CAPTION THIS: A CONTENT ANALYSIS OF LOCAL NEWS CLOSED CAPTIONING

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ABSTRACT

Because of the Americans with Disabilities Act, accommodations have been made to allow for better access to buildings, services, and information. Raised bumps on a sidewalk at an intersection allow for blind pedestrians to know where they are and the different noises that the crosswalk signs make also signal for them to know when they can cross. Ramps next to stairs allow for persons in wheelchairs to be able to access the same area without having to battle going up stairs. In the same need for accessibility, closed captioning allows D/deaf and hard-of-hearing individuals to have access to auditory information, but there is a problem: D/deaf and hard-of hearing individuals find closed captioning to be full of errors and distractions. For this study, content analysis was used to analyze closed captioning on local news broadcasts across three stations during a one-week period. The results of the content analysis of those 21 newscasts revealed that, on average, almost four closed captioning errors occurred every minute. Shannon and Weaver's communication model indicates that noise and distractions, in this case the errors in the closed captioning, interfere and even change the message viewers are receiving. The data gathered support the need for a higher standard when it comes to closed captioning for local broadcast news.

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This thesis is dedicated to my family: my husband, Casey, for his support and understanding; my son, Tristan, never give up and you can reach the stars; and to my mom and dad, you both have sacrificed so much so that I could be more. Your love and guidance has been priceless.

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TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION

When running on the treadmill at the gym, people often stare at a vast wall of televisions to distract them from the pain. Many times these muted screens display closed captioning. For the average gym user, not much thought goes into how the information is being displayed, its accuracy, or its ease of use. No one really pays attention because it is simply a distraction to get them by while running that mile they dread running every day. If once in a while some story catches their attention, they might notice the poor quality of captioning as they try to decipher the message, and only then will they have the slightest notion of the frustration a D/deaf or hard-of-hearing person has to endure when trying to watch television with closed captioning. For nearly 100 million people in the United States, however, these captions are necessary (National Captioning Institute, n.d.). The frustration that arises from trying to decipher a message that is inlayed with a plethora of errors, as well as information that does not pertain to the message, can have an adverse effect on the reception of the message. Errors in closed captioning could change the meaning of the original message, distract from the message, or completely eliminate the message.

Deaf vs. deaf

This research will reference the two different categories deaf individuals are most often classified under: “Deaf” as a culture and “deaf” as a disability. A lowercase “d” such as the d in deafness, refers to the medical aspect of deaf. This can be anyone with hearing loss, from a child that is oral to an aging adult who gradually loses his hearing.

The uppercase “D” in Deaf refers to the cultural group, the same way one would capitalize Mexican, Hindu, or any other cultural group. People can be deaf without being Deaf; this would mean they have some degree of hearing loss, but they do not identify with the cultural aspect of deafness. An example of someone who is deaf would be a person who loses her hearing as an adult due to working around loud machinery.

Misconceptions of Deafness

There are many misconceptions about deafness and the need for captions. For example, people often assume all D/deaf people can read lips. Because of that false assumption, people may assume poor closed captioning would not be a problem because D/deaf viewers could simply read the lips of the person talking on the television in order to gather information; however, that is not true. This myth is strengthened by television shows and movies. The popular 1990s sitcom *Seinfeld* (Leifer & Cherones, 1993) featured an episode where the main character, Jerry, has a girlfriend who is D/deaf but can communicate with everyone by reading lips. The story depicts her reading the lips of a person at a party from across the room. In the popular *Mission Impossible* (Wagner & Abrams, 2006) movie franchise, the main character, Ethan Hunt (played by Tom Cruise), is able to read lips and uses that ability to find out information. Unfortunately, the amount of the English language that is understandable through lip reading is extremely low, but because that is not widely known, people believe what they are seeing portrayed on television and in the movies when it comes to the ability to read lips (“lipreading”, n.d.).

History and Legislation Overview

Because lip reading is unreliable, closed captioning is the key method for D/deaf viewers to be able to follow a storyline or the news. Closed captioning was first introduced in the early 1970s, but it was not until the 1990s that it became more regulated and cheaper to access (Carney & Verlinde, 1987). Considering the number of people who depend on closed captioning as a means of gathering information, surprisingly little research has been done to analyze caption quality. Even from a legislative standpoint, the focus on closed captioning is the availability, not the quality. Rules and regulations vary depending on market size, which could result in a vast range of quality of closed captioning from city to city. Variations are also inevitable from market to market because access to resources differs dramatically. For example, in a larger market, a business might be found to sponsor the closed captioning; the revenue can be used to buy better closed captioning equipment, pay for a live in-house captioner, or for a captioning company to provide live captions.

The purpose of this research is to look at the quality of closed captioning on local newscasts in small markets. A common complaint across both the D/deaf and hard-of-hearing communities is that closed captioning on broadcast television is poor, to the point that they do not want to watch broadcast television and would rather turn to Internet sources for entertainment (Applebaum, 2005).

Rationale

Importance of Local TV News

Even with the wide use of social media, local television news has remained a major source for the public to turn to when needing information (Saad, 2013). Severe weather can happen in minutes, leaving a short time for people to take shelter. The same can be said for other news events, such as an active shooter. In a situation like that, people need to be able to gather accurate information quickly. Though much of the same information is available via social media and the Internet, it can't be assumed that everyone has access to computers, tablets, and smart phones. Research from the United States Census (File & Ryan, 2014) shows that 83.8% of United States households reported owning a computer in 2013, and 74.4% reported Internet use. In comparison, Stelter (2011) said 96.7% of U.S. households own a television. This means almost one fourth of the U.S. population likely relies on television news for emergency announcements. In fact, according to the Pew Research Center for the People and the Press, more than 23 million viewers tune in for the local news on a regular basis (Matsa, 2015). This means that even though there are other venues available to gather information, the general public still turns to the local news television stations when searching for local news.

Lack of Consistency

The problems with closed captioning quality stem from the rules and regulations in place by the Federal Communications Commission. The FCC sets the guidelines that stations must follow, but there is not one standard set of regulations that applies to all

networks; instead there are rules that apply to certain market sizes. Without set rules that apply to everyone, viewers in different markets have access to different levels of closed caption quality.

Lack of Research

There is not much research that looks at closed captioning. The few studies related to closed captioning mainly examine reading rates and comprehension. The area of captioning quality is largely untouched by academic research.

Summary

Deaf culture and deaf as a disability are two separate categories. A lowercase "d" as in deafness refers to the medical aspect of being deaf. An uppercase "D" in deaf refers to the cultural group. In this paper, both categories will be discussed.

Many times, at gyms or places that are louder like restaurants or bars, closed captioning is available on the TV to be able to decipher what is being said. But, for nearly 100 million people in the United States, the captions are necessary and sometimes the only means of "hearing" a message (National Captioning Institute, n.d.). Closed captioning is the key method needed for D/deaf viewers to understand encoded messages as they watch TV.

This research will look at the quality of closed captioning on local newscasts in a small-sized market – research prompted by many complaints in the D/deaf societies that closed captioning is poor (Deaf viewers voice, 2005). The FCC has guidelines that stations must follow, but the standards are different. In this research, closed captioning and the lack of equitable access for the D/deaf community will be discussed further.

CHAPTER TWO

LITERATURE REVIEW

Whether people identify as Deaf, deaf, or hard-of-hearing, they experience many of the same challenges. No matter their label, one that they all try to overcome is that of "disabled." Deaf communities, as well as deaf and hard-of-hearing people have spent many years trying to remove the label along with the stigma that comes with it. All of the groups have worked to prove that the only thing they cannot do is hear. While the label is unwanted, the access to everyday items, such as audio on television and movies is welcomed, but in need of modifications.

