THE STATE OF CLOSED CAPTIONING SERVICES IN THE UNITED STATES

An assessment of quality, availability, and use

LOOK, YOU TAKELEMAN'S WILL HAVE THAT COMMIE CRAP OUT. PLAN?

RESTAURANT RESTAURANT

THERE'S JUST NO WAY

The NCI Foundation

THE ANNENBERG PUBLIC POLICY CENTER OF THE UNIVERSITY OF PENNSYLVANIA

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Preface

Quality of captioning has been one of the primary elements of the mission of the National Captioning Institute (NCI) since our organization was established in 1979. Based on concepts advanced by the National Bureau of Standards and the American Broadcasting Company, and funding from the Department of Education and several insurance companies, NCI was formed to establish closed-captioning. In the early years, working out the technology of closed-captioning, making decoder units affordable and urging networks to broadcast programs with closed-captioning were our primary tasks, but we were always mindful that without quality, what was delivered would not provide meaningful access.

Today, closed-captioning is pervasive, there is a decoder chip in virtually every set sold in the U.S. and while we are striving to have every program captioned, our focus continues to be on quality.

Ten years ago, NCI commissioned a limited survey to analyze the state of closed-captioning. Although not extensive or scientific, the survey revealed much about the size and makeup of the users of closed-captioning as well as their views of the quality being delivered. To date, this survey is one of the few sources of information on closed-captioning and has been broadly referenced. Recently, NCI sought to again assess the state of closed-captioning quality and commissioned the Annenberg Center for Public Policy at the University of Pennsylvania to conduct a more extensive study to determine the end-users' views of closed-captioning and how we might make improvements. The result is this study.

It is NCI's hope that this study will help broadcasters assess the needs of end-users, providers of closed-captioning services to improve the quality of their services, end-users to better understand the closed-captioning process, and most importantly, ultimately bring better, more usable captioning to end-users.

NCI consistently works to improve the captioning we provide and recently we have made further advances based on the findings in this report. We urge all caption providers and broadcasters to join us in rededicating our efforts to delivering the highest quality captioning to viewers.

Finally, NCI would like to thank Dr. Amy Jordan and her staff for their tireless efforts in conducting this research.

Gene Chao, Ph.D.
Chairman and CEO
National Captioning Institute

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Acknowledgments

Introduction

Closed captioning is an assistive technology designed to provide access to television for persons with hearing disabilities. It is similar to subtitles in that it displays the audio portion of a television signal as printed words on the television screen. Unlike subtitles, however, closed captioning is hidden as encoded data transmitted within the television signal.

Though closed captions have been available on some programs for several decades, the Telecommunications Act of 1996 now requires closed captioning of most, but not all, new television programming. The rules became effective in January 1998 and are designed to create transition periods during which the amount of closed captioning will gradually increase. By January 2006, 100 percent of program distributors' new programs must be provided with captions.[1]

Today, virtually everyone can receive closed captions without any special decoder device. All TVs sold after 1993 have built-in decoder circuitry, making television accessible to the more than 28 million Americans who are deaf or hard of hearing (H.R. 2527, 2001). In addition, closed captions have become a familiar presence in public spaces where noise precludes sound (such as gyms or bars) or where noise is not permitted (such as hospitals).

Despite these advances in technology and policy, we know very little about audience use and perception of closed captioning, the quality and accuracy of captioning, or the industry's response to the mandate. This study, therefore, addresses an important gap in our understanding of a critical communication policy. We look at the implementation and utility of closed captioning in several ways:

1) *Through the programming itself* - that is, the amount and quality of captioning that currently exists and airs in one large broadcast market, as well as a sub-sample of news programming in markets across the country;

2) *From the perspective of the audiences* - primarily the audience that is deaf or hard of hearing but also those who might use it to bolster their understanding of English and a general audience that might use it under special circumstances; and

3) *From the perspective of industries charged with providing the captioning* - that is, producers, networks, local stations, and those who offer closed captioning services.

Part 1: Content Analysis of Closed Captioning

The content analysis component of this study seeks to examine two key elements of closed captioning: 1) the extent to which closed captioning is consistently provided for audiences; and 2) the degree to which captioning is clear and accurate.

To conduct the content analysis, we initially intended to rely on an Annenberg Public Policy Center library of programming collected via videotape across seven different broadcast and cable channels in 2001. However, we discovered that when videotapes are stopped and started frequently (as required in content analysis), closed captioning becomes garbled, captions are cut off, and nonsense symbols appear. Consultation with electronic engineering experts and the staff of the National Captioning Institute led us to rely on digital recordings to provide a better "read" of the captions. Thus, for the general sample of television programs, a TiVo device was used for recording and playing back the programs. TiVo is a technology that allows viewers to digitally record programs and store them in a computer memory for later playback. For the sample of news programs, videotapes of local and national news broadcasts were transferred to DVDs. Though TiVo did not completely eliminate the kinds of glitches seen in videotapes, it did drastically reduce them. The DVD recordings of news tapes did not introduce any new glitches because the captions were burned onto the DVD itself.

The following section provides an overview of the approach used to assess the quality of closed captioning in the general sample of television programs (which will be referred to as the TiVo sample) and the sample of local and national news programs (which will be referred to as the news sample). While the content analytic approach to the two separate samples is similar, the findings are presented separately as they have distinct implications for caption provision and public policy.

Methodology

The TiVo Sample

The TiVo sample (general television programs) was drawn from public broadcast, commercial broadcast, and cable television programs randomly selected from 38 channels over four 24-hour periods in October 2002. The sample comprises one composite weekday

and one composite weekend day. The days were broken into 30-minute time blocks and recordings were made on the half hour, yielding 93 separate half-hour programs or half-hour portions of longer programs. (Three programs on Univision [a Spanish language cable station] were not recorded due to broadcast signal problems.) All programs were digitally recorded.

As Figure 1 illustrates, 62 percent of the programs in the sample were captioned and 38 percent of the programs were not. Fewer programs were captioned on weekend days than weekdays, although the difference was not statistically significant.[2] There were no significant differences in the provision of captioning across different times of the day. Foreign language stations were significantly less likely to have closed captioning than English language stations.

Figure 1: Closed captioning in 48-hour TiVo sample of broadcast and cable television programs

Not Captioned 38%

Captioned 62%
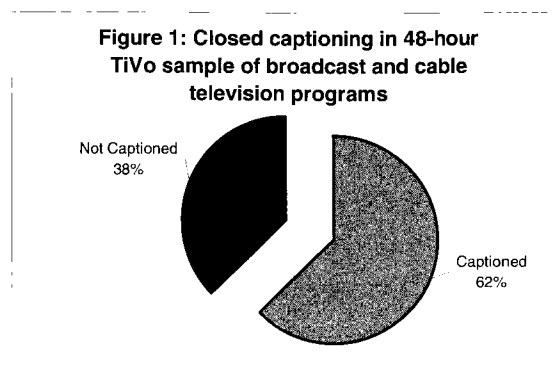
We were also interested to see the extent to which individual channels on broadcast and cable television provided closed captioning over a 24-hour period in the summer of 2002. Using a different sample of TiVo recording, we examine 24 consecutive hours of five stations (see Table 1). The networks were chosen to represent the diversity of offerings in the public/commercial and broadcast/cable arenas. The networks varied considerably in the amount of closed captioning they provided over the course of a day, ranging from a high of 100 percent on Lifetime and a low of 54 percent on The Family Channel.

Table 1: Closed captioning over a 24-hour period

Network	Percent of Programs Captioned
PBS	70%
Family Channel	54%
Lifetime	100%
Nickelodeon	78%
CBS	94%

News programs

The sample of news programs was drawn from the local evening newscasts of six different cities and four different networks and the national evening newscasts of three different networks. The local news stations were selected to represent a national geographic

Table 2: Markets used for local news analysis

City	Broadcast Market Ranking
Chicago, Illinois	# 3
Philadelphia, Pennsylvania	# 4
Seattle, Washington	# 12
Raleigh-Durham, North Carolina	# 29
Tucson, Arizona	# 71
Bangor, Maine	#155

distribution and a range of media market sizes, according to the 2000-2001 Nielsen rankings. The cities and their market rankings are represented in Table 2. All local stations in this sample have network affiliations, with the exception of one independent UHF station in Bangor, Maine.

The local newscasts from outside the Philadelphia market were taped in the spring of 2002. The local Philadelphia newscasts were drawn from a library of programs recorded in 2001. Videotape recordings were subsequently transferred to DVD to provide stability in the program playback. The local news sample consisted of 28 half-hour programs: five each from Chicago, Philadelphia, Raleigh, and Seattle and four each from Bangor and Tucson (see Figure 2). This sub-sample was derived from a larger sampling frame of programs airing on two of the large broadcast stations (ABC and NBC) and two of the smaller networks (Fox and WB). Though we ideally would have sampled all of the broadcast stations in each market, including unaffiliated stations, time and resources precluded this. All of the local news programs were closed captioned, with the exception of the ABC affiliate in Bangor, Maine.

Figure 2: Local news network sample distribution

- ABC 32.1%
- WB 7.1%
- Fox 21.4%
- NBC 39.3%
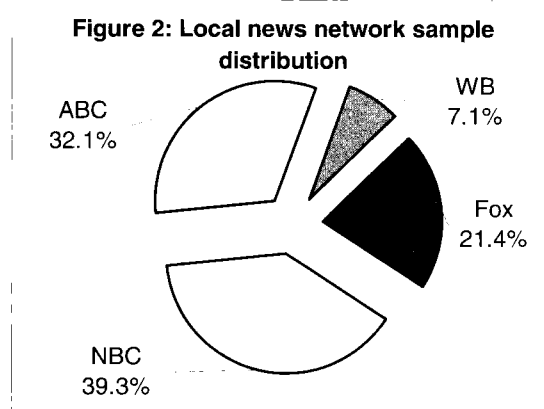
The national news broadcasts were also taped in the spring of 2002 and transferred to DVD. The national news sample consisted of 17 half-hour evening news programs or half-hour portions of longer evening news programs; five from ABC, four from NBC, and eight from CNN (see Figure 3). With this sample we attempted to create a national sample with ABC and NBC that paralleled the local sample. The prominence of CNN as a national news network led us to include this channel in the national news sample as well. All of the national network news programs were closed captioned.
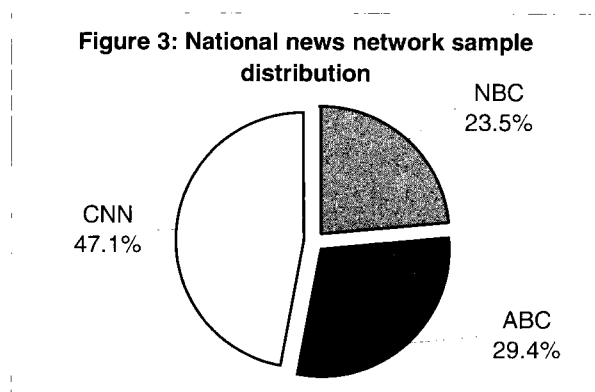
Figure 3: National news network sample distribution

- NBC 23.5%
- CNN 47.1%
- ABC 29.4%

Coder Training

The coding team was comprised of three undergraduate senior communication majors, one graduate student (who also served as the project manager), and the principal investigator. Coders were trained for six weeks in the spring semester of 2002 and for an additional five weeks in the fall semester of 2002. Coding did not begin until the coding team achieved acceptable inter-coder reliability, deemed to be greater than 75 percent on each key variable.

