Advanced Television
Closed Captioning: Research Report

1998

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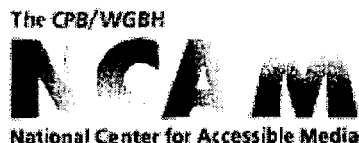
Advanced Television Closed Captioning

Executive Summary

Advanced Television (ATV), will dramatically change television technology within the coming years. ATV will also make exciting new caption features possible such as multiple caption streams (enabling viewers to select different languages or reading speeds), a wider range of character sizes, fonts, and colors, and increased flexibility regarding caption placement. ATV may also allow users to customize the appearance of captions on their television sets.

The ATV Closed Captioning Working Group was created to ensure the development of a captioning specification which best serves deaf and hard-of-hearing viewers while also serving the needs of the designers and manufacturers of the coming digital media. The ATVCC Working Group operates under the aegis of the Television Data Systems Subcommittee of the Electronics Industries Association. Key activities are funded by the U.S. Department of Education.

One of the Working Group's objectives is to involve users in the design of ATV captioning. Therefore, a key activity was to conduct market research with current and potential caption users. In January 1997, NCAM commissioned the WGBH Research Department to one phase of this market research.

The purpose of the research was to obtain input from current and potential caption users about features that may become possible with ATV. The information obtained through this research will assist receiver manufacturers in determining how to design their products to best serve caption consumers.

There were 26 participants consisting of approximately equal numbers of men and women and representing a wide range of age groups, different degrees of hearing loss, and varying levels of computer expertise. The interviews began with a written questionnaire in which participants were asked questions about their use and opinions of current captions. Upon completing the questionnaire, the participants viewed a 20-minute video tape featuring real captioned footage. The tape was divided into 21 segments, showing different styles of captioning. The segments were roughly grouped into seven categories based on the features being tested: size, font, spacing, color, window style, character edging and presentation method. After each segment, the tape was stopped and the participants were asked to rate the captions on a scale of one to 10 (with 10 being the highest score) and to comment on what they liked or disliked.

There was a high level of consensus among participants. The participants tended to favor captions in mixed case, a sans serif font, and white captions on a black

background. There was also a lot of agreement among participants regarding which features they would like to control. The participants would most like to be able to adjust the caption background and control the color and size of the captions. They also expressed a strong desire to be able to move the captions or adjust the picture on those occasions when captions tend to interfere with other information.

Differences tended to occur along expected lines. Older people tended to prefer greater contrast; hard-of-hearing consumers with higher degrees of hearing tended to rate the black background lower, preferring to see more of the picture; and computer users were more particular about the font.

Because there is such variation in people's visual tastes, it is clear that a considerable amount of flexibility needs to be built into ATV closed captioning. However, it is not necessary to include an exhaustive number of features or for viewers to be able to control each of the tested features.

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PART II: THE VIDEOTAPE

"STANDARD" STYLE

The captions in the segment which was viewed by all participants first, were in a style that we defined as the "standard" or "default" style. This style incorporated the features that we felt produced the most readable captions and which would test well with consumers: "medium" size, Helvetica font, white captions on a black window, presented in the "pop-on" style. These captions were not dramatically different from current captions, but did feature a different font (although it was still a sans serif font), proportional spacing, and mixed-case characters.

After viewing this segment, the participants were asked first to rate the overall appearance of the captions on a scale of 1 to 10, and then asked to focus on each feature--size, font, spacing, color, and window--and rate each on the same 1 to 10 scale. (Results from this clip were incorporated and used for comparison in relevant sections of the report.)

For subsequent clips, the participants were directed to focus on one or two particular features.

"Standard" Caption Features	All	Deaf	HoH	Hearing	Men	Women	Under 50	Over 50	No PC
Overall	7.8	7.9	8.7	7.1	7.4	8.0	7.9	7.6	8.0
Size	7.9	8.1	8.7	7.2	7.3	8.3	7.6	8.2	8.1
Font	8.0	7.5	8.8	8.1	7.5	8.4	8.1	7.9	8.9
Spacing	7.1	6.7	7.0	7.5	6.1	7.7	7.1	7.0	8.0
Color	7.6	8.4	7.8	6.7	7.2	7.9	7.3	8.0	7.9
Window	7.3	7.3	8.2	6.9	6.9	7.6	7.7	6.9	8.6

"STANDARD" (Figure 1)

Most participants found the captions easy to read. However, many felt that the letters were a little too close together. This could be a result of the mixed case quality of these captions which differ from today's upper case closed captions. Some also found the

white captions against the black window to be too bright.

