of this study?
You will receive no direct benefit from participating in this study; however, the results of this study may benefit students in the future.

Do I have to participate?
No. Your participation is voluntary. You may decide not to participate or to withdraw at any time without your current or future relations with Texas A&M University or LoneStar College-Tomball being affected.

Who will know about my participation in this research study?
The records of this study will be kept private. No identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely, and only the researcher, Robbie Fitzpatrick, will have access to the records.

Whom do I contact with questions about the research?

If you have questions regarding this study, you may contact Robbie Fitzpatrick, 281-252-8860, rnfitzpatrick@comcast.net.

Whom do I contact about my rights as a research participant?
This research study has been reviewed by the Human Subjects' Protection Program and/or the Institutional Review Board at Texas A&M University. For research-related problems or questions regarding your rights as a research participant, you can contact these offices at (979)458-4067 or irb@tamu.edu.

Participation
Please be sure you have read the above information, asked questions, and received answers to your satisfaction. If you would like to be in the study please check the appropriate box, and sign one copy of this form, and return it to your instructor, keeping the second copy for yourself.

- ☐ I agree to be a Participant in the research study as described above.
- ☐ I do not choose to be a Participant in the research study as described above.

Signed:_____

Dated: _____

APPENDIX B

Debriefing and "Thank You" Letter

Dear Participant:

Thank you for participating in the research project carried out during your English class this semester. At the onset of the study, you were informed that the project was a "research study investigating methods to improve adult grammar instruction" and that the purpose of this study was to assess the instruction of personal pronouns and the resulting recall of the lessons. If you had known that the real purpose of the research was to test the impact of the humor included in the presentations, the results would have been biased since you would have paid particular attention to the humor itself.

Studies have shown that humor included in instruction can have a beneficial impact on learning/memory. By making humor an integrated part of the pronoun instruction, the rules and definitions should be more easily remembered for a longer time period. Analysis of the data taken from this study will help show whether this is so.

Whether or not the results of this research shows humor is beneficial, thanks go to you as participants in research that is necessary to keep learning how to improve education.

Robbie Fitzpatrick
Principal Researcher

APPENDIX C

Grammar Assessment (Pre-Test)

Pronoun Section:

1. The form a pronoun takes to indicate its function in a sentence defines:

    a. antecedent
    b. case
    c. determinant
    d. complement

Complete the following by providing the pronoun which correctly completes the sentence.

2. The understudy had learned (his, her, his or her, their) lines.

3. When deciding if a college should be attended, the person should first focus on (his, her, his or her, their) desire to achieve specific goals.

4. Everybody has been assigned (his, her, his or her, their) number for the class.

5. You provide an environment where all the child's needs are met and where (his, her, his or her, their) welfare and safety are not endangered.

Read the following sentences and select the correct form of the pronoun.

6. The administration wasn't very happy about (our, us, we) stealing the college mascot.

7. Every college and university must do (its, their) best to provide adequate student counseling.

8. No one is as pleased as (I, me) by Henry's promotion to manager.

9. Robert has a better understanding of Asian history than (I, me).

10. I realize that was (he, him) standing over by the window.

11. There is no excuse for (his, him) yelling at her in front of us.

12. From the following sentences, indicate (by selecting) which is an example of INCORRECT determination of the singular or plural form of the pronoun.

a. Meteorology has made many advances in the past few decades, but it still cannot answer a number of questions about tornadoes.
b. Every tornado has their own unique characteristics.
c. The science of tornado watching has its own system, the Fujita scale, for measuring storms, from weakest to strongest.
d. An F4 tornado or an F5 tornado can destroy everything in its path.

13. From the following sentences, indicate (by selecting) which are examples of INCORRECT determination of the case of the pronoun.

a. Many researchers have debated their theories about violent behavior in this country.
b. Did the popular myth of the "Wild West" influence us and our ancestors?
c. Other industrialized nations and us have very different policies concerning guns.
d. Guns played an important part in Western settlement, but other machines may have been more significant than they.

14. Indicate which of the following decides the selection of gender of a pronoun.

e. The gender of the pronoun must match its antecedent and also agree with the number.
f. The pronoun must match its antecedent whether or not it conflicts with the number.
g. The pronoun must follow political correctness and use neutral pronouns above all else.
h. The gender of a pronoun is decided by its function in the sentence.

15. Read the following sentence and select the correct form of the pronoun.

Neither of the boys has done (his, his or her, their) homework.