Content Analytic Categories

The unit of analysis is the program as a whole, excluding advertisements and including opening and closing music, credits, and bumpers. TiVo sample programs were coded in two--minute time blocks, which ranged from 11 to 15 blocks depending on whether the 30 minutes included commercials. News sample programs were coded in news story segments, which ranged from 4 segments to 20 segments per 30-minute newscast. Codebooks were used to guide the coders' assessment of numerous content variables.

TiVo program variables included: the *type* of program (e.g., drama or children's show), *recording style* (live, prerecorded, or both), and presence or absence of *captioning*. Overall conventions in the program were also identified. These included: *sound effects* captioning, *speaker identification, caption text style* (e.g., upper and lowercase or all uppercase), *changes in text style* for particular conventions (e.g., italics for whispering), *caption placement* (e.g., bottom of the screen), and *changes in caption placement* (e.g., from bottom to top to make room for titles). Finally, coders judged how closely the captions matched the audio track in both *timing* and *veracity*. Specifically, we asked whether the captions were *in or out of sync, paraphrased or verbatim*, or *complete or incomplete*. Most important to this research, we asked whether the captions were *understandable* and *meaningful* or whether caption errors significantly interfered with viewers' ability to understand the individual segments or the program as a whole.

Each program was viewed by coders twice, first with the television sound off and then with the sound on. With the sound off, captions were evaluated for their *clarity* and *speed*. In addition, coders assessed whether the overall meaning of the program was clear without sound and whether the speed of the captioning was manageable. With the sound on, coders

examined the accuracy of the captions (i.e., whether they matched the audio, both in terms of the text and its synchronicity).

Coders also looked for errors and judged whether these errors affected the segment's meaning – that is, whether the error(s) made the captions difficult to read or made it difficult to understand the program. In the TiVo sample, these errors are delineated into three categories. Category 1 errors included mistyped words or technical problems, such as mis-strokes, typos, and technical problem symbols (e.g., black boxes where letters should be) (see Figure 4). Category 2 errors included words or sentences that were omitted or added and words that were substituted or swapped within a sentence (see Figure 5). This category also was used when whole sections of a show were not captioned (see Figure 6). Category 3 Errors in the TiVo sample included glitch errors--the kinds of technical errors that came and went on successive reviewing of the program (see Figure 7).

Figure 4: Category 1 Error, News and TiVo Sample (technical or typographical error)
From ABC's World News Tonight: "DEAD NATING"
Audio: "detonating"
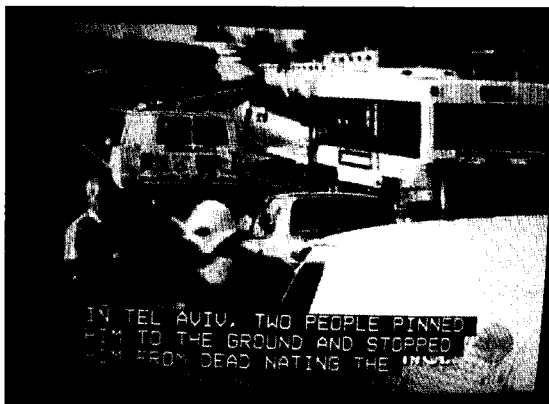
Figure 5: Category 2 Error, TiVo Sample (word addition, deletion, or substitution)
From the syndicated program *Seinfeld*: *"Don't listen. You've got a good job."*
Audio: *"Don't listen to him, Kramer. You've got a good job here."*
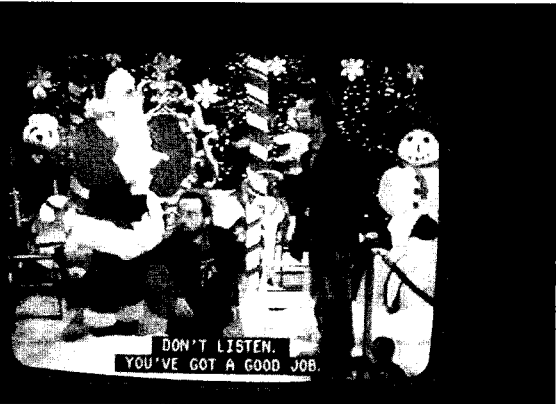
Figure 6: Category 2 Error, News Sample (segment not captioned)

Figure 7: Category 3 Error, TiVo Sample (glitch that disappears)
From Bravo's Maurice: "I can seit."
Audio: "I can see it."
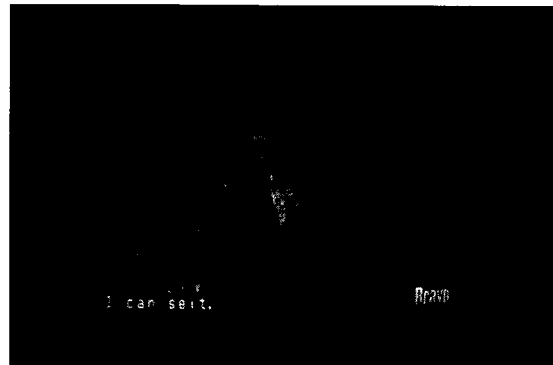
News programs

News programs required some slight modifications to the TiVo coding scheme. For instance, the variable for sound effect captioning was omitted because none of the news programs captioned sound effects. A variable to capture the closed captioning on bumpers or promos used at commercial breaks was added. Nevertheless, certain overall conventions remained the same, including whether and how *speaker identification* was used, the *style* of the caption lettering, whether the text changed for particular *conventions* (e.g., lowercase for interviews), caption *placement* (e.g., bottom of the screen), and *changes in caption placement* (e.g., from bottom to top for titles.) Again, we looked at whether the captions and the audio were *in sync* and *accurate* both with the sound off and with the sound on.

Although news programs generally follow a similar format, each station or network employs conventions specific to their broadcast. For example, while all of the national news programs used a single anchor to convey the news, only 39 percent of the local news programs used a single anchor (the remaining 61 percent had two anchors). The live context of news adds another dimension. Closed captioning is available on news using different technologies. Some stations use *real-time captioning*, in which a captioner types in the closed captions as the anchor, reporter, or news subject speaks, often resulting in some delay but greater parity with the audio. Alternatively, the closed captioning can be conveyed via the teleprompter script, or *electronic newsroom captioning*, which generally parallels what the anchor reads but often does not capture ad lib, live, or remote stories, weather, or sports. A cue that a program's captions come from the teleprompter script may come from an observed error (e.g., captions from a different story are running) or from a text that runs ahead of the anchor's reading of the story.

In this sample of local news programming, 54 percent of the newscasts used real-time captioning and 46 percent used electronic newsroom captioning. Stations in smaller markets (Tucson, Bangor) were more likely to use electronic newsroom styles while stations in larger markets (Philadelphia, Seattle) were more likely to use real-time captioning. Although national news programs were all coded as using real-time captioning, it was more difficult to know for certain whether the captioner was following the teleprompter text since these news programs tend to go more slowly and the closed captioning text tended to run nearly in sync with the audio. In addition, ABC and NBC were very highly scripted, with virtually no "live"

interviews included in the newscasts.

Not all of the news programs were fully captioned, a reflection of the fact that some rely on the anchors' teleprompter script (or electronic newsroom captioning) and others caption live (real-time captioning). Table 3 illustrates the disparity in the completeness of captioning in local and national news.

The kinds of errors present in news programs are similar to the ones we identified in the TiVo sample. Category 1 errors included mistyped words or technical problems (as in Figure 4

Table 3: Captioning available in news sample

	Fully Captioned	Partially Captioned
National News	100%	0%
Local News	46%	54%

above). Category 2 errors included omissions, additions, or substitutions (as in Figure 5 above). This category also captured the news segments that did not have any captioning, as in Figure 6. With the news sample, Category 3 errors included captions that freeze on the screen or run into the commercial that follows that particular news story. There were no glitches on the DVD recordings made from the videotapes.

Findings

From the content analysis of the general sample of TiVo programs, we can ask several critical questions.

Are TiVo sample captions clear, accurate, and understandable?

We analyzed programs first with the sound off in order to determine whether the captions allowed the viewer to know what was being said, what was happening and why, and who was speaking throughout the program. A program viewed without sound was judged to have "clear" meaning if one could determine what was happening or being said and by whom throughout the program on a consistent basis, "somewhat clear" if there were minor problems that introduced some confusion, and "very unclear" if it was difficult to understand most of what was happening.

We next examined the programs with the sound on to see whether the closed captioning adequately matched the audio portion of the program, misled viewers, or omitted critical

elements of the content. Programs were judged to have "no problems" if the closed captions were consistent and accurate, "minor problems" if there were some mistakes or omissions when compared to the audio, but they did not fundamentally change the meaning of the program, and "major problems" if there were critical mismatches, numerous errors, or important omissions.

Figure 8: Clarity of TiVo program captions (without sound)

Clear 75.9%
Very unclear 10.3%
Somewhat unclear 13.8%

Figure 9: Problems with TiVo program captions (with sound)

No problems 63.8%
Major problems 12.1%
Minor problems 24.1%
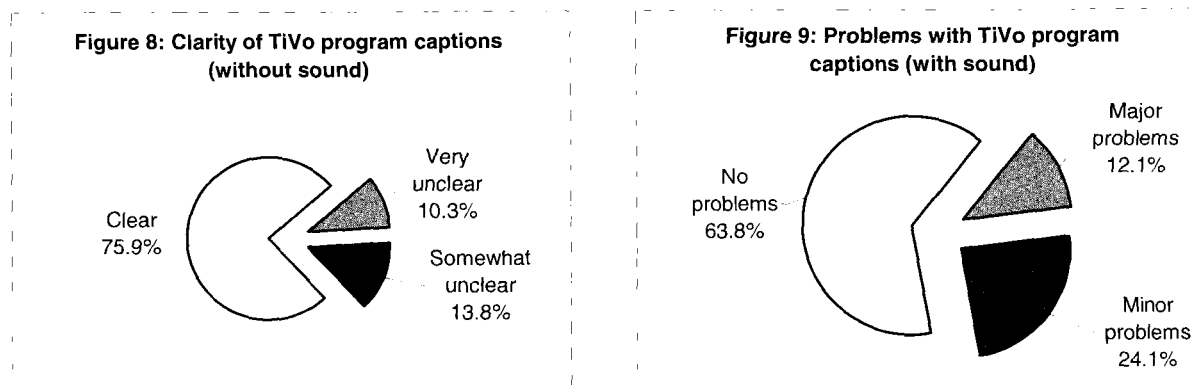
As Figures 8 and 9 illustrate, the majority of the programs in the TiVo sample were understandable, both with the sound on and off. When the sound was off and the coder relied solely on the captions, 76 percent of the TiVo programs were clear, 14 percent were somewhat clear, and 10 percent were very unclear (Figure 8). With the sound on, 64 percent of the TiVo programs were judged to have no problems, 24 percent had minor problems, and 12 percent had major problems (Figure 9). The discovery of more "errors" with the sound on was mainly tied to two issues: 1) there were some word deletions and substitutions that altered the meaning of a segment (e.g., in one program about a child molestation case, the caption read, "if he knew he was 13, he would have opened the door," but the announcer in fact said "if he knew he was 13, he would not have opened the door") and 2) there was often confusion about who was speaking particular lines in captioning that did not do an adequate job of speaker identification. Often this confusion was only realized when the sound was on.

Programs in the TiVo sample that were out of sync (delayed) and appeared to be real-time captioned were significantly more likely to be judged as being unclear and as having significant problems. In this sample, 71 percent of the programs had their captions in sync with the audio portion and 29 percent did not.