Easy to read. But maybe the letters were a little too close together. I like it that it used no unnecessary part of the screen.

I like the black background. No matter what it makes the captions easy to read.

It didn't allow my eyes to look at the whole screen. Easily readable. Nothing was grabbing my attention. The lettering being with in the black area was what I was focused on.

I like the good contrast but this is a little too glaring

I didn't like the mixed case. The letters were too squat and too thick. It looks like a print for children.

It's too bright, too white. The size is very readable. The window style made you focus on the words.

I could read everything. But the black backing bothered me.

It's comfortable to read, clear and straightforward. It's nice that they were somewhat big. I'm not sure I needed the window.

The color was a little harsh.

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TEST ELEMENT 1: CAPTION SIZE

We tested three different sized captions--"small," "medium," and "large." To determine the appropriate sizes for each, we decided to define the size of today's captions as "medium." We determined that "medium" sized captions are roughly equivalent to 26 scan lines of the TV picture.

The "medium" size captions were the clear choice of all participants. The larger size was also highly rated, particularly among the deaf and over-50 participants.

Participants described both the "medium" and the "large" size captions as easy and comfortable to read. However, many participants felt that the "large" captions took up too much of the screen. Most participants felt that the "small" size was too much of a strain to read. However, some remarked that it was nice to be able to see more of the screen.

Caption Size	All	Deaf	HoH	Hearing	Men	Women	Under 50	Over 50	No PC
Medium	7.9	8.1	8.7	7.2	7.3	8.3	7.6	8.2	8.1
Large	6.6	7.2	5.8	6.5	6.2	6.9	6.1	7.3	7.6
Small	5.1	4.6	5.3	5.5	6.0	4.6	4.6	5.7	6.4

MEDIUM (Figure 1)

Easy to read. But maybe the letters were a little too close together. I like it that it used no unnecessary part of the screen.
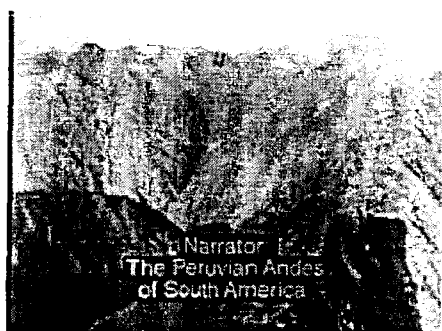
The size is very readable.

I could read everything.

It's comfortable to read, clear and straightforward. It's nice that they were somewhat big.

Very clear and easy to read but it stood out too much. Easy to follow, but took away from the picture. Perfect size but it could have been smaller.

LARGE (Figure 2)

At the beginning it seemed big. They were very easy to read. The size doesn't bother me unless it is too small. With a larger size I feel a little more relaxed reading it.

I liked it. It was easier to read then the "medium." It didn't take up too much of the screen.

It obscured more of the picture. I didn't like it quite as much. The other [medium] was quite sufficient.

It's so much easier to read but it disturbs the aesthetic and entertainment of the image. Too large. Intrudes.

SMALL (Figure 3)
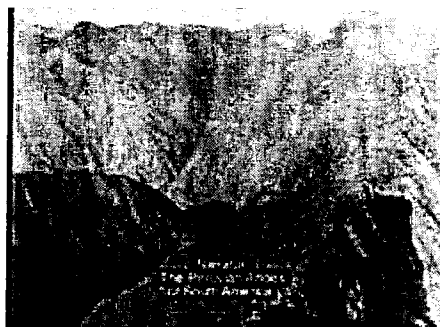
They were too small to feel comfortable to read. It is easier in terms of comprehension with larger ones. I had to really concentrate. It was a strain.

Hate it. It looks like one big long word. I have to work too hard to read this.