APPENDIX D

Pronoun Quiz (Immediate Post-Test)

1. Indicate which of the following DOES NOT affect the selection of the singular or plural form of a pronoun:

    a. Pronouns and their antecedents must agree in number.
    b. When parts of an antecedent are joined by "or" or "nor," the pronoun should be plural.
    c. Collective noun antecedents take singular or plural pronouns depending on their meaning.
    d. Antecedents joined by "and" usually take plural pronouns.

2. Which of the following is one of the guidelines that applies to a pronoun and its gender?

    a. The gender of a pronoun must always allow for both sexes.
    b. The gender of the pronoun must fit the function of the pronoun in the sentence.
    c. The gender of the pronoun must agree with its antecedent.

3. Which of the following determines the case of a pronoun?

    a. The case of a pronoun is determined by the part of speech of its antecedent.
    b. The case of a pronoun is determined by how it functions in a sentence.
    c. The case of a pronoun is determined by its part of speech.

4. From the following sentences, which is an example of INCORRECT determination of the singular or plural form of the pronoun.

    a. Each of the Jones children brought their laundry home at Thanksgiving.
    b. Such celebrations are very expensive because they entail a religious service followed by a huge party.
    c. A girl's immediate family, unless it is rich, cannot afford the party by itself.

5. What would the correct case of a pronoun be if it were the subject of a sentence?

    a. subjective
    b. objective
    c. possessive

6. From the following sentences, indicate which is an example of INCORRECT determination of the gender of the pronoun.

c. Sara Young invited her son to join the company's staff.
d. Old Faithful spews its columns of water, each of them over 225 feet high.
c. The wolf has little contact with people, even its own keeper, during the year of his captivity.

7. From the following sentences, indicate which is an example of INCORRECT determination of the case of the pronoun.

a. The others may lend their support when she and Novick get a hearing.
b. The best employees at our old company were she and I, so we expected to find jobs quickly.
c. Obtaining enough protein is important to us vegetarians.
d. The coach disapproved of them lifting weights.

8. From the following sentences, indicate which is an example of INCORRECT determination of the case of the pronoun
?

a. We and our neighbors have an ongoing dispute about the boundary line.
b. We students ought to strike against the possible tuition increase.
c. My classmates and me should get an “A” in this assignment.

9. From the following sentences, indicate which is an example of INCORRECT determination of the form of the pronoun.

a. When she was forty, Pearl Buck's novel *The Good Earth* won the Pulitzer Prize.
b. Scientists cannot yet predict how strong any tornado will be before they happen.
c. What makes us Americans so prone to violence?
d. Many people are so apathetic that they refuse to vote.

Select the right pronoun from those in parenthesis.

10. Each of the artists expected to have (his, her, his or her, their) work praised highly.

11. Although several students asked, no one received permission to leave (his, her, his or her, their) seat.

12. On Easter, the family dressed in (its, their) finest clothes and went to church.

13. Nobody I know has ever built a house by (himself, themselves).

14. The other competitors objected to (his, him) being given the award.

15. Sarah detests (you, your) being more popular than she is.

APPENDIX E

Final Pronoun Exam (Delayed Post-Test)

1. Which of the following determines the case of a pronoun?

    a. The case of a pronoun is determined by the part of speech of its antecedent.
    b. The case of a pronoun is determined by how it functions in a sentence.
    c. The case of a pronoun is determined by its part of speech.

2. What would the correct case of a pronoun be if it were a predicate nominative?

    a. subjective
    b. objective
    c. possessive

3. Explain what determines the selection of either the masculine or feminine form of a pronoun.

    a. How the pronoun is used in the sentence
    b. How the antecedent is used in the sentence
    c. The relationship between the pronoun and the antecedent
    d. The gender of the antecedent

4. From the following sentences, indicate (by selecting) which is an example of INCORRECT determination of case.

    a. He resents you being richer than he is.
    b. Most of the members paid their dues without my asking them .
    c. The counselor made John and me repair the damage.

Read the following sentences and select the correct form of the pronoun.

5. Each of the artists expected to have (his, her, his or her, their) work praised highly.

6. The leader of the expedition, along with two followers, made (his, her, his or her, their) way to the top of the ridge.

7. If a person wants to commit suicide badly enough, no one can stop (him, him or her, them).

8. Although several students asked, no one received permission to leave (his, her, his or her, their) seat.

9. What do you think about (him, he, his) buying such an expensive car?.

10. Although the trainee doctor has been used to working long hours, (he, he or she, they) can experience irritability that leads to mistakes.