With the availability of closed captioning comes the frustration of dealing with the many types of errors that comes with it. Not only is closed captioning usually displayed with many spelling errors, it is often displayed too fast. The following section examines the cultural aspect of Deafness, the history of closed captioning, how the reading rates and levels of D/deaf and hard-of-hearing individuals has an effect on the speed in which closed captioning should be displayed, and the issues that come with edited and verbatim closed captioning.

D/deaf Communities

Throughout history deaf individuals have been labeled "disabled" and oftentimes ostracized for their differences. When changes are made to include and lessen the negative attitudes towards minorities and people with disabilities, the Deaf community has been placed within the disabled category (Golos, 2010).

Deaf individuals do not view themselves as disabled. In the Deaf community you would not find them referring to themselves as "hearing impaired"; this is a term only used by the hearing majority, and is associated with a lack and a disability (Rose, 1995).

When looking at deaf people, many outsiders overlook the community and only focus on the medical aspect, wanting to "fix" what is broken or to make "normal" what is not. In the book *Deaf in America: Voices from a Culture,* the authors juxtapose how Deaf individuals are most often viewed versus their own view:

> In contrast to the long history of writing that treat them as medical cases, or as people with "disabilities," who "compensate" for the deafness by using sign language, we want to portray the lives they live, their art and performances, their everyday talk, their shared myths, and the lessons they teach one another. We have always felt that the attention given to the physical condition of not hearing had obstructed far more interesting facets of Deaf people's lives. (Humpries & Padden, p.1)

While other minorities have gained attention about how their culture is portrayed in the media (e.g., Mastro & Behm-Morazwitz, 2005), the Deaf community remains overlooked. There are few D/deaf characters in film and television; when deaf characters are included in a program, they are generally shown as disabled, leaving the impression on the viewers that D/deaf individuals are not capable of operating in mainstream society in the same manner as everyone else (An et al., 2012).

Challenges Faced

When conversing with D/deaf or hard-of-hearing persons about the daily issues they face, one of the first issues that is often brought up is the lack of consistency when it comes to closed captioning. Previous research that was conducted by the author using in-depth interviews and focus groups found that a main reason D/deaf and hard-of-hearing people prefer other entertainment and news sources over broadcast television is the poor quality of the closed captioning (Glasgow, 2015). Participants described a sub-genre that has developed with D/deaf individuals creating websites that house webisodes where actors sign throughout the episode. Although D/deaf community members have compensated by creating entertainment programming, these webisodes do not resolve the need for news information. Another issue found during these in-depth interviews with the author was not only the frustration in the quality of the closed captioning on local newscasts, but the added frustration in having to rely on hearing friends and family members or cell phones and computers to get accurate weather information (Glasgow, 2015). This could be a problem in the case of severe weather when Internet and cell phone connections can be disrupted.

The concern of the quality of closed captioning reaches further than a safety issue, it is a problem that starts with the rules and regulations not being uniform. Studenmund (2013) looked at some of the issues with closed captioning and pointed out how part of the problem is that there is not one set standard for closed captioning, but rather multiple regulations that depend on the size of the television market and the reach of the program. Each entity that touches the program has various responsibilities in creating and

maintaining the closed captioning. Studenmund (2013) shared an example of the captioning process:

> A local professional sports team captions the broadcasts of its games. The team sends that TV signal out over the air, satellite and over cable to viewers all over the world. When a local cable company airs that game, the cable company is required to maintain those captions so the captions are available for viewers who want or need to use them. (p. 26)

Under the authority of the Communications Act and the Americans with Disabilities Act (ADA), which was passed in 1990, auxiliary aids must be made available to people with disabilities. This applies to D/deaf and hard-of-hearing persons in the form of closed captioning for videos (Griffin, 2015). Stations are required to have closed captioning available, but it is not the availability that is the issue. The issue is the quality of the closed captioning that is being offered. Often the captioning is full of misspelled words, jumbled information, or completely missing (Applebaum, 2005). Although it is more of a nuisance when watching regular entertainment television programs, it can be a hindrance to people's health and safety when it comes to local news broadcasts (Applebaum, 2005). With nearly 100 million people in the United States depending on closed captioning to deliver a large amount of information daily (National Captioning Institute, n.d.), one can see how important it is to have good quality captioning readily available.

Closed Captioning History, Rules, and Regulations

In 1971, a Boston Public Broadcasting station, WGBH-TV, was one of the first stations to experiment with captioning. The Bureau of Education for the Handicapped

funded a one-time open captioning of Julia Child's *The French Chef* on WGBH (Carney & Verlinde, 1987). Over the next 2 years, more shows were captioned, and it was shown that "captioning was an effective means of communicating the information essential in a TV show" (Carney & Verlinde, 1987, p. 73). By 1973, the captioning center at the Boston PBS station was allowed to add captions to ABC-TV's network evening news and then air it later that evening on public television (Carney & Verlinde, 1987). This was the first time that D/deaf and hard-of-hearing people had an accessible national news broadcast.

By the late 1970s, the same captioning center was adding captions to adult and children's programming. In addition, Gallaudet University, the National Technical Institute for the Deaf, and Rochester Institute of Technology added captioning to more programs and made them available to local communities and national educational material distributors (Carney & Verlinde, 1987). A problem soon arose, however, as hearing audiences complained the open captions were a distraction. The solution was closed captioning that required a decoder box. Early closed caption decoder boxes sat on top of the television set, had their own antenna, were able to turn the captioning on and off, and cost around $200. According to Reager (2009), there are around 24 million D/deaf or hard-of-hearing people in North America, but in more than 25 years, only 400,000 decoder boxes were sold. Reager suggests that the reason for the low sales was the high cost of the decoder box. By the early 1990s, the need for decoder boxes was lessened when the FCC created new regulations with the Decoder Circuitry Act. All

televisions sold within the United States with screens 13" or larger after 1991 were required to have a built-in caption decoder chip (Reager, 2009).

As of 1990, all programs are required to supply closed captioning unless they file for an exemption with the Federal Communications Commission. Individual requests are evaluated, and proof must be shown under section 713(d)(3) of the Twenty-First Century Communications and Video Accessibility Act of 2010 that it would be "economically burdensome" to provide closed captioning for a program (Dortch, 2012, p. 48103).

While the FCC does require all local television stations to add closed captioning to their local news broadcasts, live or real-time captioning is only required in the top 25 markets (Hatfield, 2006). In smaller markets, other captioning methods may be used, such as the Electronic Newsroom Technique (ENT), the most common tool used for stations to create closed captioning. This tool turns the script that is used for the teleprompter into closed captioning, including technical cues and directions. Which can be confusing. Also, the problem of missing closed captioning then arises during segments that are traditionally not scripted. Not only can the extra, unneeded information be confusing or distracting to D/deaf or hard-of-hearing viewers, but by only using scripts for captioning, breaking news and weather segments are often not captioned (Kipling, 1991). The disadvantage of not having captioning available during these unscripted segments is that oftentimes these are the same segments giving timely information requiring viewers to take action quickly in order to stay safe. Kirby and Stewart *(*2014) point to how the FCC felt the need to update rules and regulations and add more ways to ensure better quality of closed captioning after noticing the large number of users that

were dissatisfied with the current state of closed captioning. The FCC updated the rules and regulations of closed captioning to try to alleviate the high rate of errors in closed captioning ("FCC Requires," 2014). The FCC released information regarding the newly set regulations concerning closed captioning in programming where scripted information is not available. In February 2014, the FCC passed a new requirement concerning news stations and closed captioning. The FCC now requires captions to be more accurate when it comes to dialogue and background sounds; they need to be in sync with the program, not block important information on the screen, and they must be provided for the full length of the program. The rules go on to say that local news broadcasts must pre-script more of their segments so that more of the news is accessible to people using closed captioning ("FCC Requires," 2014).