I'm satisfied with this size. Maybe it's slightly too small but I like seeing the beautiful scenery. I don't want that covered up. I preferred the medium size.

It slowed my reading down tremendously because they were small. The scene changed before I got a chance to look at it.

Return to Table of Contents
Continue to Next Section of Report

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NCAM

National Center for Accessible Media
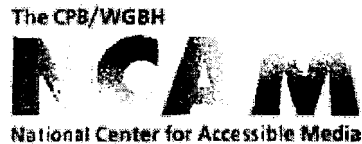
TEST ELEMENT 2: FONT STYLE

We tested three different fonts: Helvetica, Times, and Monaco. We included Helvetica because it is a popular sans serif font, and Times because it is a popular serif font. We included Monaco because we wanted something similar to today's captions for which no "font" exists. Monaco is similar to current captioning because it is a sans-serif, monospaced font. Although most of the captions we tested were in mixed case, we elected to use Monaco in all upper case so that it would look more like current captions.

The Helvetica font was the clear choice of participants. Participants praised its clarity and simplicity. Most participants felt that Times was too "busy" or "crowded". This was due in large part to the serifs, although some felt that another serif font may have worked. Most of the participants felt that Monaco was too large. This may have been because the letters were all uppercase. The poor response to Monaco indicates that it was not an effective approximation of today's captioning, after all.

The vast majority of the participants preferred captions in mixed case. Although current closed captions are all upper case, participants feel that mixed case is more natural and grammatical.

Font Style	All	Deaf	HoH	Hearing	Men	Women	Under 50	Over 50	No PC
Helvetica	7.9	7.8	7.8	8.0	7.6	8.1	7.7	8.1	8.1
Monaco	5.3	5.7	5.0	5.1	5.7	5.1	5.6	4.9	5.4
Times	4.9	4.2	5.8	5.1	5.3	4.7	4.6	5.3	6.3

HELVETICA (Figure 4)
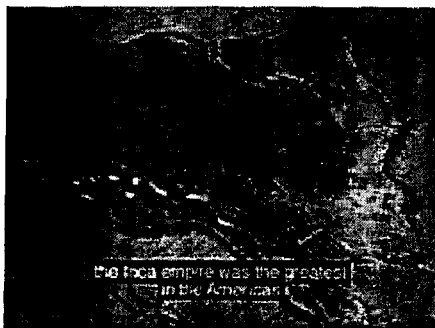
It was very nice. Soothing. Easy to read.

It was more even. I like that. I still feel like I'm seeing a lot of white.

That was comfortable. The font could have been a little more crisp. I like it much better than the other [Monaco].

I liked that much better. The ease of reading and minimizing eye strain are most important.

Perfectly readable. I like the grammaticality of it. It's so important for captioning to communicate correctly.

MONACO (Figure 5)
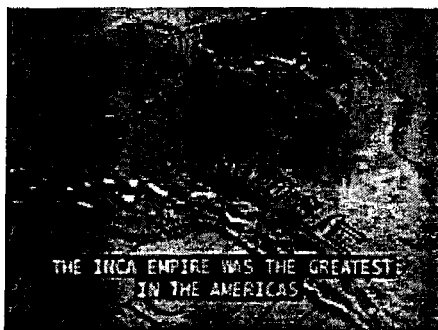
They were easy to read but it was too big. The space is wasted. I liked mixed case. I am not that crazy about all capitals. It looks very square.

I prefer mixed case. The capitals are unfriendly like someone shouting.

I've never seen that kind of lettering before. I wouldn't pick that one. But I prefer all capitals. Upper case can look more even and not shift your eye gaze.

*They're different. I like all capitals like on (current) TV.*

I didn't like all capitals. I don't like reading captions written like that. It

removes capital "highlighting" (i.e. CIA).

Very sharp, very clear. very easy to read. I wasn't even aware that it was all capitals. It didn't occur to me. I think all capitals would be easier to read for a long time.

It's easy to read with the all capitals. Stylistically, I like the one before [Helvetica]. I prefer mixed case. It's more like the way I normally read.