In addition, the style of captioning used within the TiVo sample was examined. *Pop-on* style captions - used in prerecorded programs - appear in sentence fragments or full sentences all at once on the screen and are generally in sync with the audio and often placed under the speaker. Sixty-one percent of the programs in the sample used this style. *Timed roll-up* captions (similar to *live display* captions) - also used in prerecorded programs - appear to

"roll" onto the screen. They are also generally in sync with the audio but are not placed to indicate speaker. Far fewer programs used this style - just 5 percent. Finally, *real-time* captions - which are always used with live programs and sometimes used with prerecorded programs - are typed as the program airs and are always delayed. Nearly one-third of the programs (31 percent) used this style. Analyses indicate that programs using the *pop-on* or *timed roll-up* style of captioning are significantly more likely to be judged as clear and problem-free while those using *real-time* captions are significantly more likely to be judged as somewhat unclear or having minor problems.

Are news sample captions clear, accurate, and understandable?

Evaluations of the clarity of local and national news program captions indicate that viewers would experience greater difficulty understanding them than they would with programs in the general sample. Again, coders judged the clarity of meaning with the sound off. Not more than three-quarters of the local news programs were judged to be "somewhat unclear" or "very unclear" (Figure 10) while only 18 percent of the national news sample was judged "somewhat unclear" and no programs were judged to be "very unclear" (see Figure 12).

Figure 10: Clarity of local news program captions (without sound)

Clear 25.0%
Somewhat unclear 42.9%
Very unclear 32.1%

Figure 11: Problems with local news program captions (with sound)

Minor Problems 53.6%
Major Problems 46.4%
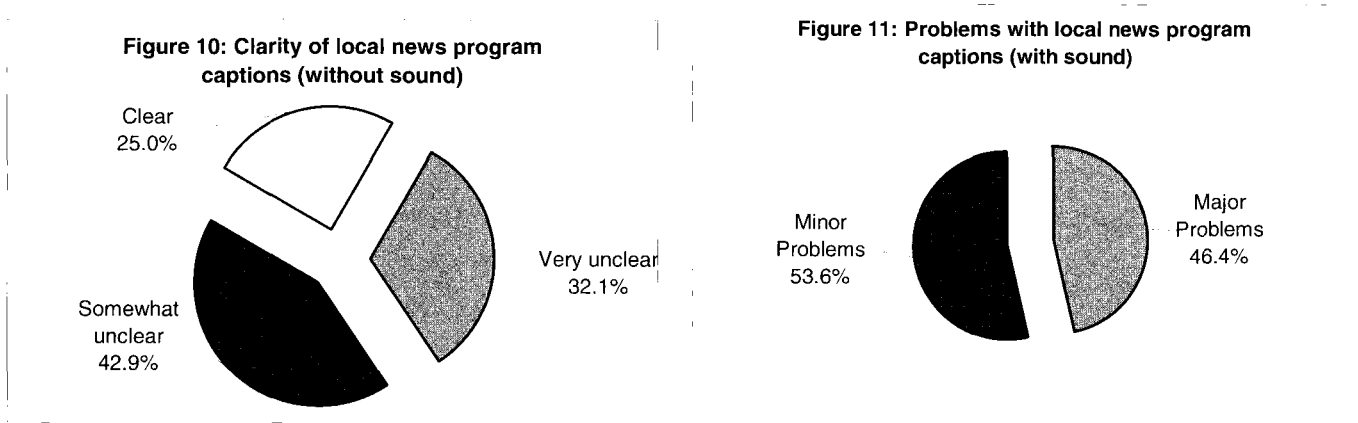
With the sound on, all of the local news programs were judged to have either major (46 percent) or minor (54 percent) problems (see Figure 11). National news fared significantly better: two-thirds (65 percent) had minor problems, 6 percent had major problems, and nearly 30 percent had no problems (see Figure 13). As with the TiVo sample, we discovered more caption errors when we had the opportunity to compare the captions with the audio track. Again, news programs sometimes deleted key names, titles, or phrases, altering the meaning

of the story. They also did not identify the speaker in the audio track.

Figure 12: Clarity of national news program captions (without sound)

Somewhat unclear
17.6%

Clear
82.4%

Figure 13: Problems with national nev program captions (with sound)

Minor Problems
64.7%

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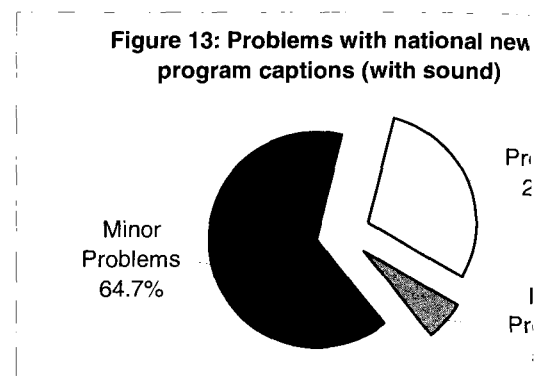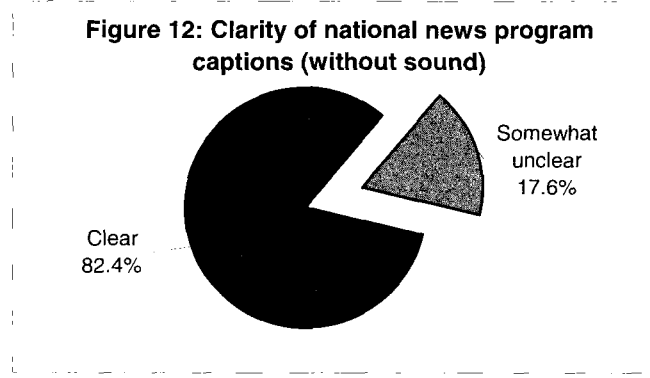
What kinds of errors do closed captions have?

As Table 4 illustrates, the program segments (2-minute blocks in TiVo and news stories in local and national news programming) were frequently judged to have captioning that deviated from the audio track. Sometimes the deviations, which we call errors, were of consequence and sometimes they were not. TiVo sample segments were equally as likely as news segments to omit or substitute words in the captions, while news segments more often contained typographical and technical errors. While we saw instances of glitches (errors that come and go) in the TiVo recordings, we did not see such transient problems in the news DVDs. News programs, particularly in the local sample using electronic newsroom captioning, often had captions that "froze," "bled" into commercials, or sped up to an unreadable pace (appearing to try to "catch up" with the anchor).

Table 4: Types of errors in the TiVo and news samples

	TiVo	Local News	National News
Category 1 (technical, typo)	34%	50%	62%
Category 2 (substitution, deletion, omission)	76%	73%	73%
Category 3 (glitch or freeze)	Unreliable	15%	6%
Meaning Affected	24%	69%	50%
Meaning Severely Affected	7%	22%	1%

Table 4 illustrates that a greater proportion of the national news stories contained technical and typographical errors when compared to local news stories. This is likely due to the fact

that many of the local news programs were captioned using the *electronic newsroom* process – meaning that the captions came directly from the teleprompter and contained no typographical errors that would be introduced by a transcriber listening and typing the news real time. Table 4 also indicates that although errors affected the meaning in each of the samples, they were most likely to cause significant problems in the local news programming. More than one-fifth of the local news segments had problems that severely affected the viewer's ability to understand the news story compared to 1 percent and 7 percent of the national news and TiVo sample, respectively.

Are caption sponsor, provider, and availability made clear?

In both non-news and news programs, coders looked for the symbols that identify captioning availability, as well as those that announce caption sponsors and providers. Caption *symbols* are typically icons, such as a CC in a rectangle, that generally appear at the start of the program. Caption *sponsors* are companies that underwrite the cost of captions (including production companies). Caption *providers* are companies that provide the closed captioning service. Sponsors and providers are usually identified at the close of the program. In several instances, however, the sponsor was identified as part of a commercial break in the middle of the program. Ironically, the sponsor identification was often indicated in the audio track only. Figure 14 provides an illustration of a screen from CNN's *Headline News* in which the closed captioning sponsor is identified in the audio track but not in closed captioning.

Figure 14: Screen from CNN's *Headline News*:
Audio track says: "Closed captioning provided by ISC, Invention Submission Corporation." No closed captions.
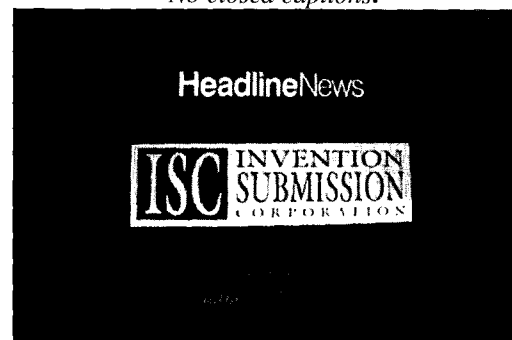
Of the portion of the TiVo sample for which we obtained the complete show (i.e. the program lasts for 30 minutes and the beginning and the end are captured), 35 percent indicated a caption sponsor (e.g., U.S. Department of Education and ABC, Inc. or Carsey-Werner Distribution, LLC) and 61.5 percent indicated a caption provider (e.g., National Captioning Institute, Vitac, or Media Access Group). Only 26 percent of the complete shows had a symbol at the beginning of the program indicating that the program contains closed captions.

The sample of local and national news programs did not fare any better than the TiVo sample in informing audiences about the availability of closed captions. In the local sample, 14 percent used a symbol at the beginning of the program indicating closed captioning. Slightly more (29 percent) announced the sponsor (usually in the audio-only portion during a commercial break). Most often, the sponsor was a local company or car dealership. Eleven percent listed the closed captioning provider (usually the name of the person, e.g., Jennifer Murray, or the name of the company, e.g., Regis Realtime Captioning). In the national news sample, none of the networks used a closed captioning symbol in the beginning, although far more mentioned a caption sponsor (63 percent). Most often the sponsor was the U.S. Department of Education and the network itself. In addition, 60 percent of the national news shows indicated the caption provider, most often Mediacaptioning.com and Vitac.

Is the speaker identified clearly to the viewer?

Most of the programs in the TiVo sample used speaker identification conventions or were paced in such a way that it was clear who was speaking. However, nearly one-third of the programs (31 percent) were "not successful" or only "sometimes successful" in identifying who was speaking. Clarity of the closed captioning was not affected by the success of speaker identification. It should be noted that in over one-third (36 percent) of the captioned programs, there appeared to be some effort to move the captions so that the on-screen text would not be obscured for those using them. Figures 15 and 16 illustrate how this is and is not accomplished.

Figure 15: On-screen speaker identification text unobscured
From: The History Channel's Then and Now
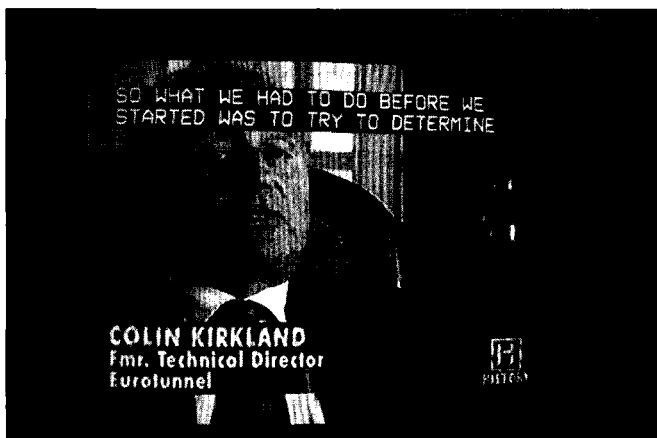
Figure 16: On-screen speaker identification text obscured
From: ABC's World News Tonight
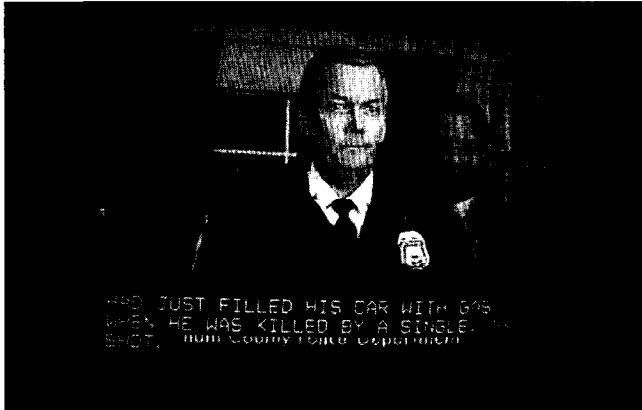
In the section that follows, we explore how audiences respond to the closed captions provided on their screens.