According to Nyman (2015), this new regulation should make television news more accessible for D/deaf and hard-of-hearing individuals. These rules went into effect between January and March 2015. Stations now must also keep a minimum of 2 years' worth of records covering the monitoring and maintenance of their closed captioning and the equipment used to generate captioning. Overall, stations now must be able to show that they are using their best efforts to provide quality closed captioning (Nyman, 2015).

In order to have closed captioning during these unscripted segments, stations will have to use live captioning, which is accomplished by either having a person manually typing what is being said to create the closed captioning or by using software that creates closed captioning. According to McKairnes (2007), there are some issues with live closed captioning. The first concern is that there is a high chance for errors. In addition, live

captioning speed can be affected by the speed of the person creating the caption. Also, there is an added burden to the station of having to either purchase new software that can create text from speech or hire an employee to type the information.

Reading Levels of D/deaf and Hard-of-Hearing Persons

One of the biggest issues with closed captioning is not the availability; the FCC has taken care of that by making captioning readily available. The chief problem, in addition to accuracy, is the rate at which captions are displayed and how that plays into the overall comprehension of D/deaf and hard-of-hearing viewers. The rate of how many words appear per minute on the screen can be a distraction from the message.

Past research has looked at the reading speeds and comprehension levels of D/deaf and hard-of-hearing persons (e.g., Karchmer & Mitchell, 2003; Lewis & Jackson, 2001). These studies show there is a significant difference in D/deaf and hard-of-hearing individuals' reading rates and comprehension when compared to their hearing counterparts. Thus, closed captioning needs to be displayed at a slower rate, a rate that is most comfortable for the majority of D/deaf and hard-of-hearing viewers.

Research about the effects of the rate of closed captioning on a viewer's comprehension was conducted by Jensema, McCann, and Ramsey (1996). The research shows a statistical correlation between rate and comprehension levels. Jensema et al. (1996) analyzed 205 television programs that contained both roll-up captioning, which comes up from the bottom of the screen, and pop-on captioning, which is shown on the screen line-by-line. The data were classified by type of program and type of captioning. The researchers looked at how many words per minute aired, words per line, characters

per line, per word, and per minute, and lastly, lines per minute. The results of the study showed the average rate of closed captioning in the United States is 141 words per minute, but the average reading speed of a D/deaf or hard-of-hearing child is 116 words per minute and 135 words per minute for D/deaf and hard-of hearing adults between the ages of 17-20 years.

The rate at which people read depends on their literacy level. Karchmer and Mitchell (2003) compiled past research to find that the average reading comprehension level of D/deaf and hard-of-hearing students at age 15 was the same as the average reading level of hearing students at 8 or 9 years old. These findings show that the average D/deaf and hard-of-hearing person has a lower reading comprehension level than his/her hearing counterpart, and a lower reading comprehension means a slower rate of reading. Burnham et al. (2008) add that the lower literacy rate of D/deaf and hard-of-hearing individuals is not widely known, and this rate can have an effect on closed captioning comprehension.

Jelinek and Jackson (2001) compared the reading comprehension level of D/deaf students to hearing students through an experiment. They administered a hearing-impaired version of the Stanford Achievement Test to D/deaf participants in order to find their reading grade level. For the hearing subjects, their Stanford scores were used, or for the ones lacking Stanford Achievement Test scores, their standardized achievement test scores were converted to the accepted equivalent. Both hearing and D/deaf participants were asked to watch a 10-minute video and then answer an 18-question multiple-choice test about the video. They found that only 58% of their D/deaf participants understood

the captioning the majority of the time. When comparing the comprehension of D/deaf and hard-of-hearing individuals to that of their hearing peers, despite being on the same reading level, the hearing students always had a higher comprehension level.

Research conducted by Harkins (1995) reveals that many D/deaf and hard-of-hearing individuals are not satisfied with the rate of closed captioning and say that it is too fast. To help lower the speed in which closed captioning appears on the screen, edited captioning has been introduced, but this has some problems of its own that will be covered in the next section.

The trouble with the small amount of closed captioning research thus far is that researchers have looked only at the rate of speed and reading comprehension. Although these are important factors, these previous studies are problematic in that all the captioning tested was created for the individual research projects, which meant the captions were complete and accurate. In the real world, however, closed captioning is riddled with errors that can affect the comprehension levels of viewers. No prior research looks at the quality of the closed captioning being aired.

There is not much research that looks at closed captioning; what research there is tends to look at the accessibility of it, the type of closed captioning it is (i.e., edited or verbatim), or the rate at which viewers can read and comprehend the information delivered on it. Zdenek (2011) points out how little research has been conducted with closed captioning in the humanities fields:

> Closed captions have gone unnoticed by mainstream scholars in rhetoric and related fields, despite the seemingly obvious ways in which captions can be

> analyzed as text by textual/rhetorical critics and as a mode by scholars in composition interested in multimodal composition. (para. 5)

This lack of research has led to the current content analysis of closed captioning.

Edited Verses Verbatim Closed Captioning

There are two types of captioning. The first, and most common, is edited captioning, which is characterized by the select reduction of text. According to Szarkowska, Krejts, Klyszejko, and Wieczorek (2011), "Elements of spoken discourse are omitted, words deemed difficult are changed into easier ones, and old forms are modernized. Edited captions are usually displayed at low reading speeds, no more than 150 words per minute" (p. 364). As mentioned above, D/deaf and hard-of-hearing people need captioning to scroll at a slower rate. They often feel as if it is moving too fast (Harkins, 1995). To address this issue, edited closed captioning has been used in an effort to allow for the closed captioning to stay in better sync with the program without being displayed too fast. The problem with edited closed captioning, however, is that the information displayed in the captioning is the interpretation of the person editing the original message (Szarkowska, Krejtz, Klyszejko, & Wieczorek, 2011). Sadly, this information about reading and comprehension rate differences is not widely known, so captioning speed goes overlooked (Burnham et al., 2008).

Because of the need for live captions, editing captions is an issue. D/deaf and hard-of-hearing people often send letters to closed captioning companies to inform them of their concern with how poorly their closed captioning is when watching live television ("Deaf viewers," 2005). Although the captioning rate tends to be more reasonable for

viewers to read, one concern with edited closed captioning is that there is no regulation on how much editing takes place. Captioning that is highly edited often leaves closed captioning users frustrated when they can see the actor's mouth on the program is moving, for example, yet the closed captioning blocks are blank (Jensema, McCann, and Ramsey, 1996). Another issue with edited closed captioning is the feeling of not getting full access to the information (Robson, 2004).

According to Rashid, Vy, Hunt, and Fels (2008), edited captioning is completely left up to the person providing the captioning. This means that captioners are allowed to make whatever edits or adjustments they deem necessary. A captioner is allowed to add and omit information and to paraphrase as he/she sees as necessary; this can result in errors and potentially biased reporting (Rashid, Vy, Hunt, and Fels, 2008). An example of how errors can occur in closed captioning and how they can be a distraction when trying to interpret information via closed captioning is the case of an error that occurred on a Fox affiliate during coverage of the 2013 Boston Marathon bombing. While the reporter spoke about one of the suspects, the closed captioning read "MARATHON BOMBING, HE IS 19-YEAR-OLD ZOOEY DESCHANEL" (Coughlan, 2013). This is incorrect information, and an individual dependent on captioning might believe that actress Zooey Deschanel played a part in the 2013 Boston Marathon bombing. This is an example of words not appearing on the closed captioning correctly, leaving the viewer misinformed. A way to help avoid the incorrect interpretation of a message by a captioner is to use verbatim captioning, which displays every word in the program. Verbatim captioning

does not eliminate all chances of errors; it does, however, lower the chance of having the message changed due to editorial changes made by the captioner.