TIMES (Figure 6)
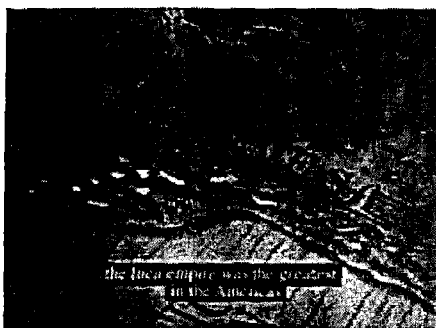
It's a rotten serif font. It's not as readable because the letters have different weights (different parts of each letter.) Rockland is very readable.

These are not that wonderful for me. Hard to read. The letter "e". The uniformity is less. Constricted. I would prefer a more simple font without the curls.

Too fancy. Simplicity is the best way to go. This pushed the words closer together.

Too busy, too intricate.

The previous one [Helvetica] is better for easy following. This is more difficult to read quickly. My eyes notice it too much.

I don't like this as much. Maybe if it were bigger, the serifs would work better. But, I don't want it bigger and is too hard to read.

Return to Table of Contents
Continue to Next Section of Report

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TEST ELEMENT 3: CHARACTER SPACING

For this segment, we compared a monospaced font (Courier) to a proportionally spaced font (Times). We elected to use two serif fonts because we did felt that comparing a serif to a sans serif font would make it even more difficult to evaluate the spacing.

Participants rated the monospaced Courier higher than the proportionally spaced Times. We do not feel, however, that this necessarily reveals a preference for monospacing. The results are somewhat clouded by the participant's dislike of the Times font (which they had already rated poorly in the previous segment) and the difficulty in distinguishing between the spacing of a font and its size and serifs. Some participants were able to make the distinction, and remarked that they thought they preferred proportional spacing, although they disliked the Times font. Although the participants rated Courier higher, several remarked on how "spread out" it was.

For the purpose of comparison, we have also included data on how Helvetica (a proportionally spaced font) was rated by the participants with regard to spacing.

If the font itself is readable, the style of spacing becomes irrelevant.

Character Spacing	All	Deaf	HoH	Hearing	Men	Women	Under 50	Over 50	No PC
Mono	7.3	7.6	8.0	6.6	7.5	7.2	7.6	7.0	7.3
Proportional	6.1	6.1	5.8	6.3	5.7	6.4	6.3	5.9	6.9
Helvetica	7.1	6.7	7.0	7.5	6.1	7.7	7.1	7.0	8.0

MONOSPACING (Courier font) (Figure 7)
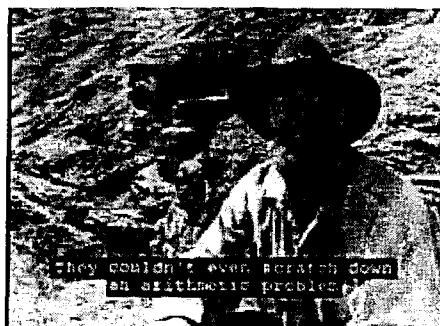
I liked this the best of all the clips. It was the easiest to read.

It was better. Easy to read. More spread out, clear. I feel like I can read at a better speed and grasp the whole thing before it goes. I don't have to lean forward.

Too spread out for me. As if my eyes had to spread out to read it. I felt like I had to back up more.

I did not like this as well. I felt I was reading blocks. It wasn't pleasant looking.

My eyes were drawn to the space between the words.

PROPORTIONAL SPACING (Times font) (Figure 8)

I like the proportional part but not the font. In general, I think proportional fonts would be more readable but not this font.

I had to concentrate. I could sense the spacing was close together. I'd probably get tired of having to concentrate for a whole program.

A little too close together. I prefer mono spacing. It's easier to read than proportional.

*I like it. I never felt that the letters were too close together. But they sometimes seemed a little hard to read but I liked the look a lot.*

I found that one more pleasing. It's more compact and pleasing to the eyes. It's more normal. It wouldn't distract like the previous one would.