Part 2: Audience Survey

To what extent do the audiences intended to benefit from closed captioning feel their needs and interests are being served by captioning? To answer this question, we focused on four distinct audiences that might use closed captioning: 1) an audience that is deaf, 2) an audience that is hard of hearing, 3) an audience that speaks English as a second language, and 4) a general audience.

Methodology

In order to measure audience attitudes, perceptions, and uses of closed captioning, we developed an exploratory survey to examine the audiences individually and collectively. The instrument was comprised of 23 questions that asked about respondents' television usage in general, their knowledge about closed captioning, their uses of closed captions, and their attitudes about and perceptions toward closed captioning both as a whole and in distinct genres. The survey combined open- and closed-ended questions in order to gather a wide range and depth of data. [3]

On a cover sheet, the survey disclosed the purpose of the study, stated that participation was voluntary, assured respondents of the anonymity of their responses, and encouraged respondents to ask questions. The instrument was approved by the University of Pennsylvania's Institutional Review Board, which ensures the protection of human subjects involved in research. The survey took approximately 20 minutes to complete. It was written in English and translated into Spanish and both simple and traditional versions of Mandarin Chinese in order to accommodate respondents who speak English as a second language. The text was written at a sixth grade reading level.

Once drafted, the survey was reviewed by consultants from local organizations used for subject recruitment in order to ensure that each groups' special needs were being met. For example, it was important to ensure that the questions were written in a manner that could be easily translated into American Sign Language for the deaf and that could be understood by respondents who might be less comfortable with reading. Spanish and Chinese versions of the survey were also reviewed in order to ensure correct translations. The survey was pretested with representatives from each group who did not participate in the actual survey. Overall, 73 respondents took the pretest version of the survey, including five deaf respondents, 30 hard of hearing respondents, 20 ESL respondents, and 18 respondents from the general population. The piloting of the survey was critical to its refinement.

Budget and time limitations necessarily constrained the research design to a convenience sample. This means that organizations serving the populations with which we were concerned were non-randomly chosen. These organizations were based in and around a large northeast metropolitan area and included the Pennsylvania School for the Deaf, the Hebrew Association for the Deaf, and Valley View Intermediate Care Facility, local chapters of Self Help for Hard of Hearing People (SHHH), ESL classes at a local community college, and a summer program at a local university.

Survey Administration

Pretests of the survey instrument suggested that respondents were most comfortable self-administering the survey. In all cases where the survey was administered to a group the researcher read the instructions but not the questions or response categories. This approach allowed for more expedient data collection and prevented respondent fatigue.

For the all of the deaf respondents, the researcher's instructions were interpreted in American

Sign Language. In two of the four groups containing hard of hearing respondents, communication between the researcher and the respondents operated through a loop system. For one of the loop system groups, a captioner was also present to transcribe audio interactions into text that was projected onto a video screen that everyone could read. The surveys for the other two hard of hearing groups were distributed by the SHHH chapter presidents and were returned to the researcher by mail. For the ESL respondents, English, Spanish, and Chinese versions of the survey were administered to adult students in four ESL classes. Participants were given the option of completing whichever version of the survey they felt most comfortable reading. Instructors from the survey site who were fluent in multiple languages were present to translate and respond to questions that could not be expressed in English. For the general population respondents, the survey was administered to undergraduates at a local university. In addition, hearing adults present at the survey administration for deaf, hard of hearing, and ESL groups also filled out and returned the survey, diversifying the general population group beyond college students.

Sixty-one deaf respondents filled out surveys. Of these, 52 were complete. Forty-six hard of hearing respondents filled out surveys. Of these, 43 were complete. Seventy-two ESL respondents filled out surveys. Of these, 54 were complete. Fifty-four general population respondents filled out surveys and all 54 surveys were complete.

Sample

A total of 203 respondents participated in the survey. As Figure 17 illustrates, 25.6 percent were deaf, 21.2 percent were hard of hearing, 26.6 percent were ESL, and 26.6 percent were general population.

Approximately half (52.2 percent) of the respondents were age 35 and under, and the other half (47.8 percent) were 36 and over. As might be expected, respondents from the deaf and hard of hearing groups tended to be older than those from the

Figure 17: Distribution of survey respondents

General Population 26.6%

Deaf 25.6%

English as a Second Language 26.6%

Hard of Hearing 21.2%
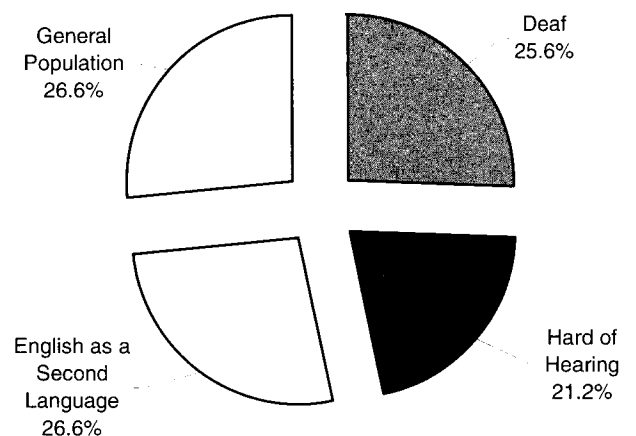
ESL and general population groups. Deaf respondents reported spending approximately one hour more per day watching television (averaging 3 hours a day) than the other groups, which averaged 2 hours a day. The ethnicity of the respondents was diverse. Sixty-nine percent of the sample was white and 31 percent was non-white (12 percent Asian or Pacific Islander, 12 percent Hispanic, 4 percent African-American, and 3 percent other). The diversity of the sample came mainly from the ESL respondents. Female respondents constituted 62 percent of the sample; males constituted 38 percent. The respondents represented a range of educational backgrounds: 7 percent had less than a high school education; 16 percent had a high school diploma; 39 percent attended vocational school or had some college; and 38 percent had a college degree or beyond. The educational level of the respondents was comparable across groups.

Findings

How aware are audiences of the availability of closed captions?

Critical to understanding the value of the closed captioning mandate is assessing whether audiences view captions as widely available and easily accessible. Respondents were asked "How many TV shows have closed captions?" The majority (85 percent) of the respondents knew that "some or most" television shows have closed captions, while 8 percent thought "very few" programs have them and 7 percent thought that "all" programs have them. There was little difference in the groups in terms of their perception of the availability of captions with the exception of the ESL respondents, who were most likely to have an inaccurate sense of captioning availability. As might be expected, those who say they "sometimes" or "often" use closed captions were more familiar with their availability. Those who "never" or "rarely" use captions were significantly more likely to believe that very few shows have closed captions.

Respondents were also asked whether they can access closed captions on their television sets. The vast majority of the respondents (82 percent) reported having a television set that is less than 10 years old. Because a closed captioning decoder has been built into television sets since 1993, most respondents have the technology to read the captioning (in fact, most simply need to press a button on their remote to access them). Eighty-two percent of the respondents said that their TV could in fact receive captions and 80 percent said that they can turn them on if they want to. Indeed, three-quarters of the respondents (75 percent) said that they have turned them on. Of those who have accessed closed captions from their home TVs,

80 percent felt that it was "very easy" or "somewhat easy," 15 percent felt that it was "neither easy nor difficult," and 5 percent felt that it was "somewhat difficult" or "very difficult." The data therefore suggest that awareness of the captions and ability to access them do not present obstacles to their use.

Table 5: Reasons for not using closed captioning

	Total Sample*	Deaf	Hard of Hearing	ESL	General Population
Don't know how	54%	100%	50%	73%	30%
Don't need them	48%	25%	50%	7%	85%
Didn't know they were there	20%	0%	50%	20%	20%
Take up too much screen	22%	0%	0%	7%	40%
They are annoying	39%	0%	50%	7%	70%

*41 of the respondents indicated that they never used captions

Forty-one respondents indicated that they have not used closed captioning at all, in any setting. Respondents could indicate any one of five reasons for not using closed captions (they were instructed to "check all that apply"). Table 5 illustrates the respondents' reasons for not using closed captions. While deaf and hard of hearing respondents were more likely to say they did not know how to turn them on or didn't know they were there, general population respondents who don't use closed captions indicate it is because they don't need them and because they find them annoying. Importantly, 73 percent of the ESL respondents who do not use captions indicate that it is because they don't know how to access them.

What motivates viewers to turn on the closed captioning feature?

After pilot testing, a list of reasons for why people turn on the closed captioning feature on their television was developed and presented to the respondents (respondents were instructed to check "all that apply"). Of those who have turned on the closed captioning device, the main motivation was to better understand the program. Table 6 illustrates the reasons viewers indicated for why they access closed captions.

Table 6: Reasons for using closed captions

Reason for turning on closed captions	Total Sample*	Deaf	Hard of Hearing	ESL	General Population
To help understand show	52%	74%	76%	39%	12%
To help with reading	28%	26%	21%	61%	3%
To help with English	30%	33%	13%	69%	3%
Exploring the TV	26%	9%	8%	22%	71%
Couldn't hear sound	25%	42%	37%	6%	12%
Didn't want to hear sound	15%	16%	11%	6%	27%
Didn't want to disturb someone	15%	14%	16%	8%	21%
Did it by accident	11%	2%	0%	3%	44%
Someone else couldn't hear sound	10%	9%	5%	3%	24%

Of the 152 respondents who indicated they have turned the captions on

As Table 6 suggests, there are important differences between the groups in the reasons they give for using closed captions. As expected, respondents who are deaf and hard of hearing were more likely to say they turned on the captions because they couldn't hear or because they wanted to better understand the show, while respondents from the general population were more likely to say they did it by accident while exploring the TV, because they didn't want the sound, or because someone else couldn't hear. ESL respondents were more likely than others to say they turned on the captions to learn English and for help with reading.

Sixty-four percent of those who said they had turned on the closed captions said that they had turned them off as well (see Table 7). Those who are less likely to need captions on an ongoing basis (respondents from the general population and from ESL) were more likely to say that they have turned off the captions, and were more likely to say that it was because they were annoying and that they didn't want to use them. Respondents from the deaf and hard of hearing groups were more likely to say they had turned off the captions in order to read text on the screen, such as titles that might be covered up by closed captions. It is also important to note that deaf respondents were more likely to report that they turned off the captions because they found them difficult to read.