The downside of verbatim captioning is that the captions generally run at a higher rate, usually at 180 words per minute or more depending on how fast the speaker is talking (Szarkowska et al., 2011). Some members of the D/deaf community prefer verbatim closed captioning because of the feeling that it allows them to not miss information, and broadcasters also support the use of verbatim captioning because it is more economical for them to run. Stations can use speech recognizing programs that create the captioning rather than employing someone to edit the information; however, even though it is important for accuracy and for the community to feel as if it is being treated equally, research shows (Neves, 2008) that a benefit of edited closed captioning is fewer words to read, resulting in the ease of readability. The use of speech recognizing programs comes with its own set of issues. The research by Boulianne et al. (2006) examines current problems with speech recognition software and suggests ways to possibly improve the software. One of the issues they examine is the "need for low-latency real-time recognition" (p. 273). The major issue with speech recognizing programs is that they have to take into account homonyms and accents, as well as less commonly used words that the program fails to recognize. The current programs basically builds up the vocabulary it has in its memory based on the words used, but not all words are kept in its memory; less commonly used words can be removed to make room for other words. The programs cannot account for all the different ways people may say a word, which may change depending on their geographic location and the resulting

accent inherited. While the idea of speech to text software is a way to ensure more segments and programs are captioned because of the lack of skilled captioners, there are many problems that need to be addressed in order for speech recognition programs to create quality captioning.

Verbatim captioning has an average of 30 words per minute more than edited captioning. Not only does verbatim captioning require a much higher reading rate, it can take away from the actual enjoyment of the program because so much effort has to be put into reading. With verbatim captioning there is also the chance that the viewer may not be able to read all of the text because of it scrolling too quickly. Neves (2008) asks, "Why demand for verbatim when it is more important to have sufficient reading time and carefully adapted subtitles that are enjoyable to read, easily interpreted, and unobtrusive? Subtitles should never be in the way of enjoyment" (p. 136).

The Zoey Deschanel error is unfortunately not the only well-known captioning mistake. Some people do not see the importance of quality closed captioning because they believe in the false assumption of a person's ability to read lips. Often when a closed captioning error occurs, people are quick to say that the D/deaf and hard-of-hearing viewers could just read lips, an incorrect notion strengthened by stereotypes and mass media.

Issues with Closed Captioning and Lip-reading

The National Association of the Deaf voiced its concern with Fox's *American Idol* when it showed the wrong phone numbers to call or text when voting for contestants ("Deaf Deride," 2005). All but one contestant had the wrong voting number on the closed

caption. Although that mistake is not a health and safety issue, it shows how mistakes can and do happen with live closed captioning. Fox responded by saying the network made a mistake, but the network minimized its guilt by saying that the correct number was posted on the screen that all viewers could see and that "lip readers would have gotten the correct number as well" ("Deaf Deride," 2005, p. 14). For Fox to say that "lip readers" could have received the correct number is not only a disrespectful statement to members of the D/deaf community, but it is also not correct.

What Fox spokespeople failed to realize is that lip reading is not simple. First, according to "Lipreading" (n.d.), it is usually easier for someone who is hard-of-hearing or who became deaf later in life to read lips than someone who has been deaf from birth. Second, it's not easy to read lips. There are a few factors that go into how much and with what ease a message can be understood via lip reading; in the case of watching TV, the viewer would need to be focused on the face of the performer/reporter instead of the closed captioning. Other variables include: how clear is the speaker? Is the talent looking straight into the camera? Do they really focus on pronouncing each syllable? In addition, many words can look like other words despite being completely different in sound and meaning ("Lipreading," n.d).

Even if all the correct things were being done, such as looking straight at the camera and speaking clearly, the viewer must be focused on each actor to be able to read his/her lips and not focused on the closed captioning. Researchers Jensema, Dantruthi, and Burch (2000) sought to find out how much time D/deaf viewers spent focused on the closed captioning rather than the actors. The researchers recruited 23 deaf subjects

between the ages of 14 and 61 years. Employing eye tracking software to monitor the subjects' eye movements, Jensema et al. had the subjects watch short captioned videos that were created for their study. Researchers found that the subjects looked at the closed captioning 84% of the time and at the video content only 14%. With so much of the viewing time being spent on reading the closed captioning, very little time was spent viewing the actors in the video. Even if these viewers were able to read lips perfectly, it could only be during the 14% of the time they looked up from the lower third of the screen. Not only does this finding support the belief that D/deaf viewers are using closed captioning as the main tool for gathering information from the television, but it also suggests that reading the captions requires more attention, effort, and focus. This is not only important to consider when arguing that D/deaf and hard-of-hearing persons can lip read the television programing, but it also plays into the importance of reading rate and captioning rate mentioned earlier. With so much information available about the short comings in closed captioning, reading and comprehension levels of D/deaf and hard-of-hearing persons, along with the misconceptions associated with lip reading, the natural next step would be to conduct a content analysis of closed captioning. Because of the pertinent information delivered via local television newscasts, along with the documentation that local television's closed captioning features are inferior to that of national closed captioning, a content analysis was conducted to examine the quality of closed captioning.

Content Analysis

Researchers in the media field have used content analysis for many different research topics, from how programs convey different social issues such as race and violence (e.g., Oliver, 1994) to how often themes and messages occur (e.g., Story & Faulkner, 1990). For example, DeMoss (2010) mapped out four decades worth of newscasts that covered education at the elementary and secondary levels. Through the mapping, trends were noted. By using content analysis, DeMoss was able to look at how often television news networks aired stories that dealt with issues concerning elementary and secondary education, what regions were mentioned the most, and how long the segments averaged.

Researchers Hopmann and Shehata (2011) used content analysis to study the average citizen's inclusion in coverage of political news. Hopmann and Shehata analyzed news coverage of two major Danish networks, looking at 4 weeks' worth of major news shows that broadcast prior to their major election day. The two used each news story as the level of analysis, looking only at stories that were classified as political. Next, the persons who appeared in the story were classified by their role in the story such as journalist, cabinet member, and ordinary citizen.

Similar to the current study, previous researches have used one week of televised content for coding (e.g., Bretl and Cantor, 1988; Yanich, 2013).

Theoretical Foundation

Claude Shannon and Warren Weaver, both of whom were mathematic engineers, published *The Mathematical Theory of Communication* in 1959. One of the most well-

known results of their research is the Shannon-Weaver model of communication, which explains the process of sending and receiving information. While an engineer for Bell Telephone Company, Shannon created the model with the goal of having a theory that would help engineers find the best way to transmit electrical signals (Scott, 2009).

The model is straightforward. According to Scott (2009), the information source sends out the message via a transmitter. The signal from the transmitter goes to the receiver, but during this process noise or distractions can interrupt the message delivery and distort the message that is being sent through the receiver.