Return to Table of Contents
Continue to Next Section of Report

NCAM / WGBH Educational Foundation / www.wgbh.org

The CPB/WGBH

NCAM

National Center for Accessible Media
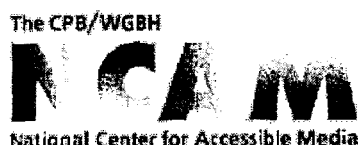
TEST ELEMENT 4: CAPTION COLOR

White--the color most captions users are most familiar with--scored highest in this category. Yellow and Blue were tied in second place. The issues for participants are contrast, clarity and easy of reading. Older participants and profoundly deaf participants tended to place the highest value on contrast. A few participants preferred the "softness" of the blue or yellow captions. Others remarked that blue or yellow captions may be more suitable for certain types of programming and that they would like the ability to select these options. Green captions were not rated favorably by the participants.

Caption Color	All	Deaf	HoH	Hearing	Men	Women	Under 50	Over 50	No PC
White	7.6	8.4	7.8	6.7	7.2	7.9	7.3	8.0	7.9
Yellow	6.9	6.8	7.5	6.7	7.6	6.5	6.8	7.1	6.9
Blue	6.7	7.0	7.3	6.1	6.9	6.6	6.7	6.8	6.8
Green	5.8	5.9	6.0	5.5	6.3	5.4	5.9	5.6	6.5

YELLOW (Figure 9)
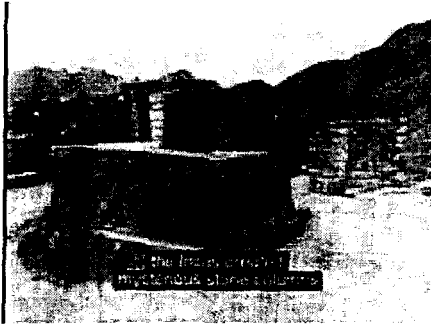
No. There was not enough contrast.

I do like the yellow very well. It's close to white. I would prefer having both and switching back and forth.

I like white on black much better. This made me aware of the "floaters" in my vision.

It's easier on the eyes (than white) especially with the variable color background. The white is a little bit of a brighter contrast. This has perfect brightness.

I think the yellow is depressing. This looked faded or like a dull white.

Good. The white was easy to read. This is more relaxing but not as easy to read. It was nice as a variety to see another color, it breaks some tedium.

BLUE (Figure 10)

My initial reaction was that I didn't like it. I like the softness, the white seems harsh in comparison but I like the higher contrast.

It's not too bad. There was no glare (like the yellow). Very soothing. I still prefer the white on black.

I couldn't tell how the soft contrast would be to read over time. Maybe this is a

little too soft. It took a little more effort.

I liked it less [than the yellow]. It was a little distracting. I wanted the information without noticing the color too much. The blue made me notice it too much.

GREEN (Figure 11)
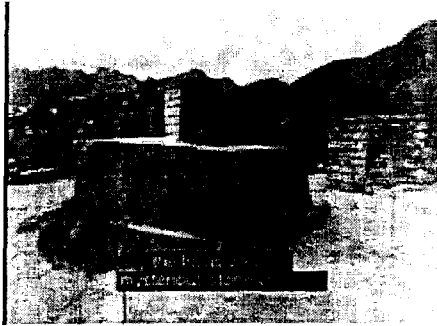
I don't like the green at all. The contrast against the black isn't sharp enough. It clashes with other colors. The blue enhanced the mood of mystery but the green did nothing.

No. Green is my favorite color but not for captions. It doesn't belong on TV. It drains your eyes. The white makes your eyes more relaxed.

It's easy to read but I feel funny. I'm not used to the green. there are too many colors around. I'm not sure if I could watch the green for 1 to 2 hours. I would switch back to the white.

Return to Table of Contents
Continue to Next Section of Report

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TEST ELEMENT 5: CAPTION WINDOW (COLOR)

In this segment, we tested different caption window styles. "Caption window" refers to the background against which the caption appears. This background is traditionally black and adjusts to the size of the caption. With ATV, caption windows can take on different shapes, colors, degrees of transparency and can include features such as borders and shadows. We were limited in how many variations we could test and ended up testing several of these features in combination.

Although participants favored the solid black window, the translucent window was also rated highly. Some liked this feature because you could see the underlying video. Many felt the translucency could be quite helpful depending on the nature of the program (for example, when information was obscured by captions.) Features like colors and borders scored low with participants who felt that they were distracting and unnecessary.