11. From the following sentences, indicate (by selecting) which is an example of INCORRECT determination of the case of the pronoun.

    a. Violence and justice are so intertwined for many Americans that disagreements between other people and them can erupt into fights.
    b. American entertainment is frequently violent, too, and some people worry that such violence affects us and our children.
    c. There are defenders of violent files, TV shows, and video games who claim that entertainment reflects our tastes rather than influencing them.
    d. Sometimes it seems that our worst enemies are us.

12. From the following sentences, indicate (by selecting) which is an example of incorrect determination of the number of the pronoun.

    a. Persuaded by his father to attend West Point, Ulysses did not look forward to beginning his military career.
    b. Tigers are highly adaptable, and if it has sufficient habitat, it can survive.
    c. No two styles of Merengue are alike because everyone moves in his own way.

Read the following sentences and select the correct form of the pronoun.

13. It's up to (us, we) meteorologists to warn the people of impending storm activity.

14. Neither of the football teams' coaches made (his, their) goals public.

15. If a person wants to succeed in life, (he, she, he or she, they) should know the rules of the game.

APPENDIX F

Copy of Pronoun Modules – Showing All Three Versions
The Correct Use of Pronouns

The correct use of pronouns is a problem for many writers. To use pronouns, there is a series of decisions you need to make. Some of these decisions you may make easily, but some may be more difficult. All are based on your knowledge of grammar and the rules that apply. To use pronouns correctly, you need to understand sentence mechanics, the parts of speech, and all the aspects of pronouns themselves, including person, gender, number, and case.

A quick review: a pronoun substitutes for a noun or another pronoun, and that word is called the pronoun's " **antecedent**." When you write your sentence, you need to be clear what noun the pronoun will be substituted for, or the meaning of the sentence will be vague; your sentence won't make sense.* If there is confusion, the sentence may need to be rewritten, sometimes in a form without pronouns.

* Incorrect Example - with unclear antecedent: The suitcase was on the plane, but now it's gone.

Corrected: The suitcase was on the plane, but now the suitcase is gone.

Once you know what your antecedent is, you need to make sure your pronoun agrees with your antecedent in gender, person, and number. Once you've got those decisions made, you have to decide what case the form of the pronoun will take. Unlike gender, person, and number, case is NOT based on the antecedent but on the function of the pronoun in the sentence.

This session will be reviewing Person, Gender, Number, and Case. Let's review each, one by one.

Person

Learning Objectives:

Student will be able to:

- Define "person" as it applies to the use of pronouns.
- Name the correct first, second, and third person pronouns, singular and plural.
- Provide the correct pronoun selection regarding person in a sentence example.

Reading Assignment: Textbook, pages --- through----.

Definition: In English grammar, *Person* refers to *who* or *what* is performing the action of the verb or receiving the action of the verb. There are categories used to distinguish between the speaker (or writer) and those to or about whom he or she is speaking or writing. In English, there are three "persons," and each has a plural form.

	First Person	Second	Third
Singular	I, me, my	you, your	he, him, his, she, her, hers
Plural	we, us, our, ours	you, your	they, them, their, theirs

Rule: The pronoun must agree in person with its antecedent.

Incorrect: The students at Hogwarts learned that you had to watch out for Filch.

Correct: The students at Hogwarts learned that they had to watch out for Filch.

Sometimes "one" is used as a generic term to refer to an unnamed individual. This can also lead to agreement problems.

Incorrect: Sara had learned her lesson: one should not count their eggs before they hatch.

Correct: Sara had learned her lesson: one should not count his or her eggs before they hatch.

Better: Sara had learned not to count her eggs before they hatch.

Discussion: There is a Discussion Topic on "Pronouns – Person" where you can share information and ask questions.

Gender.

Learning Objectives:

Student will be able to:

- Define "gender" as it applies to the use of pronouns.
- Explain both the rule for gender agreement and the problem of avoiding sexist pronouns.
- Provide the correct pronoun selection regarding gender in a sentence example.

Reading Assignment: Textbook, pages --- through----.

Definition: Gender is the classification of nouns and pronouns as masculine, feminine, or neuter.

Rule: The gender of a pronoun must agree with its antecedent.

Non-humorous  This is an easy rule, but one too often overlooked.

Non-related This is an easy rule, but be sure not to ignore it!. 

Integrated Humor "A gentleman always agrees with his Auntie Cici." 

Correct Example:

In the following example, "Dr. Brown" is the antecedent for the pronoun. The antecedent is male.

The new Dean of Men will be Dr. Brown. We will enjoy working with him.

Free of explicit or implicit reference to gender or sex

If the antecedent is clearly male or female, the choice of gender is easy; the pronoun agrees the antecedent. However, if the antecedent is a noun that can be interpreted as male or female or represents both, then the choice of pronoun is more difficult. In many circumstances, it is unacceptable to use "sexist" language. To avoid such pronouns, there are a number of ways you can rewrite the sentences.