Using Shannon and Weaver's model, Dobra and Popescu (2008) examined the various barriers in oral communication at both the sender and receiver ends. Dobra and Popescu found that the Shannon-Weaver model was "the most common communication model used in low-level communication" (p. 16). Although models describing communication between individuals have since been modified to include a feedback loop (e.g., Dobra and Popescu, 2008), the original Shannon-Weaver model can be applied to closed captioning because of the low level of interaction that is involved. There is no direct feedback from the receiver (TV viewer) to the sender (the script writer). While this could be an issue when applying the model to direct human-to-human communication, in the case of closed captioning, the human closed caption users are gathering their information from a machine (television).

For this study, the message is the information being delivered in the newscasts by the anchor, reporters, weather person, or sports reporter. The transmitter, in this case would be the closed captioning used to deliver the information to D/deaf and hard-of-

hearing viewers. As in the original model, this is the place where noise and distractions come into the picture. Here, noise and distractions would be the various types of errors taking place in the closed captioning being displayed. These distractions then affect the final message that the viewer is receives. Without any noise and distractions, the message that was sent would be identical to the message received, but with the noise and distractions—in this case misspelled words, technical cues, missing closed captioning, and letters/symbols—the message received is a distorted version of the original (see Appendix).

Shannon-Weaver's Communication Model explains how noise and distractions, in this case errors, can alter the message. The more noise or errors that occur, the more the message becomes altered and harder to comprehend.

Research Questions

With the growing displeasure in the quality of closed captioning, the need for quantifiable information regarding closed captioning quality and errors is clear. A content analysis will allow for this to be accomplished. With the numerous issues voiced by D/deaf and hard-of-hearing individuals pertaining to the quality of closed captioning during live programming, the following research questions are proposed:

RQ1: How frequently are closed captioning errors made in local newscasts?

RQ2: What news segments exhibit more closed captioning errors?

RQ3: Is there a difference in the number of errors between news stations?

Summary

While some people choose to identify themselves as being culturally Deaf, others choose to see deafness as only a medical issue. No matter which definition is chosen, one thing remains the same, both cultural Deaf and medical deaf individuals, as well as hard-of-hearing persons, utilize closed captioning to gather information from videos, movies, and television programs. Even though closed captioning has been around for more than 30 years and has been even easier to access since the early 1990s, little has been done to ensure high quality captioning. Despite research bringing to light areas that need attention—for example the speed of closed captioning and problems with edited and verbatim captioning—a lack of research and understanding remains.

There are myths that need to be debunked; a person's ability to read lips is a widely accepted notion that is reinforced by the media and popular culture. This myth then is used as a way of excusing low quality closed captioning, saying that D/deaf and hard-of-hearing individuals can rely on reading lips in order to gather information.

Because many of the people dependent on closed captioning have voiced a concern with the quality of closed captioning, a content analysis will allow for gathering information that is quantifiable. This information can be used to see what areas need improvement in local newscasts.

CHAPTER THREE

METHOD

Content Analysis

One of the best ways to analyze text, such as closed captioning, in a program is to conduct a content analysis. Content analysis allows researchers to analyze information by gathering or coding various aspects of a message (Naqib Al-Sadat, 2012). Content analysis is a very clear method that uses a systematic approach to gathering data (Wimmer & Dominick, 2010). With content analysis, coders have clear categories to place information in and researchers are able to gather more information in a timelier manner. Krippendorff (2012) points out strengths of using content analysis: the information collected from the text can be easily replicated and it produces valid data that can easily be referenced.

To address the research questions related to closed captioning errors, a quantitative content analysis was conducted of the closed captions airing on three local 10 o'clock news broadcasts in a small market, mid-sized Southwestern city spanning a one-week period. Coders made note of the frequency of errors in the programs' closed captioning as well as what station each error was on, what segment was airing when the error took place, and what type of error occurred.

Levels of Analysis

The level of analysis for this study was every word that appeared on the television screen by way of closed captioning. Each word was analyzed to see if an error had occurred. Words were examined to see if they matched the audio that was delivered at the

same time. If the words did not match the audio, then the error that occurred was placed into one of the five designated categories: misspelled words, missing closed captioning, technical cues, letter/symbol, and other. The synchronization of the audio and closed captioning was not expected to be exact, knowing that there is often a slight delay in closed captioning; this issue was only marked if there was a gross difference in the time from when the audio text was displayed in closed captioning. The coders looked for instances where the incorrect word/s were used or various types of unneeded and distracting information was displayed in the closed captioning. Coders were allowed to pause the prerecorded news broadcasts that were being analyzed in order to better understand a word.

Types of Errors

Misspelling. Misspellings can cause the meaning of the message to either change or no longer make sense because the incorrect word was used. The category "misspelled words" included any words that were not spelled correctly and wrong words that were captioned, for instance if a synonym was used.

Technical cues. Technical cues are meant for the anchors, reporters, and master control operators to have messages relayed to them concerning what is coming up next, what place in the pre-recorded footage is meant to play in order to coincide with the story, and other information not intended for the viewing audience. Often these cues include the pound symbol (telling the reporter to pause) or time codes (numbers that show what time a segment should start). While these technical cues are important for the

persons they are intended for, when they appear in the closed captioning area, they can cause confusion and prove to be a distraction from the intended message.

Missing. Captions were coded as missing elements any time a blank block of closed captioning appeared on the screen or there was a lack of closed captioning despite there being obvious vocal/audio information being put forth. Many times the black box that the white text is placed on will be shown minus the text; in other cases, there will be no evidence of closed captioning when there is obvious auditory information being delivered. In this research, instances of missing closed captions were counted as one error.

Symbols. Letters/symbols were coded any time the closed captioning displayed incoherent and jumbled letters and/or symbols.

Other. The last type of error was "other," referencing any type of error that would not be included in the above categories. "Other" included instances where the captioning would stay stuck on one sentence, move too fast, or would repeat the same phrase or sentence multiple times.

These five categories cover errors that would lead to misinformation, a distraction from information, confusion when interpreting information, or complete lack of information, thus leaving no message delivered.

Segment. After coding the type of error, coders indicated in what segment each error took place. This allowed for analysis to be done seeing if certain segments have a higher rate of errors. Previous research has shown there is a greater incidence of errors

occurring during segments that do not use a teleprompter (Blanco, Morales, & Silvestri, 2015).

Segments in the current study were broken down into the following categories: news, sports, weather, and other. "News" refers to any news being delivered from behind the desk, in the field, the newsroom, or pre-produced packages. Sports include any time that sports information is being delivered by the sports anchor. The "weather" category includes conditions/forecasts delivered by the weather reporter. The last type of segment was "other," referencing any information delivered in any other setting that would not be fulfilled by the categories described above. "Other" included instances where the anchors were partaking in cross-over talk or other small talk not associated with an actual story or segment.

Coding Scheme

Different variables were coded for each error viewed. A numerical ID was given to each reference that was being coded. Coders noted the time within the program that the incident took place; this was done in order to make sure that the same events were being coded by both coders and aided intercoder reliability. Coders were able to reference what station was being viewed, in which segment the error occurred, what time the error took place within the program, what date the news broadcast originally aired, and what type of closed captioning error occurred.

Coder Training and Intercoder Reliability

Coders were first trained on the four types of errors and reviewed the coding scheme to make sure that there was a unified understanding of what constituted as an

error. Three 6 o'clock news broadcasts selected from a prior week were viewed and coded as part of the training. Coders were allowed to discuss if an error had occurred, what type of error they were classifying it as, and why they believed it to be an error. This was done to make sure that coders were in agreement as to what constituted an error, what type of error would fall under the various categories, and what each segment would entail. Results from the sample were then compared to make sure that further training, clarifications, and adjustments to the coding sheets were not necessary. After comparison, there was no need to adjust the coding sheet; however, there was a need to clarify what the segments were and how to code the errors.