Caption Window Color	All	Deaf	HoH	Hearing	Men	Women	Under 50	Over 50	No PC
Black	7.3	7.3	8.2	6.9	6.9	7.6	7.7	6.9	8.6
Translucent	7.1	6.8	6.3	7.8	6.5	7.4	6.7	7.5	7.5
Yellow	5.0	4.5	5.0	5.4	4.8	5.1	5.0	4.9	6.0
Green	4.3	3.3	4.8	5.0	4.4	4.3	4.3	4.3	5.0
Border	3.3	2.5	3.8	3.9	3.5	3.3	3.5	3.2	4.4

TRANSLUCENT WINDOW WITH WHITE CAPTIONS (Figure 12)

The way the camera is panning and captions are moving, it made me feel nauseous. It could help, though, to see something behind. But it would be distracting long term because I am looking at two things. But transparency would be helpful with the news.

It needs a black background. I don't like this, it's too distracting. The less distraction, the better.

I liked it much better. I didn't block out what was behind so you could see it. It was maybe a little distracting but I'd rather have that than the color block and I'd rather be able to see more of the picture.

I still don't like the window. But this is better than the solid background.

Hard to tell. Parts I liked and parts I didn't. I liked being able to see through the block. On a lighter background it becomes harder to read the letters. It showed up better against the dark background.

I didn't care for being able to see through the window. It's much clearer and less distracting if it is solid. I find myself looking through the window.

YELLOW WINDOW WITH BLACK CAPTIONS (Figure 13)

It was very easy to read but I don't like the yellow. The color demands too

much attention. Any color would be too distracting, black is nice and neutral.

I'm not crazy about that background. It is a little too dominant. The color was too bright. The yellow stands out and "blasts" to me.

Very good. It's almost as easy to read as the white on black. It's a good shade of yellow. But a little distracting in it's vividness.

I didn't like that because it stands out too much. You can't ignore it if you want to.

I didn't care for that. Both the color and the rectangle seemed intrusive.

GREEN WINDOW WITH WHITE CAPTIONS (Figure 14)

I don't like that at all. The white and green are both bright colors. the white seems to dance. The contrast gets weird. Too jarring.

I don't like it. The green with the white was bad. I prefer the black print better than white print. I like this window better but the contrast of the first was better.

Difficult to read. I think the colored background was distracting.

Too much green. It draws my attention from the rest of the picture.

I like that but I am partial to green. I liked the green and white

Bad. It wasn't readable. Day-glo.

I prefer to see letters that are darker. The yellow and green backgrounds were equal but there was too much focus on the background.

BLUE WINDOW WITH YELLOW CAPTIONS, YELLOW BORDER (Figure 15)

It was too much color. Too fancy. What's the purpose of that? It's unnecessary. I don't like the border. No purpose. It would be distracting. Keep it simple.

The border made this pretty challenging.

The three colors were distracting and ugly.

It looks lovely but it is too pleasing to the eyes to be good for his captions because it would draw attention from the picture. I find this more distracting. I like the border.

I liked that. It was nice and soothing.

Oh, no! Too much!

TEST ELEMENT 5b: CAPTION WINDOW (SHAPE)

This segment of the tape featured a rectangular-shaped window, rather than the traditional background which adjusts to fit each row of the caption (which we referred to as "shrink-to-fit"). Most participants did not notice the difference until it was pointed out to them. Once it was pointed out, the participants expressed a preference for the "shrink-to-fit" style. They felt that the rectangular shape covered up too much of the screen and called attention to itself.

RECTANGULAR VS. SHRINK-TO-FIT

It doesn't make a difference to me if the window is a rectangle but it might cover up more.

I prefer the shrink-to-fit window.

The rectangular shape made the window too big.

I wasn't aware of the shape difference but I think shrink-to-fit is better.

I liked the shrink to fit block because it is a visual clue of how much text you will have to read.

It doesn't need the rectangle.

Return to Table of Contents
Continue to Next Section of Report

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TEST ELEMENT 6: CHARACTER EDGING

The primary purpose of this segment was to determine if character edging--such as an outline or drop shadow would help make captions more readable when there was no window. Four different features were tested: white captions with no edging and no window; white captions with a black drop shadow and no window; yellow captions with a black drop shadow and no window; and white captions with a black drop shadow, against a very translucent window.