Table 7: Reasons for turning off closed captions

Reason for turning off closed captions	Total Sample*	Deaf	Hard of Hearing	ESL	General Population
Wanted to read the words on the screen	30%	50%	53%	29%	8%
They were annoying	22%	6%	6%	8%	47%
Didn't want to use them anymore	23%	0%	0%	21%	45%
Person who needed them no longer watching	19%	0%	29%	8%	29%
Didn't want them at all	14%	11%	0%	13%	24%
Too difficult to read	13%	33%	0%	13%	11%
Didn't need them anymore	11%	0%	6%	8%	29%

* Of the 97 respondents who indicated they have turned the captions off

Where do audiences use closed captions?

We asked respondents about the settings, if any, in which they have used closed captions in order to explore the variety of public and private spaces that might give viewers an opportunity to experience closed captioning. Seventy-seven percent of the respondents indicated they have used closed captioning in some setting, with respondents from the ESL and general population groups significantly more likely to say they have not used closed captioning in any setting.

Table 8: Settings for closed captioning use

Setting	Total Sample*	Deaf	Hard of Hearing	ESL	General Population
Home	88%	100%	97%	92%	62%
Someone else's home	46%	80%	51%	24%	21%
Bar/Restaurant	43%	57%	34%	5%	72%
Hospital	33%	61%	23%	14%	26%
Gym	29%	35%	23%	11%	46%
School	27%	48%	23%	8%	26%
Airport	25%	30%	11%	22%	33%
Dormitory	19%	35%	9%	8%	18%
Doctor's office	17%	26%	9%	5%	23%
Senior center	10%	28%	0%	3%	3%

*Of the 157 respondents who indicated that they have used cc in any setting

As Table 8 indicates, audiences are most likely to use captions in their own or others' homes, although significant numbers of closed caption users also attend to them in public spaces such as bars, gyms, and airports.

How often do respondents say they use closed captioning?

Focusing on those who indicated that they had used closed captions in any setting, we explored how often they report using them.

While nearly one-quarter (24 percent) of the respondents say they use captions "rarely," almost half (45 percent) said they use them "all of the time." The remaining 31 percent said they use captions "some of the time" or "most of the time."

Figure 18: Respondent use of closed captioning

All of the time 46%
Most of the time 15%
Some of the time 15%
Rarely 24%
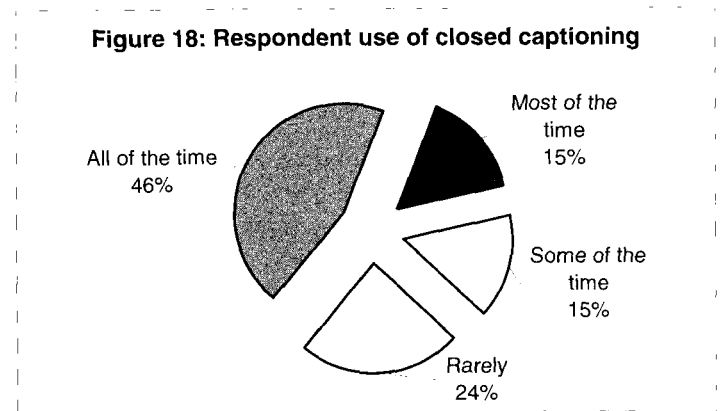
Table 9: Frequency of closed captioning use by different groups

	Rarely	Some of the time	Most of the time	All of the time
Deaf	4%	4%	7%	84%
Hard of Hearing	3%	6%	26%	66%
ESL	11%	37%	31%	20%
General Population	80%	15%	3%	3%

* Sums may not add up to 100% due to rounding of percentages

As indicated in Table 9, deaf and hard of hearing respondents are significantly more likely to report using closed captions "most of the time" or "all of the time" than respondents from the ESL or general population groups. While the low use of closed captions by general audiences is not surprising, it is important to note that 68 percent of the ESL respondents said they use them "some of the time" or "most of the time" and 20 percent said they "always" use them.

How important is closed captioning?

Respondents were asked to indicate the importance of providing closed captions for a variety of program genres (local news, national news, commercials, and entertainment programming). They were also asked about the importance of providing captions through

non-TV program venues (commercials, videocassettes, DVDs, and Internet audio). Respondents indicated if they thought it was "very important," "somewhat important," or "not at all important" to provide captions for each category. Tables 10 and 11 illustrate the percentage of respondents who feel it is "very important" to provide closed captioning in each category.

Table 10: Percentage of respondents who say it is "very important" to provide closed captions for TV genres

	Local News	National News	Entertainment TV	Sports
Deaf	96%	96%	86%	74%
Hard of Hearing	88%	88%	88%	57%
ESL	72%	83%	33%	31%
General Population	76%	83%	41%	40%

Table 11: Percentage of respondents who say it is "very important" to provide closed captions for audiovisual venues

	Commercials	Videotapes	DVDs	Internet Audio
Deaf	49%	86%	82%	89%
Hard of Hearing	14%	86%	73%	53%
ESL	16%	50%	56%	47%
General Population	11%	56%	50%	42%

Respondents in all groups place a high value on the provision of closed captions for local and national news. In their open-ended comments, many deaf respondents reflected that although there has been improvement in closed captioning over the past 25 years (for example, one was particularly pleased with the addition of captions to *Monday Night Football*), there is still room for improvement. These respondents pointed to the lack of captioning for all venues – network, public, and cable television. Specifically, they identified the lack of captioning on educational channels such as The Discovery Channel and The Learning Channel, entertainment programming such as game shows and movies, the news, weather, and advertising. As one respondent commented, "*Super Bowl* commercials are rarely captioned. We like to laugh too." Deaf respondents overwhelmingly indicated that they wanted comprehensive captioning, on all channels, for all programming at all times. As one respondent wrote, "equal access to full communication should be required on every single show on every channel known to mankind."

In their open-ended comments, hard of hearing respondents also emphasized the value of closed captioning for improving the quality of their lives. One hard of hearing respondent commented, "without closed captioning my isolation as HOH/deaf person would be extreme.

Thank God we have it." Another stated, "In general they are a life-saver for both me and my wife! Even with the mistakes on the local news, they allow us to watch TV. Without them we probably wouldn't own a TV! In fact, if a movie is not captioned we will return it unwatched."

While they are grateful for the captioning that does exist, hard of hearing respondents, like deaf respondents, noticed the absence of captioning on programs. Specifically, they identified a lack of captioning in educational channels such as WHYY (the local PBS station) and the Discovery Channel, entertainment programming (such as movies), news programming, and commercials. And like the deaf respondents, many hard of hearing respondents indicated that they wanted captioning on all channels, for all programming, and at all times.

Respondents who are deaf or hard of hearing were significantly more likely than other groups to say it is "very important" to provide captions in virtually all categories. One exception is with national news, where there was no significant difference between groups. More than three-quarters of the ESL and general population respondents said it is "very important" to provide closed captions for news programs. Half or more of the sample also said it is "very important" to provide captions in pre-recorded programming (i.e., videotapes and DVDs) as well. Open-ended comments in the surveys from these groups also reveal strong support for the provision of captions.

How interested are respondents in using captions for different types of media content?

Survey respondents were asked to indicate whether they personally would be interested in using closed captioning for different types and venues of programming. Tables 12 and 13 summarize the percentage of respondents in each group that are "very interested" in using the captions.

**Table 12: Percentage of respondents "very interested"
in using closed captions for TV genres**

	Local News	National News	Entertainment TV	Sports
Deaf	96%	92%	83%	74%
Hard of Hearing	86%	84%	95%	58%
ESL	62%	64%	47%	31%
General Population	21%	21%	17%	17%

**Table 13: Percentage of respondents "very interested"
in using closed captions for other audiovisual venues**

	Commercials	Videocassettes	DVDs	Internet Audio
Deaf	50%	88%	86%	71%
Hard of Hearing	28%	93%	68%	62%
ESL	19%	51%	61%	40%
General Population	6%	19%	21%	12%

There were significant differences in levels of interest in using closed captioning. Deaf and hard of hearing audiences expressed greater interest in using all types of captioning than ESL or general population respondents. However, more than half of the ESL respondents and 20 percent of the general population respondents said that they would be "very interested" in using captions for local news, national news, videos, and DVDs.

In addition to capturing hypothetical use of closed captions (as represented in the tables above), we measured the respondents' self-reported actual use of closed captions in each category. Respondents were asked, "How often do you currently use captions for [type of content]?" They could indicate "always," "sometimes," "rarely," or "never."

Table 14: Reported use of captioning in different TV program genres (All respondents)

	Local News	National News	Entertainment TV	Sports
Always	53%	51%	43%	36%
Sometimes	13%	13%	19%	17%
Rarely	14%	15%	13%	15%
Never	20%	21%	25%	32%

Table 15: Reported use of captioning in other audiovisual venues (All respondents)

	Commercials	Videocassettes	DVDs
Always	25%	46%	39%
Sometimes	25%	17%	14%
Rarely	18%	11%	11%
Never	36%	25%	36%

(Internet audio caption use was not assessed as it is not widely available.)

As Tables 16 and 17 show, there is heavier overall captioning use by deaf and hard of hearing respondents, but also a high level of use among the ESL respondents. Captions for news, entertainment, and prerecorded videos appear to be the most heavily used. Though we may have expected to observe low levels of use of closed captioning in commercials, deaf (79 percent), hard of hearing (66 percent), and ESL (43 percent) audiences all reported fairly high levels of attention to the captions on commercials.

**Table 16: Percentage who "always" or "sometimes"
use closed captioning in different TV genres**

	Local News	National News	Entertainment TV	Sports
Deaf	96%	94%	92%	89%
Hard of Hearing	93%	90%	95%	76%
ESL	71%	66%	57%	42%
General Population	11%	15%	15%	13%

**Table 17: Percentage who "always" or
"sometimes" use closed captioning in other audiovisual venues**

	Commercials	Videocassettes	DVDs
Deaf	79%	93%	85%
Hard of Hearing	66%	93%	67%
ESL	43%	61%	62%
General Population	4%	15%	11%

How do respondents perceive the quality of captioning?

We asked respondents about the quality of captions in order to assess overall how audiences perceive the current state of closed captioning in America. Statements were developed from pretesting, and respondents could check all that apply.

Table 18: Overall perceptions of closed captioning

	Total Sample	Deaf	Hard of Hearing	ESL	General Population
Generally happy	45%	56%	70%	34%	28%
Captions move too fast	18%	27%	14%	21%	11%
Words are too complicated	4%	6%	2%	9%	0%
Captions move too slowly	11%	13%	12%	4%	17%
Captions have too many mistakes	26%	33%	35%	15%	22%
Other issues	16%	25%	28%	7%	7%

Though nearly half said they are generally happy with the quality of captions (and nearly one-quarter felt they had too little experience to judge), many indicated that the captions contain too many mistakes or move at a pace that is not comfortable for them. The extent to which captions are used was related to overall perceptions of quality. Heavy users – those who say they use closed captions "most of the time" or "all of the time" – were significantly more likely than light users – those who say they use closed captions "rarely" or "sometimes" – to report that they are "generally happy" with the closed captions (60 percent

vs. 31 percent). There were no significant differences between the heavy and light viewers in terms of the kinds of problems they experienced with the captions.

Table 19: Perception of the quality of program genres

We also asked respondents to judge the quality of captioning for distinct genres of programming (see Table 19) and for other audiovisual venues (see Table 20).

	Local News	National News	Entertainment TV	Sports
No Opinion	17%	19%	23%	35%
Poor/Fair	25%	22%	20%	23%
Good/ Excellent	58%	60%	57%	42%

As Tables 19 and 20 indicate, many respondents had "no opinion" about the quality of closed captioning. Importantly, however, more had an opinion about the news genre than other types of genres. Opinion on the quality of news captioning varies though, with one-quarter of the respondents perceiving local news captioning quality as "poor" or "fair" and more than one-fifth perceiving national news captioning as "poor" or "fair." Commercials received the poorest ratings, with one-third of respondents judging them to be sub par.