An intercoder reliability check was completed on 10% of the total sample of newscasts. According to Wimmer and Dominick (2010), intercoder reliability is crucial in order to remain objective as well as to show reliability. To check for intercoder reliability, coders commonly coded three of the 21 10 o'clock newscasts, with one being from each news affiliate. Each error was tested by segment, channel, and type of error yielding a Cronbach's alpha score of 99% for the two coders across the three commonly coded newscasts.

Data Analysis

Resulting data were analyzed using Chi-square tests. Results from the Chi-square tests were analyzed to see if there were any indications that certain segments had a higher rate of error compared to other segments. Also, data were examined to see how often errors occurred during newscasts. Lastly, data were looked at to see if results revealed that a station had a higher occurrence of errors compared to the other analyzed stations.

CHAPTER FOUR

RESULTS

In order to determine how often closed captioning errors occur in local newscasts and to answer RQ1, one week of evening news on three local stations was coded. Of the 21 newscasts coded, one had no captioning at all: ABC's Saturday night newscast. A total of 2,340 errors were observed in the 20 newscasts with captions. With 600 minutes of newscasts analyzed and 2,340 errors observed, there were, on average, 3.9 errors occurring every minute. Related to the frequency of errors, a significant difference was found as far as which days had more errors. Friday had the highest percentage of errors across all categories (22%), followed closely by Tuesday (21.3%) and Wednesday (20.9%). On each day of the week except Saturday, the most frequent error type was spelling. The highest frequency of spelling errors occurred on Friday (27.3%). The highest percentage of missing captions happened on Saturday (27.2%), which was the most frequent type of error made on Saturdays ($n = 63$). The most frequent use of technical cues happened on Wednesday (25.7%) and Tuesday (25.2%). The highest percentage of symbols and letters happened on Wednesday, and the largest number of "other" errors happened on Saturday.

A Chi-square test was conducted to answer RQ2, comparing the frequency of errors in newscasts by segment (sports, news, weather, and other). The test revealed a significant difference in the frequency of errors, $\chi^2(12) = 153.64$, $p < .001$. Examination of frequencies revealed that the largest percentage of errors (39.5%) occurred during the segments classified as news (i.e., stories shared from the desk or newsroom). Out of the

2,340 errors coded, 924 were in news segments. In fact, the news category had the highest percentage of errors across three of the five categories of errors (spelling, symbols/letters, other), and it came in a close second for technical cues. The weather segment had the highest percentage of errors in two categories: missing and technical cues.

Running down each column of error type (see Table 1), these are the highest percentages based on segment. The segment with the highest percentage of spelling errors was news (46.8%). The segment with the highest percentage of missing captions was weather (39.7%). The segments with the highest percentage of technical cues were weather (32.2%) and news (32%). The segment with the highest percentage of symbols/letters was news (43.5%). The segment with the largest percentage of other errors was news (47.8%). The segment with the fewest errors of all was sports (n = 349), compared to "other" (n = 481), weather (n = 586) and news (n = 924).

The highest number of errors in most segments came from the spelling category. There were 499 misspellings in news, 241 in "other," and 131 misspellings in sports across the 20 newscasts. As opposed to the other four categories, the highest number of errors in the weather segment fit under the technical cues category (n = 255).

During the news segments, which, again, had the highest percentage of errors in three of the five categories, the closed captioning would often appear to be stuck, with the same phrase staying on the screen despite the advancement in the message being delivered. There were also instances where the same sentence would repeat over and

over. When both of these errors would happen, they were followed by the captioning being displayed at an extremely fast rate in order to catch up with the program.

As mentioned above, the segment with the most missing captioning was the weather segment (39.7%). This means that no captions were displayed despite the aural information being delivered. Many times in the weather segments, the captions displayed the graphics that were displayed behind the weather person. For example, there might be a caption that appeared saying "(High/low)" when a graphic depicting the area's high and low temperatures appeared. While the graphics can give the basic information that the weather person is delivering, the more detailed facts the weather person shared verbally about how long the current weather will last or if storms were expected was not conveyed on closed captioning.

Although the sports segments had the fewest overall errors, they had the second largest percentage of missing captions (26.3%). Similar to the problems with the closed captioning on the weather segments, sports segments often had no closed captioning to relay the aural information. Again, there are some graphics that present the scores, but the other information was left out. When there was closed captioning, it would be for the scores that were already being displayed.

The second highest percentage for symbols/letters (e.g., @#%*) came in the "other" category, which accounted for 28.3% of that type of error. There were many times when symbols and letters that had no part in the story would appear in the middle of sentences.

Table 1

Crosstabulation of Errors by Segment

Segment**		Type of Error ***					Total
		Spelling	Missing	Technical Cues	Symbols/ Letters	Other	
Sports	Count	131	61	127	10	20	349
	Expected Count	159.0	34.6	118.3	6.9	30.3	349.0
	% within Type of Error ***	12.3%	26.3%	16.0%	21.7%	9.9%	14.9%
Weather	Count	195	92	255	3	41	586
	Expected Count	267.0	58.1	198.6	11.5	50.8	586.0
	% within Type of Error ***	18.3%	39.7%	32.2%	6.5%	20.2%	25.0%
News	Count	499	54	254	20	97	924
	Expected Count	420.9	91.6	313.1	18.2	80.2	924.0
	% within Type of Error ***	46.8%	23.3%	32.0%	43.5%	47.8%	39.5%
Other	Count	241	25	157	13	45	481
	Expected Count	219.1	47.7	163.0	9.5	41.7	481.0
	% within Type of Error ***	22.6%	10.8%	19.8%	28.3%	22.2%	20.6%
Total	Count	1066	232	793	46	203	2340
	Expected Count	1066.0	232.0	793.0	46.0	203.0	2340.0
	% within Type of Error ***	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

To test RQ3 to determine if a station presented more errors than another, a single-sample Chi-square test analysis was again conducted, this time to examine the frequency of closed captioning errors by news station (see Table 2). Analysis revealed a significant difference in the number of errors by station, $\chi^2(8) = 697.53$, $p < .001$. Examination of frequencies revealed that 85.3% ($N = 2340$) of all errors were made on the NBC affiliate station. The other two affiliates, errors were 7.8% (ABC) and 7% (CBS) respectively. The NBC affiliate had the highest percentage of errors in each category: spelling (97.4%), missing (40.5%), technical cues (87.6%), symbols/letters (63%) and other

(68.5%). Where NBC made its highest number of errors was in the spelling category (n = 1038). For ABC, the worst category was missing captions (*n* = 67). CBS had the most errors under technical cues (*n* = 73), closely followed by missing (*n* = 71).

Table 2

Crosstabulation of Errors by Channel

Channel**		Type of Error ***					Total
		Spelling	Missing	Technical Cues	Symbols/ Letters	Other	
NBC	Count	1038	94	695	29	139	1995
	Expected Count	908.8	197.8	676.1	39.2	173.1	1995.0
	% within Type of Error ***	97.4%	40.5%	87.6%	63.0%	68.5%	85.3%
ABC	Count	16	67	25	25	58	182
	Expected Count	82.9	18.0	61.7	61.7	15.8	182.0
	% within Type of Error ***	1.5%	28.9%	3.2%	3.2%	28.6%	7.8%
CBS	Count	12	71	73	1	6	163
	Expected Count	74.3	16.2	55.2	3.2	14.1	163.0
	% within Type of Error ***	1.1%	30.6%	9.2%	2.2%	3.0%	7.0%
Total	Count	1066	232	793	46	203	2340
	Expected Count	1066.0	232.0	793.0	46.0	203.0	2340.0
	% within Type of Error ***	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Summary

With a total of 2,340 errors observed, there is much room for improvement in the quality of closed captioning on local news. The highest percentage of errors took place in the segments classified as news with misspelled words being the highest type of error in the news segments. As for the affiliate that had the most errors, NBC had the highest percentage with 85.3% of the errors taking place on that channel, although ABC

committed what could be called the worst error of all: an entire newscast with no captions.