The only option that scored fairly high was the white captions with a black drop shadow against a translucent window. The participants felt that the difficulty with a lack of a window is that the captions often get lost in the picture.

We are unsatisfied with the testing of this segment and recommend further research to determine an effective way of providing captions without a window. Several participants expressed their dissatisfaction with the traditional black window an their desire to see more of the picture. A different caption color--perhaps a bright yellow--would have been more effective.

Character Edging	All	Deaf	HoH	Hearing	Men	Women	Under 50	Over 50	No PC
Translucent	7.2	7.3	6.5	7.6	7.0	7.4	7.3	7.2	7.4
White w/shadow	5.7	5.5	4.7	6.4	6.3	5.3	5.4	6.0	5.6
White	4.7	4.6	4.2	5.0	5.6	4.1	4.6	4.7	5.0
Yellow w/shadow	4.3	4.0	3.8	4.8	4.8	3.9	5.0	3.4	4.5

WHITE CAPTIONS WITH BLACK SHADOW, TRANSLUCENT WINDOW (Figure 16)

It was OK. I could read it fine but I was not crazy about it. I had to concentrate harder. I feel more comfortable with a background underneath. This was more stressful.

Interesting. I could see getting to like that a lot. Most unobtrusive presentation of captions but retains the most legibility. Maybe I can't read them equally as well but still well enough.

Compared with the others I liked it better. But I don't like to see through. I prefer a solid background. I don't want my eyes to have to work harder than they have to.

It's the best so far but I want the sheer to be darker.

Good. the background could be a tad darker and the white could be whiter. The design is the best so far.

It seems clearer, good. Rather ideal. There is enough definition to help you read it. I like the idea of the background.

WHITE CAPTIONS WITH BLACK SHADOW, NO WINDOW (Figure 17)

I liked the unobtrusiveness of not having a window. The shadow makes them legible, but over a light background the letters can get lost. It takes a bit more effort to read.

Good, but it needs a background. They become hard to read against a similar background.

That was a little distracting. I would prefer the captions without the shadow.

It's better than yellow with a shadow. Acceptable. I would take this over a window at any time.

It does require a lot of attention because of the lack of a background. The shadow appeared to be a part of the picture and not the captions themselves.

WHITE CAPTIONS, NO SHADOW OR WINDOW (Figure 18)

Those really get lost against a light background.

It's nice to have it without the box but the captions aren't clear enough. I wouldn't recommend it.

It seemed to be more clear in terms of the light captions. It requires more concentration without the background but it doesn't block the picture.

Much different. I'm satisfied with it but sometimes with a bright background it was difficult to read. I like the idea. Yellow or green captions may be better than white.

The captions need a background. There needs to be a shadow without a background. Otherwise they are invisible.

YELLOW CAPTIONS WITH BLACK SHADOW, NO WINDOW (Figure 19)

It was very bad. Hard to read. I'm surprised, I thought the shadow would make it clearer but it made it worse.

I'd rather have a background because the letters become hard to see (without one.) Too many different colors in the picture make it hard to read.

It was a little too faded for a quick read. The shadow kind of dulled it up.

The shadow helps a lot and works with the idea of wanting to see stuff behind the background but it is still harder to read especially against a light background.

Return to Table of Contents
Continue to Next Section of Report

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National Center for Accessible Media

TEST ELEMENT 7: POP-ON VS. FADE

In this segment, we tested two different presentation methods for the captions: the traditional style in which the caption "pops" on all at once and then pops off just before the next caption appears; and a style in which the caption "fades" on (appearing gradually) and then fades off while the next caption is fading on.

This was a somewhat difficult feature for participants to distinguish. Many simply didn't notice the difference. Those that did had mixed feelings although slightly preferring the pop-on/off style. Some felt the fade-on/off captions imparted a different pace to the clip. There was also a feeling that they weren't keeping up with the program.