1) Change singular nouns to plurals and use a gender neutral pronoun

   Incorrect: Each student must have his notebook with him in class.

   Correct: All students must have notebooks with them in class.

2) Rewrite the sentence to avoid the pronoun altogether

   Incorrect: A Senator who cannot finish his term of office…

   Correct: A Senator who cannot finish the term of office…

3) When eliminating the pronoun seems unavoidable, use both male and female pronouns

   Incorrect: A student should meet with his advisor.

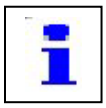
   Correct: A student should meet with his or her advisor.

Some less correct writers wrongly say:

Incorrect:

When a student attends a local college, they should register early to make sure they get the classes they before those classes fill up.

[This constitutes an error in Number disagreement. The antecedent ("student") is singular and the pronoun ("they") is plural.]

Non-humorous	Do not break any other grammar rules in order to avoid using sexist pronouns .	
Non-related	Do not break any other grammar rules in order to avoid using sexist pronouns	
Integrated Humor	While you do need to avoid sexist language, you still have to follow all the pronoun rules.	

Too many *his*'s and *her*s eventually become annoying, however, and the reader becomes more aware of the writer trying to be conscious of good form than of the matter at hand.

Although there are those who may accept this as "correct enough," it is still incorrect since "somebody" is singular and "their" is plural and, thus, does not agree in number with its antecedent. This is not acceptable.

Discussion: There is a Discussion Topic on “Pronouns – Gender” where you can share information and ask questions.

Number.

Learning Objectives: Student will be able to:

- Define “number” as it applies to the use of pronouns.
- Explain both the rule for number agreement and the problems that make this a complicated area (modifiers, compound subjects, and indefinite pronouns).
- Provide the correct pronoun selection regarding number in a sentence example.

Reading Assignment: Textbook, pages --- through----.

Definition. Number is the form of pronoun that indicates singular or plural.

Rule: A pronoun must agree with its antecedent in number.

Hint: Number should be easy as well. There are only two possibilities, singular or plural. There is either one or more than one. However, writers get a bit sloppy when determining the correct antecedent.

More rules:

- The pronoun agrees with the antecedent and not the modifiers that may follow directly.

Non-humorous	Don't let modifiers confuse your determination of your antecedent.	★
Non-Integrated	Don't let modifiers confuse your determination of your antecedent.	
Integrated Humor	Don't let modifiers block your determination of your antecedent!	

Correct example: **Leaders** in a society alienate **their** people.

Incorrect example: **One** of the students must give **their** oral report tomorrow.

- Treat compound subjects connected by *and* as plural.

Correct example: The ***Montaignes and the Reillys*** have sent ***their*** regrets.

Incorrect example: In this simulation, ***employees and the manager*** communicate to achieve ***his*** annual goals.

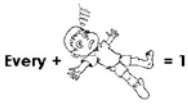
Exception: When the parts of the subject form a single unit or when they refer to the same person or thing, treat the subject as singular.

Example: Sue depended on Sarah, her ***friend and adviser,*** so she made sure she never took ***her*** for granted. { Her friend and adviser are one person, and thus is treated as singular. }

Exception: When a compound subject is preceded by *each* or *every*, treat it as singular.

Example: ***Every car, truck, and van*** is required to pass ***its*** inspection.

Treat most indefinite pronouns as singular.

Non-humorous		Think of most of these words in two parts, with the second part as singular.
Non-related		Think of most of these words in two parts, with the second part as singular.
Integrated Humor		Think of most of these words in two parts, with the second part as singular.

Indefinite pronouns include: anybody, anyone, each, either, everybody, everyone, everything, neither, none, no one, someone, something, and others.

Correct example: ***Everybody*** who signed up for the ski trip ***was*** taking lessons.

Incorrect example: ***Each*** of the books ***have*** been read.

Correct example: ***Each*** of these volunteers ***was*** to represent an employee in an experimental business situation.

Correct example: ***Everyone must*** give up some freedom to be accepted in society because if ***he*** *or* ***she does*** *not*, then society could not exist.

Note: The indefinite pronouns ***none*** and ***neither*** are considered singular when used alone.

Correct example: ***None is*** immune to this disease.

When these pronouns are followed by prepositional phrases, the pronoun is still a singular subject.

Correct example: ***None*** of those jobs ***requires*** a college education.

Incorrect example: **Neither** of the boys **are** coming home tomorrow.