CHAPTER FIVE

CONCLUSION

Although some improvements, such as more accessibility to programming with closed captioning, have been made since closed captioning was created, there are still areas for much improvement. The content analysis showed that local newscasts averaged almost four closed captioning errors per minute. This number of errors would not be considered acceptable if made by the reporters for the hearing audience. The concern with the quality of a program's closed captioning for a D/deaf or hard-of-hearing individual can be compared to the need for quality sound during a broadcast for a hearing person. When a hearing person is watching a program, if the audio is not synced with the video, is cutting out, or is missing, the ability to enjoy the program has been drastically reduced. Not only is the overall experience diminished, the ability to receive the message has been jeopardized by this distraction. This could result in the misinterpretation of the message, or the message not being available for interpretation at all. Under similar scenarios, the same issues can arise for D/deaf and hard-of-hearing persons when a program's closed captioning is too fast, has many errors, or is not present. The lower level of acceptable quality and lack of unified standards allow news stations to expend little effort on closed captioning. Closed captioning is clearly not a major focus of news stations because it does not have to be, and thus, many errors are made without a second thought to how they affect D/deaf and hard-of-hearing viewers.

Because they are closed captions rather than open, meaning they are not visible for everyone all the time, the lack of consideration in the quality could simply be a case

of out of sight, out of mind. Perhaps no one is seeing the closed captioning in the newsrooms, and therefore, no one is aware of the ridiculous number of errors. Training is apparently needed for local news producers to realize who uses closed captioning and why it is important to have captioning with little to no errors. Having a monitor with closed captioning on would allow for the producers at news stations to see errors as they occur. Viewing the closed captioning could help local news stations recognize any issues and prompt corrective action.

It is neglectful and inconsiderate to allow full segments to air without any closed captioning. People are relying on closed captioning to deliver information to them, and by not having adequate closed captioning, it comes across as if the D/deaf and hard-of-hearing communities are not important.

In the case of the newscast that had no closed captioning, that was 30 minutes worth of information that was unusable for an entire community. By allowing an entire newscast to be aired without closed captioning shows the lack of awareness of the need for closed captioning by D/deaf and hard-of-hearing individuals and/or the lack of monitoring by that station's producers. The entire newscast that was not captioned raises many questions as to why it was not captioned. Is it just one person's job? If that one person is not there that day, does it go without being done? Did anyone notice that there was no closed captioning? Did viewers contact the station? How often does this occur? Did anyone at the station notice there were no captions? If so, what measures were made to get the captions back on the air? Even though captions riddled with errors are

frustrating and can come across as inconsiderate, a complete lack of captions comes across even worse.

These findings support an even greater need for better closed captioning. If closed captioning is meant to allow equitable access to television programs, and there is evidence that local television news is the major source people turn to when they want information about local happenings, there should be greater action to ensure that the closed captioning associated with that programing is at its highest quality. Broadcasters are allowed the use of the public airways due to the agreement with the FCC to provide a service to the community. All broadcast channels must follow guidelines, such as providing a certain number of hours that are dedicated to children's programing and Public Service Announcements (The Public and Broadcasting, 2008). Not only are there guidelines that outline what types of programing can be classified as children's programing or as PSAs, but the documentation of said activity must be available to the FCC and the public. Without adequate closed captioning, many people are being denied equal access to the largest source for local information, thus the broadcasters are failing to meet part of the FCC's general agreement for access to the public airwaves.

Error Distortions

Shannon and Weaver's (1949) communication model identifies how a linear message is delivered from the information source to the receiver and how the occurrence of noise can result in a distorted message. Theoretically, a television program with closed captioning allows D/deaf and hard-of-hearing viewers to receive the same message that the hearing audience receives; however, with the numerous errors and distractions that

were discovered during closed captioning transmission in this study, D/deaf and hard-of-hearing viewers are in fact not receiving the same message. Instead they are receiving a distorted message. If the closed captioning is missing, they are not being presented with the message at all. Instead of being able to read the message and take in accurate information, when technical cues and unnecessary letters and symbols are displayed throughout the message, viewers must try to figure out what they mean, how they apply to the message, and once they figure out that those symbols/letters/words are not part of the news message, they have to consciously omit them from their reading. For the hearing world, this message processing challenge could be compared to trying to hear a message in a room with multiple people speaking loudly at the same time. Although a person can still receive some of the message, other parts are not comprehensible and the message can become distorted; the hearer would miss certain information. The problem with closed captioning errors in local news broadcasts is that the sender is apparently not paying attention to the message being sent out. If local news producers are uploading the teleprompter script into the ENT, they are not watching the resulting closed captioning or else they should notice that there needs to be further edits made to the script before it is uploaded, and they would see the need for spelling corrections. The errors are a clear indication that not only is noise interfering with the message, but neglectfully so.

Although many of the instances of missing closed captioning in this study occurred during segments which traditionally have graphics further explaining the verbal information being delivered, they still do not provide the entire message and could very well be leaving out important information. Another reason that D/deaf and hard-of-

hearing persons cannot rely on the graphics alone to deliver information is that not all sports and weather segments completely lacked closed captioning. Often the sports and weather segments were plagued with blocks of closed captioning that were full of symbols and technical cues leading to blocks of mistake-filled captioning covering parts of the graphics. This issue goes back to the common message from the D/deaf and hard-of-hearing communities: there is little reason behind assuring the wide availability of closed captioning if the closed captioning is not of high enough quality to convey the message correctly.

This study has revealed information that backs up the D/deaf and hard-of-hearing community's concern with the number of errors found in closed captioning on local newscasts. It also brings attention to other areas of a newscast that exhibit a vast number of errors. Although a major concern is the lack of closed captioning available during traditionally unscripted segments, such as weather and sports, the content analysis revealed that the majority of the errors actually occurred during the news segments.

In addition to accuracy, attention needs to be paid to the speed of closed captioning, making sure that portions are not appearing too fast, which happens often when closed captioning starts to lag behind the program and there is the need to catch up. Without knowing the lower speed of reading and lower reading comprehension levels common to D/deaf and hard-of-hearing persons, closed captioning companies as well as stations creating their own captioning, will not know the parameters in which to create their captioning, thus not fully accommodating their D/deaf and hard-of-hearing viewers.

When a word is misspelled, viewers can sometimes use context clues to try to figure out what the word was supposed to be, but when the closed captioning is completely missing, viewers are left with little to no information. When closed captioning is missing, viewers cannot use deductive reasoning to solve the problem. Imagine watching television and having the sound turn off every few minutes. Not only is it hindering the ability to receive the message, but it is extremely frustrating. It can also leave viewers feeling as if they do not matter because attention was not given to the task of making sure the closed captioning was of high quality. It could leave D/deaf and hard-of-hearing viewers feeling like second-class citizens. In this particular study, none of the three stations that were analyzed offered a direct way to communicate closed captioning issues or concerns. Most platforms that offer a service also have a way for their clients to offer feedback and to bring up concerns. When ordering from on online business you are about to contact them, leave reviews, and offer suggestions. There are often directions and call to action for providing them with feedback. Restaurants often have small cards on the tables with short surveys about their performance and allow for write-in comments. In the case of broadcast television, there is no call to action stating that if the viewer has concerns with the closed captioning they may contact them. Not only would the low quality of the closed captioning be frustrating, but not knowing how to get your concerns to the people who need to know about the problems would be equally frustrating.