Table 20: Perception of the quality of other audiovisual venues

	Commercials	Videocassettes	DVDs
No Opinion	38%	34%	47%
Poor/Fair	33%	16%	23%
Good/ Excellent	29%	50%	42%

Separate analyses of the survey groups reveal no clear trends in opinions about the different genres.

Respondents from the general population were much more likely to say they had "no opinion" about the quality of captions: deaf and hard of hearing respondents were significantly more critical of national news and commercial captions. In open-ended responses, deaf and hard of hearing respondents most often complained about the news. In particular, respondents noted that at times there is no captioning on national and local news and that the captioning that exists is garbled, delayed, or does not reflect what the reporters are saying, particularly during live broadcasts. One respondent also noted that "lots of times when there is a special report it didn't show up in captioning until later or not at all." Several commented on the lack of captioning for emergency news and special reports. One respondent noted "When September 11, 2001 occurred…I couldn't get all the news reports."

In open-ended questions, hard of hearing respondents also reported negative experiences with entertainment programming, on both the networks and cable channels. Individuals reported a lack of captioning for *Inside Story* and reruns of old television shows and old movies. One

respondent felt that the captioning on *The West Wing* was too fast. Respondents reported having negative experiences with MTV, Entertainment Tonight, and live entertainment programs. Live sports programming was also identified as having captions that were too slow.

ESL and general population respondents were more critical of entertainment television and sports programming, although again the differences were not dramatic. In closed-ended questions, the ESL respondents were significantly more critical of the local news captioning than the other groups.

Like the other groups, general population respondents reported more negative experiences with the news than with other programming in their open-ended responses. Both national and local news were identified as problematic. Respondents reported mistakes, particularly with foreign names, as well as delays in the captioning for national news. Captioning on local news was reported as being too fast, incomplete, or absent, particularly for the weather and for live reports.

General population respondents also reported negative experiences with the captioning for entertainment programming. Captioning for sitcoms in particular was identified as problematic because the captions move too slowly for the viewer to follow the humor. Respondents further reported having difficulty following which character was speaking. Captioning for sports programming was also identified as problematic due to the garbled text and the delay of the captions.

What problems do audiences experience with closed captions?

Respondents were asked about whether they experienced difficulties or problems in understanding closed captions. Table 21 summarizes their responses:

Table 21: Difficulties understanding closed captions

I had trouble because of missing or scrambled words.	52%
I had trouble because the captions move too fast.	36%
I had trouble because of mistakes in sentences.	34%
I had trouble because of unknown words.	19%
I had trouble because the TV signal did not work right.	18%

Respondents were also asked about their perceptions of the source of the problems, if they

have experienced them.

Table 22: Perceived source of problems

The problem is with the:	
Captioning company	33%
Channel or station	31%
Transcriber	26%
Network	18%
Show	17%
Cable company	14%
TV signal	11%
VCR	4%

Though 38 percent of the respondents said that they didn't know where the source of caption problems lay, one-third indicated that they felt it was the result of problems at the captioning company and one-quarter said that the problem rested with the transcriber. Others saw difficulties experienced by the channel (31 percent), the network (18 percent), and the cable company (14 percent). Only 15 percent felt the trouble was in the TV signal or the VCR recording. Comparisons of heavy users with light users indicates that heavy users are significantly more likely to have an opinion about where the problem lies (i.e., with the station, cable company, program, network, or captioning company) while light closed caption users are more likely to say they don't know where the problem originates.

Deaf respondents described a number of technical problems with captioning, such as captions being delayed or simply stopping in the middle of a program, at a commercial, or before the program has ended. Hard of hearing respondents also identified technical issues with captioning, including mistakes, delays in the captioning of live coverage, programs captioned on one station but not on another, programs advertised as having closed captions but not having them, and the closed captioning stopping before a program has ended. Unlike the other groups, the general population respondents discussed problems with captioning on media other than television. One respondent reported having difficulty following which speaker was speaking on educational videos as well as with the slow speed of the captions. Another respondent expressed dislike for having to turn off the captions that automatically come up on the DVD within his Play Station 2.

In their open-ended comments, survey respondents identified a number of technical problems that exist with captioning. Specifically, deaf respondents felt that captions are too small and too fast, have too many grammatical and spelling errors, and are not consistent. Hard of hearing respondents also described technical issues with captioning in their responses. In particular, they cited problems with spelling errors, size and speed of the captions, contrast, and placement of the captions on the screen. Some respondents suggested having a

mechanism such as video selection that would allow individuals to select their own preferences for captioning style.

Audience satisfaction with closed captioning

Finally, respondents were queried about particularly positive experiences they have had with closed captioning. Their comments are summarized according to the trends viewed within the distinct survey groups.

While a number of deaf respondents reported having negative experiences with captioning for news, some reported having positive experiences with news captioning in their open-ended responses. Network channels and local news were specifically mentioned. Although not standard news, *60 Minutes* was also identified as having "the best captioning." One respondent specifically complimented the captioning for the news during the World Trade Center attacks for the appropriate timing and pacing, consistent titling, and lack of delay.

Deaf respondents also reported having positive experiences with the captioning for entertainment programming. Commercial primetime programming was specifically complimented, as was PBS. A respondent also liked the captioning for sitcoms and shows such as *Touched By An Angel*, *CSI*, and *Third Watch*. In addition to regular entertainment programming, deaf respondents reported having positive experiences with captioning for made-for-TV movies and special programming, such as concerts. One respondent also reported having positive experiences with captioning on media other than television, specifically DVD.

The most common positive experiences that hard of hearing respondents reported in their open-ended responses was with the captioning on entertainment programming. In particular, network entertainment programs such as *NYPD Blue* and *CBS Sunday Morning* were complimented. The captioning on made-for-television movies (such as Hallmark and Disney movies) was also mentioned, as was the captioning on musical specials. Only one respondent noted a positive experience with captioning on local news. Respondents also commented that they had particularly positive experiences with the captioning on pre-recorded programming and on videotapes.

ESL respondents most frequently reported having positive experiences with the captioning on the news in their open-ended responses. In particular, respondents reported having

positive experiences with CNN and NBC, interviews, and the September 11th coverage. ESL respondents also reported having positive experiences with captioning for entertainment programming. Captioning for comedy programming was specifically identified. One respondent also noted positive experiences with the captioning on the children's show *Arthur* because the vocabulary is easy and it allows her to learn English.

The most common positive experience general population respondents reported in their open-ended responses was with captioning on the news. In particular, respondents reported enjoying the captioning on CNN while they are in noisy settings, such as cafes, the gym, and at the airport. Respondents also reported having positive experiences with captioning on sports, entertainment shows such as *The Osbournes*, movies, and DVDs.

Part 3: Industry Interviews

A third and final effort undertaken was a series of interviews with those who provide closed captioning for audiences. The primary goal in this aspect of the study was to understand the challenges and opportunities faced by closed caption companies, television companies, and program producers as a result of the closed captioning mandate.

Methodology

These data consist of qualitative telephone interviews conducted over a seven-week period during May and June of 2002.[4] The respondents were asked a series of open-ended questions, with follow-ups, about their company's captioning practices. Seventeen interviews out of 22 attempts were completed, resulting in a response rate of 77 percent. All interviews were tape recorded and transcribed. The interviews ranged between eight and 37 minutes long, averaging 19 minutes in length.

Sample

Respondents were identified through an Internet search of captioning companies, a review of network personnel, and respondent recommendations. They were selected to represent the local markets included in the content analysis and a range of industry perspectives on the closed captioning mandate. Respondents were told that the research was being conducted

under the auspices of a grant from the National Captioning Institute Foundation and that the findings would be released in 2003.

Table 23: Industry interview subjects (by company type)

Company Type	N of respondents
Captioning company	5
Cable television network	5
Local broadcast station	4
Program producer	2
Industry trade association	1
TOTAL N	17

Findings

How aware is the industry of the closed captioning regulations?

Respondents were asked to outline their understanding of the regulations regarding the captioning of programs for broadcast and cable television. Analyses of interviews reveal that respondents with the most sophisticated understanding of the captioning rules were those who worked for the captioning firms themselves. These respondents mentioned specific targets (in terms of the percentage of total programming) and dates by which these targets were to be met. For example, one captioning company executive said:

> The FCC mandate requires that as of January 2002, which is the nearest benchmark that we're at, that all cable and television broadcasters must be at the 50 percent mark, so 50 percent of new programming must be captioned at this point. They calculate the 50 percent of new programming based on certain hours of the day, there's all kinds of exceptions, but it's basically 50 percent of the new programming for calendar quarter and there is a, the mandate gave the broadcasters ten years to get library programs [captioned]; programming that was produced prior to January 1st, 1998, I believe.

Professionals at cable networks also had a good working knowledge of the regulations, particularly those regulations pertaining to new networks and their captioning requirements. Said one cable network executive:

> There's a whole line of regulations associated with this, where captioning was eased

in, and I believe until a network is on air for, I think it's four years...it's exempt from captioning. And there is a secondary exemption where the channel is exempt until it makes...three million dollars a year in revenue. So we have some channels that are still exempt because they haven't been on air long enough. And all of our digital networks are exempt, either for that reason, and or because of the revenue exemption.

Knowledge and understanding of the captioning regulations among local TV broadcasters was much more varied depending upon the position of the respondent. Broadcast engineers had a more rudimentary knowledge of the regulations, while station managers were more aware of some of the specific requirements (though their recall of specific regulations was not as impressive as with the cable network and captioning company executives):

> We are required to caption 900 hours of programming per quarter at this time. We very easily meet that requirement. We are a [television network] affiliate and so the [network] programs are captioned. All of our syndicated programs are captioned, our newscasts are captioned and most of the sounds bytes, depending on the deadline pressures of a particular story are transcribed and thus captioned under our news computer system. (General manager of a local TV station)

What is the process of captioning?

Respondents were asked: How does captioning happen? How do broadcasters obtain captioned programs? How do cable networks obtain captioned programs? How do captioning firms go about captioning programs? The process of creating, obtaining, and distributing captioned programs was slightly different for respondents from different types of companies.

Local broadcast stations - Although they are ultimately responsible for providing captioned programs to viewers, much of the local stations' responsibility in this regard is passed along to the broadcast networks and the producers of syndicated programming. For affiliates and independent stations, the bulk of programming is syndicated or network-provided, and these programs arrive with captions already present on line 21 of the broadcast signal. Therefore, the only kind of programming for which the captioning is actually organized and/or created by the local station is local news. Most stations utilize a system which feeds the words from the teleprompter into a computer, which encodes them onto line 21. This type of captioning system does not have the ability to caption live breaking news events or the unscripted

exchanges between news anchors:

> We have a system called I-News, which is a news-based software system that Avid came up with ...We do our news, big news, and we do it locally. And that feeds a computer, which feeds a closed captioning insert that we put inline when we do the news. So the copy that they read even when they do the story, they write the closed captioning, even the producers or directors as they're putting together the programs. So that goes right on, as the guy is looking at the teleprompter, the same thing goes on the air. So that's how we do our shows. (Broadcast engineer of a local TV station)

Caption providers, however, don't believe that electronic newsroom captioning is necessarily in the best interest of the viewers:

> I don't like electronic newsroom captioning for live programming. I think that's a disservice, because it doesn't capture any of the live elements, it only has the pre-scripted information...I've seen locally where they do a line and then there's nothing, the next line is just blank, and then another line comes up and the next line is blank. So when you have just three lines of captions rolling past I think it gives you less reading time to see what they are trying to say, and it's just hard to read. So I think some local newsrooms do a better job than others, and the ones that are not doing a good job just really aren't paying attention to what the product looks like, and if they did, if they thought of themselves as a deaf consumer at home trying to watch their news program, they'd understand that just with some very minor changes they'd be able to provide a lot better service to the audience. (Captioning company executive)

Cable television networks - Cable companies generally pass along the responsibility of captioning programs to the program producers, unless they themselves are the producer for the program. One network included in the study has begun to use its own in-house closed captioner for programs, but this practice is rare. Most cable networks have contracts with many of the major closed captioning firms to do their program captions, particularly those that carry mostly live programming (such as sports and news):

> Under the requirements of the FCC it's really the cable operators who are on the hook for that captioning, but I know for [our network], and I would only assume that this is true across the board, typically in the contract agreement between the programmers and the operators they pass through those obligations through the programmers. (Cable network executive)

What are the costs of captioning?