Note: Certain nouns in English, such as *criteria, data, media, phenomena,* etc., appear to be singular but are in fact plural nouns in Latin and Greek: *criterion, datum, medium, phenomenon*.

Correct example: The ***criterion*** by which we will be graded ***is*** unclear.

Correct example: The ***criteria*** that we used to evaluate each treatment risk ***are*** listed in

the addendum.

Correct example: Our research ***data*** from the first experiment ***show*** that treatment throughout the full session had significant effect.

Discussion: There is a Discussion Topic on "Pronouns – Number" where you can share information and ask questions.

Case.

Learning Objectives:

Student will be able to:

- Define "case" as it applies to the use of pronouns.
- Explain the rule selecting the correct case of a pronoun.
- Provide the correct pronoun selection regarding case in a sentence example.

Reading Assignment: Textbook, pages --- through----.

Definition. Case is the form a noun or pronoun takes to indicate its function in a sentence.

Rule: Case is determined by the function of the pronoun in the sentence.

Non-humorous

Remember Case is determined differently than number or gender.

Non-related

Remember Case is determined differently than number or gender.

Integrated humor

Like a case of mistaken identity

Unlike person, gender, and number, the case of a pronoun is not based on its antecedent. It is based on the function of the pronoun in the sentence. In other words, the writer will use what he or she knows about English grammar, including Parts of Speech and the Parts of a Sentence.

How do you know what case the pronoun should be?

The forms of CASE are:

- *Subjective* - same as that of the subject of a sentence

  Correct example: **She** is the mother of the child.

  Incorrect example: Bob and **her** are in the back of the store.

- *Objective* - same as that of the Direct Object, Object of a preposition, or Indirect Object

  Correct examples: I kicked **her** by mistake. (direct object)

  A number of **them** were enough to alarm the crowd. (object of a preposition).

Incorrect examples: Jane sent Tom and **I** to the fair. (direct object)

Nevertheless, it was a good opportunity for Sara, Tori, Sam, and **I**.

(object of a preposition)

- *Possessive* - showing ownership

Correct example: **Her** shoes were arranged at the foot of the bed.

More rules:

You use subjective case with "to be" verbs.

Correct Example: "I thought Tim was at the door."

"You were right. It was **he**." (The pronoun “he” is the “predicate nominative.”)

Incorrect example: The winner was **her**.

Corrected: The winner was **she**.

Make sure the pronoun is in the correct case for its role within the sentence.

Incorrect example: Pick **whoever** I tell you to.

Corrected: Pick **whomever** I tell you to.

Use possessive case with gerunds.

Non-humorous 

Remember that it's the gerund and not the person being addressed.

Non-related 

Remember that it's the gerund and not the person being addressed.

Integrated humor 

Possession can be more than 9/10 of the law!!

Correct example: **His** eating the ball upset my father.

Incorrect example: The sales clerk objected to **me** returning the sweater.

Corrected: The sales clerk objected to **my** returning the sweater.

Discussion: There is a Discussion Topic on "Pronouns – Case" where you can share information and ask questions.

Closing Summary

The correct use of Pronouns is a prime argument for proofreading. There are many considerations, and it's important to consider each sentence both in its entirety and how it relates to the sentence that precedes it. The good news is that the more you practice these rules, the easier it will become to use pronouns correctly, and eventually it will take less and less effort.

[End of Humor Presentation Material]

APPENDIX G

Correlation of Pronoun Test Grades and Final Essay Grades from Prior Class in Validity Test of Humor Impact

		Essay Grades	Pronoun Test Scores
Essay Grades	Pearson Correlation	1	.717**
	Sig. (2-tailed)		.000
	N	25	25
Pronoun Test Scores	Pearson Correlation	.717**	1
	Sig. (2-tailed)	.000	
	N	25	25

**. Correlation is significant at the 0.01 level (2-tailed).

This table shows that there is strong correlation between the pronoun test grades and the final essay grades as shown from the scores from a class prior to the classes use in the research.

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Lone Star College-Tomball--January 2000 – Present--Adjunct English Professor—English Composition, English literature, American literature

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Exxon Company, U.S.A--September 1976 to November 1999--Controller's Dept., Information Systems Department, Human Resources

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The role of structural equation modeling in the quest for reliability in behavioral research. Paper presented at annual meeting of the Southwest Educational Research Association, New Orleans, Louisiana, February 10, 2005.

An exploratory study of factors affecting online student retention in higher education. Paper presented at annual meeting of the Southwest Educational Research Association, San Antonio, Texas, February 14, 2003.

Is Distance Education Better Than the Traditional Classroom? *Accelepoint* Webzine, June, 2001.