Limitations

Limitations of this research include the broad categories used to classify both the type of news segment as well as the type of error that occurred. The categories for the segments in future studies could be broken down even more, showing crossover talk, live on-location reporting, breaking news, and voiceovers.

As for the types of errors, there are a few that could be added, such as when the closed captioning was displayed at a rate that was too fast to read. The original pilot study did not encounter closed captioning that was displayed too fast. This was an error that was only noticed once coding began, which meant it had to be coded as "other." In addition, another code could be created for listing how long the closed captioning was missing each time that the problem occurred.

Another limitation is that this research looked at one small-sized television market. FCC rules and regulations are different for closed captioning depending on the size of market. Also, by limiting the analysis to one market, the results cannot be generalized.

Another issue faced while conducting this research was the inability to see if any other errors had occurred in the closed captioning when it was moving too quickly. These errors of speed were simply classified as "other" and marked as one instance because as soon as the newscast was paused on a DVR, the captioning disappeared.

In addition to the challenge of captions that were too quick to read, the coding for missing captions needs improvement. Missing closed captioning was counted as one error no matter the duration it was missing. The duration was noted, but it was only counted

once. Segments without captioning lasted anywhere between a few seconds and a few minutes. This type of error lends itself to further research concerning the overall duration of time that a newscast is lacking closed captioning.

Areas for Future Research

As mentioned above, future research could add more categories to distinguish between segments. The further breakdown could better pinpoint the times when scripts are not being used and what type of information is being shared. Also, research could be done to see just how much time is spent during a newscast with the closed captioning missing. By being able to account for every second of missing closed captions, research could really show how much time out of the regular newscast D/deaf and hard-of-hearing people are able (or unable) to receive information.

To resolve the issue of caption speed for the coder to analyze, future researchers could video the screen on which the caption and program are displayed and then code from that video rather than from the DVR. Thus, the coder could slow down the rate in which the captioning is being displayed in order to see if any further errors had occurred during the time that the captioning was too fast to read. Future research could address this lack of a category for speed-related errors and the inability to code other potential errors inside these briefly posted captions. Future research of this sort would likely reveal even more errors.

Another area for future research would be to collect data from small, medium, and large markets and compare the number of errors, seeing if there is a better quality of closed captioning depending on the size of the market. Additional content analyses could

be done examining newscasts that aired on broadcast networks versus satellite. Many times satellite providers offer the option to use their closed captioning rather than the closed captioning that is offered by the networks. This gives the viewer more choices, too, allowing for different options in how the closed captioning is displayed.

One station in the study had its closed captioning sponsored; it was the station with the lowest number of total errors. Future research could look at whether there is a trend in stations with sponsored closed captioning having better quality captioning across other markets. There could also be research into the process of creating closed captioning when it is sponsored versus when it is not sponsored, and what guarantees are made to the business that is sponsoring the captions.

Further research could look into why the NBC affiliate had such a high rate of errors as compared to the ABC and CBS affiliates. Both ABC and CBS had around 7% percent of the errors each with the remaining errors occurring on the NBS station. For the NBC affiliate, the most common type of error was misspellings. The information found from these data could lead to areas of closed captioning creation that need to be addressed as well as other research.

Another interesting angle to look at would be to examine how D/deaf and hard-of-hearing viewers see the journalistic credibility of stations based on the quality of their closed captioning. One would suspect the journalistic credibility of a newscast or newspaper to plummet if there were a constant stream of errors in reporting. In-depth interviews and focus groups could be used in addition to content analyses to see if there is a connection between how accurate the closed captioning is and the perceived credibility

of the station and reporters. Surveys could ask how viewers felt about the credibility of the stations and the anchors, reporters and weather persons and compare those perceptions to the quality of closed captioning found in the content analysis. In addition, an experiment could be done with participants watching a newscast with poor closed captioning then one with high quality closed captioning with a post-test at the end asking about the different qualities of closed captioning and how participants viewed the credibility of each station. Like Bretl and Cantor's (1988) examination of the portrayals of men and women in television commercials, a longitudinal study of caption quality could show trends over time.

Summary

Many advancements have been made to ensure the inclusion of everyone; closed captioning is one of the latest advancements. When captioning was first introduced, it was open, which meant it was constantly on the screen where all viewers could see it. Because not everyone wanted to see the captioning, the creation of closed captioning was prompted. The downside, however, is that with closed captioning not being viewed by everyone, it keeps it out of sight and out of mind. The hearing community is likely not aware of the current issues with the quality of closed captioning.

The findings from this study support the reported feeling in the D/deaf and hard-of-hearing communities that closed captioning is lacking in quality. By having data that support this concern, many doors are opened to more research avenues that can further expand upon this topic, finding more issues and areas of concern as well as ways to address these issues. One of the reasons why this area goes unnoticed is the lack of

research. Most previous research examines viewers' reading levels, comprehension, and closed-captioning speeds. These subjects are important, but there has been a gaping hole in academic research related to the quality of captioning. Poor quality captioning is a problem because errors can play into problems with viewers' comprehension of the message. With that being said, current closed captioning research is begging for further examination of the quality of closed captioning. More research can bring to light the need for higher standards. It can also bring attention to an area that few people notice or even realize is an issue. Simply having closed captioning required by law does not mean that everyone has equal access.

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Appendix A

Coding Scheme

Unit of Analysis

The purpose of the study was to analyze how accurate the closed captioning is on local nightly news broadcasts. Quantitative information will include spelling errors, lack of closed captioning, or even jumbled text. The specific information that was looked at is:

- Misspelled words (this included the use of synonyms)
- Stretches of speech that are not accompanied by closed captioning
- Blocks of captioning that are made up of incoherent letters/symbols
- Technical cues
- The station where the error occurred
- The segment when the error occurred (news, sports, weather, or other)

Variables of Interest

The basic level of analysis will focus on how many general errors occurred during each news broadcast. Each error that is referenced will then be coded for one of the following: misspelled word, missing closed captioning, technical cues, letter/symbols, or other.

Analysis

A final analysis will look at the following:

- The number of errors per station, per segment
- The number of missing closed captions per station, per segment
- The number of misspelled words per station, per segment

- The number of technical cues per station, per segment
- The number of letters/symbols per station, per segment
- The number of other errors per station, per segment

Procedure

The goal of this study is to see how often and what types of closed captioning errors occur during local news broadcasts. The coding sheet has been designed to take into account various aspects so that the researcher may analyze different scenarios. Coders will be trained by viewing three random news broadcasts which were not part of the sample. The selections will be random because there is no prior data pointing out a news broadcast that would have a higher probability of error occurrence. Content that will be in the actual study will be the Monday through Sunday 10 o'clock news broadcasts for the three local news stations for one week.

Coding Sheet

The following is a description of the columns included in the coding sheet

Column 1: Error Number – The chronological order of errors throughout the broadcast

Column 2: Segment – This will be broken down to news, sports, weather, or other.

Column 3: Time – This is the time in the broadcast in which the error occurred.

Column 4 – Type – This is the type of error that occurred.

Sample Coding Sheet

Network: _____ Original Air Date: _____ Coder: _____

Error #	Segment	Time	Type
	____News ____Sports ____Weather ____Other		____Spelling ____Missing ____Technical Cues ____Symbols/Letters ____Other
	____News ____Sports ____Weather ____Other		____Spelling ____Missing ____Technical Cues ____Symbols/Letters ____Other