How much does it cost to caption a television program? Although some captioning companies did not divulge information about their pricing because of its proprietary nature, several respondents did provide actual figures for comparison. The cost to caption a program ranges between $450 and $700 per hour, and increases to between $800 and $1,000 per hour if the encoding services are provided by the captioning firm. Real-time captioning services are generally slightly cheaper than offline captioning services, leading some producers and networks to opt for real-time captions on even non-live programming as a strategy to cut costs. Said one captioning company executive: "[The captioning cost] is anywhere between, I would say, $600 and $700 for an hour of programming, if they handle their own encoding, and anywhere between $800 and $1000 if we handle the encoding for them, for an hour of programming."

Another said:

> Because it costs less to do the real-time, sometimes, recently we've been asked to real-time some things that I don't think should be real-time. You know, anything that's like a sitcom format, for example, because of the delay time with the captions you are not able to keep current with the video, and because we can't always write verbatim. We're having to use what words are in our center dictionaries or having to spell this out letter-by-letter sometimes, or substitute titles for names, or words of equal meaning. Sometimes you just lose the joke or you just lose the context - it's just too hard in a fast exchange situation to have it make any sense because by the time it comes up on the screen the video's gone, the joke is gone, and it just doesn't work. (Captioning company staff)

How is quality control of captions maintained?

The most rigorous quality control procedures for closed captioning were reported by respondents from captioning companies.

> We have a quality control process in our offline captioning. At every stage we do that. We have people double checking work and any one product going out the door

has probably three different sets of eyes that look at it at any one time. (Captioning company executive)

However, the respondents working for cable networks also outlined standard procedures for making sure that the transcripts produced from their programs were accurate:

> After a program is fully completed and ready for air, including captions, we have someone screen those programs, either spot check them or anything in primetime they'll screen in real-time, they call it QC or quality control, and they'll check to make sure the captions are timed correctly. (Cable network executive)

Local broadcasters typically do not do quality control regarding the transmission of captions on line 21 of their broadcast signal, relying instead on viewer complaints to identify any problems with the system. For instance, when asked whether or not his station examined the quality of the captions they transmitted, one station manager replied, "You know, I don't watch it so it would be hard for me to assess the quality of it. I don't have it on my television set at the TV station or at home...I guess the best judge of the quality of that would be the receiver of the message."

A broadcast engineer of a local TV station said:
> I periodically check the system to make sure that line 21 is passing the closed captions. And also if there's a problem with the local people that use that, they call us right up and so it's like the best way to get a check is that the people who use the closed caption ring the phone off the hook if there are problems.

What are the logistical difficulties associated with program captioning?

When appropriate, respondents were asked to describe any challenges or difficulties associated with the captioning of programs. Although different kinds of challenges were cited by different types of companies, in general they fell into two broad groups: logistical challenges and technical challenges. There are three core processes involved in generating and distributing closed captions for broadcast and cable television: captioning (transcription of the sound and dialogue), encoding of the captions, and transmission of the signal (via electromagnetic waves or coaxial cable). According to the interviews with industry executives, these three tasks -- captioning, encoding, and transmitting -- were often completed by three different companies, sometimes creating logistical challenges.

Time pressures: Because the captioning and encoding are usually the last stage in the post-production process of a program, the quick turnaround time before their broadcast was cited as a logistical hurdle to providing high-quality captions to the public. This was of particular concern to captioning firms as well as cable networks. When faced with a 24- to 48-hour deadline for captioning a non-live program, for example, some captioning companies utilized real-time captioning (instead of offline captioning) in order to complete the work for their clients on time.

> We tell our producers we need it in house at least two weeks before it's aired, and of course most of them are getting it [to us] a day before it airs. So, we are always in a mad scramble if we have a lot to do, trying to get these done. (Cable network executive)

> Some of [the programs] are very close to air and some of our shows are high end promotables - primetime shows that we really would like to have captioned for people to see. We end up doing live or on very short turnaround, which ends up being more expensive. (Cable network production executive)

> [Time] becomes an issue at the more critical stages would be when a program has been edited or finished, and it has to air within say a few hours and, then, how do you get the captions done? Well, if you have the time to do it in an offline captioning fashion, the quality is usually excellent and, you know, we prefer to do it that way. But sometimes there might not even be time and we have to do it in real-time…but sometimes it's not going to be 100% [accurate] because you don't have a chance to do all the research and everything ahead of time. So we would prefer to do it offline when it's at all possible. (Captioning company president)

Encoding problems: One technical issue which sometimes threatened the quality of closed captioning transmission was the encoding of the captions onto line 21 of the video signal. Signal encoding is mostly done by the broadcasters or the producers of the program. Although this service is offered by captioning companies, it is often cheaper for networks to do the encoding themselves (it is often part of their contract with a post-production or video duplication facility). Most of the problems with encoding cited by the respondents occur when the equipment for encoding is not compatible with the equipment used by the

captioning company to generate the captions.

> [It's] difficult because some of the encoders aren't all of the same quality or of the same understanding, the same features, so we're dealing sometimes with something you have no control over. You know you've got a master control room with three different types of encoders, somebody doesn't understand one feature, and it affects your quality...We're dealing with something that sometimes is out of our control and yet it affects our service. (Captioning company executive)

Time code problems: According to the respondents, another technical problem arises when the time code is faulty for programs that are to be captioned. This prevents the captions from reading correctly on the screen, causing errors or even removing the captions altogether.

> We keep having problems with our captioning equipment. Part of our problem is, you know, maybe somebody didn't time code correctly...[The program] won't caption if the show was not time coded right. [The caption] doesn't start in the right place and end in the right place. (Cable network programming supervisor)

> Sometimes we'll get tapes sent to us that don't have the time code recorded properly for us. We have specs that we supply to our producers, say[ing] 'this is what we need and this is how we need it' so that it matches up with our facilities and sometimes someone doesn't read that. And so then we'll have to take some time to educate them, get a replacement tape from them or create a replacement tape ourselves - whatever it takes so that we can still be on time to deliver the program when it needs to be delivered. (Captioning company executive)

Editing of programs: A significant technical challenge for cable networks occurs when previously broadcast captioned programs are re-edited for broadcast. Whenever programs are edited, even slightly, the captioning for that program must be completely redone, because the editing process alters the time code for the program, interrupting the captions on line 21. As one respondent described, the shortening of programs by one minute to accommodate more advertising time necessitates a significant extra cost to re-transcribe the programs:

> Reformats of programs are big deals. What would happen is we went through a series of where we'd cut down all of our programming by one minute to allow for an additional minute of sales time and therefore when you edit a program, you interrupt

captions...If we're interrupting the captions, we have to get these programs re-captioned. And that's a cost to us because you can't expect the supplier to go back and supply you captions for shows that they've already supplied you. (Cable industry executive)

What contact does the industry have with the audience of caption users?

The respondents were all asked about whether they receive feedback from closed caption users or other audience members. Almost all respondents reported that they get very little feedback from caption users about the quality of the captions that their companies provide. When they do receive feedback, it is typically because of deficiencies in the captioning services provided:

> The complaint we get from time to time is that whenever there is a live story and we have a reporter in the field and they're doing a live interview, we don't have real-time captioning capability, and so people will let us know about that...I think during the course of a year I might get a half a dozen letters or calls expressing their concern. I don't get any feedback from people who say, you know, 'thanks for doing it.' I think it's become such a common practice now that people pretty much expect it. (General manager of a local TV station)

> Some of the complaints you get from the consumers are that the captions are breaking up, the captions are disappearing, or there are no captions at all. And in those situations typically it has nothing to do with the captioning company who produces the captions, but it has to do with, normally, the distributor of the program. (Captioning company executive)

Several respondents recalled fielding telephone calls from frustrated viewers who could not either turn on or off the closed caption feature on their televisions. These types of telephone calls were fielded by local broadcasters, cable networks, and by the captioning companies themselves:

> I get so many emails from people saying, 'Why isn't my decoder working? Can you help me?' And these are just random humans and they're sure that we do captioning, and I say 'I don't know, I'm sorry, we don't offer that service but maybe I can direct you' or sometimes I just give them generic information. (Captioning company

executive)

How do producers feel about the closed captioning requirement?

Cable networks and captioning firms have the most consistent, direct contact with the producers of television programs. When asked to reflect on producers' attitudes toward providing captions for their programs, almost all of the respondents from these companies noted that producers believe that the costs of captioning are too high and that they are not happy about the requirements to caption their programs:

> Most of the time, and this is very candid, [the producers] don't know really a lot, and [whether] they're required to do [captioning]. And they don't really care a lot about it either .... Most of them really just are doing it because of the compliance issue. And that's very candid. I think they're doing it because they really have to. (Captioning company president)

Another said:

> Some of them [producers] just flat [out] don't see why they have to do it. They just don't care. But the majority of them, it puts a financial burden on them. (Cable industry executive)

Trends & new realities for captioning services

The closed captioning mandate has increased the pressure for producers and video distributors, but it has also provided an opportunity for caption providers. The mandate, however, does not come with extensive funding for training captioners or paying for the captions. To offset the costs associated with captioning programming, many television networks and captioning companies have received grants from the U.S. Department of Education, the FCC, and other government agencies. Recently, however, money from these sources, particularly the Department of Education, has become scarcer, which is putting a new financial strain on television networks and closed captioners:

> The larger companies rely a lot on government grants, they get a lot of funding from

the Department of Education...DoED will allow them to pay for anywhere between 25 percent to even sometimes 75 percent of the closed captioning, which will require the producer to kick in a little, only like 25 percent of that. And a lot of the larger companies, they are the ones that are awarded those grants for the most part. (Captioning company president)

What happened was when they first mandated this there were grants out there like crazy so you were getting great deals ... you're sucked in with the grants and then the grants disappear and then you have no choice but to pay top price for what you are already doing. (Cable network executive)

With the increase in the number of FCC-mandated hours of closed captioning, several respondents noted that there has been a recent boom in the number of new small firms entering the arena to provide services to producers and networks. These respondents, from captioning companies and cable networks, were concerned that these new companies do not have a strong commitment to public service and that the quality of the captions would suffer as a result.

I do have a concern about the quality that's out there and I think others do [too]...What concerns me is that a company can go in with very little experience, and/or very little quality control for their people and they can get a contract and they can do the work and oh well, and that's just the way it is. And I don't know if there's any negative ramifications other than if they get a complaint, but I don't know if anything happens beyond that. So, I do think some people would be price driven rather than quality driven or service driven. And I think that would concern anybody in any field no matter if you're getting medical help or legal help or whatever, you know you'd want to know the driving force was of the services that you're getting and I'm sure we'd all want the end result to be comparable no matter what the pricing may be, [although] sometimes that isn't always the case. (Captioning company president)

There are more and more [captioning] companies that are popping up. It's a little scary, though, to know that somebody might be doing this out of their homes, and a lot of people are...They really come out of the woodwork so you don't really know what their operations are like. (Cable industry executive)

Summary

The findings from the content analysis of the general sample of TiVo television programs and sub sample of local and national news programs reveal:

Nearly two-thirds of television programs airing on 38 different broadcast and cable stations on weekdays and weekend days have closed captioning provided. There were no differences in the likelihood of captioning across different channels, day parts, or weekdays in the TiVo sample, which was recorded on a show-by-show basis. We did, however, find wide variation in our assessment of different broadcast and cable channels over a 24-hour period. Virtually all of the news programs were closed captioned, however, a significant number of the stations in the smaller local markets used electronic newsroom technology that does not caption live or ad-lib dialogue.

The closed captions had numerous errors in them – from technical problems to typographical errors to word deletions. While the majority of the errors did not affect the overall understandability of the program, nearly one-quarter of the TiVo program segments were somewhat unclear or very unclear as a result of these errors and one-half to two-thirds of the news segments were affected. The problems were most pronounced in shows that used real-time captioning, which often resulted in numerous typographical errors and significant delays in the appearance of the captions. Coders find that the best real-time captioning is that which temporally matches the audio track, as seen in the national news samples.

Researchers had difficulty finding an accurate source of information about whether programs were captioned, short of looking at the programs themselves. Only one-quarter of the programs displayed a closed captioning symbol. In addition, there was little information about the caption provider or the caption sponsor. Ironically, information about sponsors is often buried in commercial segments and indicated only through the audio portion of the transmission.

Researchers also experienced difficulty knowing who the speaker was while reading the closed captions. Although this didn't affect overall meaning, the captions often failed to use any identification convention and often obscured the on-screen text.

Findings from the survey of deaf, hard of hearing, ESL, and general population audiences indicate:

Audiences are aware of closed captioning and think it is important The majority of audiences intended to benefit from closed captioning are aware that captions are provided on at least some television shows and are aware that they can access the captions if they so desire. Audience members believe it is "very important" to provide closed captions on television programming, particularly on local and national news. Interestingly, audience members also indicated that it was important to provide closed captions for other audiovisual media. At least half of the respondents indicated that they thought it was very important to provide closed captions for videotapes and DVDs.

Audiences have access to closed captioning. The majority of the sample indicated that they have turned on closed captions at some point and most felt that accessing the captions was easy to do. The primary reasons why people access captions vary by audience type. Deaf and hard of hearing individuals are more likely to access captions because they cannot hear or because they want to understand a show. Individuals who speak English as a second language access captions to learn English and to help them read. Members of the general population access captions by accident, by exploring their television set, because they don't want to hear the sound, or because they are with someone else who cannot hear.

Audiences use closed captioning. The majority of the audience members indicated that not only have they turned on captions, but they have also used them. Individuals who are deaf and hard of hearing are significantly more likely to use captions than individuals who speak English as a second language or members of the general population. While the low use of closed captions for hearing audiences is not surprising, 68 percent of the ESL audience indicated that they use captions some or most of the time. The most common place that individuals use captions is in their home. Overall, captioning is most heavily used for news, entertainment, and prerecorded videos.

Audiences are generally happy with the quality of closed captioning, but improvements are needed. Though nearly half of the audience members indicated that they are generally happy with the quality of captions, many indicated that the captions contain too many mistakes or move at a pace that is not comfortable to read. Over half of the respondents indicated that they have had difficulty understanding the captions because of missing or scrambled words and more than a third indicated difficulty due to the captions moving too quickly. In terms of genre, the captioning on local news was identified as having the poorest quality.

Audiences have a sense of where the problems in captioning lie. One-third of the respondents indicated that the problems with captioning rest with the captioning company. Slightly less than one-third perceive the problems to be with the channel or station and slightly more than one-quarter of the audience members indicated that the problems are with the captioning "transcriber."

Several main themes which emerged from interviews with industry professionals regarding the process of obtaining, generating, and transmitting captioned programs to the public:

Different types of companies within the broadcast and cable television industries use a wide variety of techniques to caption their programs. Broadcast and cable networks generally hire captioning companies to generate captions (although a few do this work in-house), while local television stations use teleprompter scripts that are fed through a computer in order to generate closed captions for their local news programs.

Quality control varies greatly among the companies surveyed for this research. Captioning companies and cable networks have more rigorous quality control procedures, while local broadcasters often do not assess the quality of the captions for the programs they broadcast.

For companies in the broadcast and cable television industries, there are two main obstacles to obtaining high-quality captions for programs: time and money. First, because captioning is the last stage in the production process, the quick turnaround time required for programs to be captioned before their broadcast inevitably leads to errors in transcription, encoding, or transmission. Second, captioning is an expensive proposition for many small producers and television stations. In particular, off-line captioning, the most accurate type of captioning, is more expensive and sometimes requires too much time to be a viable option for producers and networks. Instead, these companies are increasingly using real-time captioning, even when the program is not being broadcast live.

Industry respondents also cite a number of technical challenges that sometimes decrease the quality of captions. Technical glitches such as encoding problems, bad time code, and re-editing of programs all contribute to poor caption quality, or the absence of captions altogether. In some cases, these glitches are due to equipment incompatibilities between different companies.

Respondents reportedly receive very little feedback from users of closed captions. When they do, they usually take the form of complaints about the quality of service. Some viewers contacted their local TV stations or captioning firms because they did not know how to turn on or off the closed caption feature on their televisions.

There is some concern among industry professionals about the future of captioned programs in the U.S. Some respondents expressed concern about the disappearance of government grants designed to offset the cost of captioning programs. Some respondents worry about the many new for-profit captioning companies, fearing that these new firms do not have the same ability or desire to deliver quality captions to their clients.

Recommendations

1. **Address technical issues quickly, before video providers move to digital broadcasting and the 2006 mandate for 100 percent captioning is in place.** Our experiences in trying to content analyze the closed captions and the reported experiences of survey respondents illustrate that the medium itself (television transmission, videocassette recording, digital recording) often introduces error that makes it challenging to watch the captions.

2. **Provide better labeling of captioned shows and provide consistent information about caption sponsor and caption provider.** Coders and respondents had no reliable source of information about whether an upcoming show was captioned and there was very little clear or standardized presentation of who paid for the captions or who provided them. Including such information in the program's captions will likely promote the image of the companies but also increase the salience of closed captioning.

3. **Make it clear who audiences can contact and how.** The Federal Communications Commission suggests that audiences with complaints first contact the network or cable company. Yet the industry interviews reveal that they receive very little feedback from audiences. Indeed, it was more often the captioning company, which sometimes provides a website or is a local entity, who gets the complaints. Offering the station's website, with a "link" for closed captioning, might begin a dialogue between audiences who use closed captioning and programmers that provide them.

4. **Increase investment in the provision of high-quality captioning for local news programming.** Our respondents complained that local news captions go too fast, have too many mistakes, and are often garbled or absent. Our content analysis suggests that they are correct in their complaints. It is a difficult genre to caption – due to the pace of the stories and the idiosyncrasies of the people and places – and unique and dedicated captioners may be required to improve the quality. The survey data indicate that an added investment is warranted because local news captions are the most widely used captions by all audiences and respondents say it is more important to caption this genre of television than any other.

5. **Wherever possible, avoid real-time captioning.** Though live genres often warrant live captions, we saw many instances in the content analysis of

prerecorded programs (such as *Ricki Lake* or *Celebrity Justice*) where the captions are done in real time. This style of captioning is significantly more likely to negatively affect the meaning of the captions and is more likely to introduce problems. Though industry interviews suggest that this is a cheaper way to meet the mandate, it is likely not the intent of the policymakers to have captioning done "on the fly."

6. **Build quality control into the process of closed captioning.** The escalating need for captioning has led to a proliferation in the number of captioning companies. Yet few television stations say they look at the closed captions in a consistent or critical way. (Indeed, one station manager didn't believe he had a television at the station or at his home that would allow him to access the closed captions.) Quality control must be an integral part of the implementation of the closed captioning mandate. Ideally, it occurs at each stage of the process: from the application of the captions to the reception on screens.

7. **Recognize that the audience for closed captioning goes beyond those who are deaf and hard of hearing.** While hearing impaired audiences are the heaviest users of closed captions, ESL respondents are consistent users of closed captions, too, saying they use captions to help learn English and develop their reading skills. Respondents from the general population also indicate that they use closed captions when they can't hear the sound, when they don't want to hear the sound or when they don't want to disturb someone else.

8. **Though the closed captioning mandate does not extend to prerecorded video programming, it is clear that audiences are making use of the captioning available on videotape and DVD recordings.** Use of captions in these venues is high; and a great deal of interest has been expressed for the provision of closed captioning in Internet audio.

9. **Audiences are, for the most part, pleased with closed captions.** Closed captions are also widely available. It is now important to conduct research that assesses the best practices for closed captioning style and speed to obtain a sense of the type of captioning that is most effective and pleasing. This might include exploring whether different types of captioning conventions should be used for different program genres.

10. **Making communication technologies truly accessible to underserved groups means understanding the audiences who have special needs and addressing them with unique services.** Greater sophistication in digital technology and television set design may provide an opportunity for closed captioning to be more customized to individuals' needs. Many respondents expressed personal preferences for the captions

-- larger type, all caps, or slower pace, for example. Given the increasingly widespread use of captions across a wide variety of audiences, it is critical to consider creating a technology that can allow the expression of personal preferences with individual programming.

Caveat: Limitations of the Data

This research was designed to explore the availability, quality, and reception of closed captioning in the United States today. While we attempted to take a comprehensive look at closed captioning from a variety of perspectives, it is important to keep in mind that there are limits to the generalizability of the conclusions. In particular, the TiVo sample of general programming came from a large broadcast market during a particular period of time. Because of the size of the market and the stations' network affiliations, it is possible that this represents the "best" of closed captioning because of the resources available to programmers. In addition, the respondents used for the audience survey and the industry interviews were carefully recruited to represent a variety of perspectives rather than randomly drawn from a large population. As a result, the findings should be considered exploratory.

Decisions about the sampling of the sample of general programs (recorded via TiVo) and news programs (recorded on videotape from local markets and national markets and transferred to DVD) were made by Annenberg researchers through a random procedure.

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[1] The rules exempt video program providers who have revenues of less than $3 million per year, programs which are in a language other than English or Spanish, programs for which the audio content is displayed visually, programs shown on new networks for the first four years of the networks' operation, locally produced non-news programs, programs shown between 2am and 6am, and commercials which are no more than 5 minutes long.

[2] Differences are considered significant if the p value is less than or equal to .05.

[3] Because the survey was not randomly distributed, the findings must be treated as exploratory and illustrative of the groups from which they were drawn. The data allow us to make comparisons between groups and suggest avenues for further exploration, but cannot be interpreted as representative of a national population of closed captioning users.

[4] One industry interview was conducted in August 2002 because of scheduling difficulties.

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About the Annenberg Public Policy Center

The Annenberg Public Policy Center was established by publisher and philanthropist Walter Annenberg in 1994 to create a community of scholars within the University of Pennsylvania that would examine the role of communications in public policy issues at the local, state and federal levels. The Annenberg Public Policy Center supports research and sponsors lectures and conferences. This research was conducted under the direction of Kathleen Hall Jamieson, Director of the APPC.

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