Pop-on vs. Fade	All	Deaf	HoH	Hearing	Men	Women	Under 50	Over 50	No PC
Pop on/off	7.3	7.8	7.2	7.0	7.4	7.3	7.6	7.1	6.9
Fade on/off	6.6	7.0	6.2	6.5	7.3	6.2	6.4	6.9	6.9

POP-ON/OFF CAPTIONS

I like this better than the others. It's clear. With the fading I think I might miss something. This is more predictable. That "hint" is important for me.

I've seen both versions and I have no preference. But there is more assurance that it is keeping up.

I liked the fading better.

FADE ON/OFF CAPTIONS

I could see using that technique for certain shows (sensitive or serious issues) but fade outs are a little distracting. Maybe they would be better if they were faster.

What do you do when people are talking too fast? It will depend on how they are speaking. The fades waste time. I prefer to have the pop-on when people are talking quickly.

I don't like that. I don't like the fading. It puts me to sleep. I want them to come on strong. It seems like the dialogue is soft.

Not bad, gradual, slow. It made the pace seem slower.

It's easier on the eyes, nice. But this one tends to give me the fear that the captions are missing the words.

The fading adds more action and motion. My eyes would become more tired watching that.

It's a little more gentle. It might be better for some things. I don't need it. It started to annoy me after a while. It draws my eyes to it. Not certain. It is gentler, however.

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TEST ELEMENT 8: SHRINK PICTURE

In this segment, we reduced the size of the television picture and positioned the captions on the black border beneath the picture. (Note: It is not clear whether this feature will be possible with ATV, but we included it because consumers had expressed a desire for this capability prior to our test.)

Few participants liked this option because they felt that they were being cheated out of a full-screen image. However, almost half felt that for a temporary situation, such as emergency announcements (e.g. weather bulletins, school closings), this would be helpful.

Shrink Picture	All	Deaf	HoH	Hearing	Men	Women	Under 50	Over 50	No PC
Shrink	4.3	4.0	5.3	4.1	4.1	4.5	4.8	3.8	4.3

SHRINK PICTURE, CAPTIONS BENEATH (Figure 20)

I want to see the whole picture. I don't like the border. The whole concept of captioning becomes invalid. If you don't have access to the big picture than why buy the screen?

Somehow you get the feeling you are being cheated but it's clear in terms of readability.

I found my eyes leaving the picture when I was reading it. And I had to shift back up to look at the picture. Maybe if it just had a black strip at the bottom it would have been better.

I definitely don't like it. It's minimizing what I am seeing. On a smaller screen it would be even worse. It doesn't work for me. Temporarily it would be OK but for an entire piece, avoid it.

TEMPORARILY SHRINK OR MOVE?

Based on the interest in this feature and the fact that so many participants remarked on the problem of captions covering up other text on the screen, we posed the following question: When captions cover up other text, would you prefer to be able to temporarily shrink the screen, or move the captions to another location on the screen?

Of those participants that had a preference, nine preferred to be able to shrink the screen temporarily and 11 wanted the option of moving captions.

I would prefer to be able to move the captions around so I don't lose the size of the screen. Moving is more of a subtle change, shrinking the screen is too much.

The shrinking can be disorienting so I would rather move the captions.

I'd want to move the captions rather than shrink the picture.

I would shrink the picture temporarily over moving the captions. It's a signal to the brain to catch something on the screen.

I would say that moving them would be better than shrinking.

I think shrinking temporarily would be fine. In those cases information is the key but with this [this program] the picture is the information. Whenever people are trying to get information off the screen. This would be appropriate.

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MOST IMPORTANT FEATURES

Each participant was asked: **If you had the ability to control three of the features that you have just seen, which three would they be?** (In order of preference. 1 = first choice, etc.)

This table shows the number of participants who chose each of the features for their first three choices. The "TOTAL" row is the total number of participants who included that feature anywhere in their top three. The total number of participants was 26.

	MODE	WINDOW	COLOR	SIZE	FONT	SPACING	EDGING
First	8	6	6	4	2	0	0
Second	0	6	6	8	3	1	1
Third	4	7	5	3	4	1	0
TOTAL	12	19	17	15	9	2	1

The features that participants said they most wanted to be able to control are the caption window, caption color, and caption size. The comments regarding controlling the caption window indicate that most would use this option not to change its color or the shape, but to adjust its saturation or eliminate it altogether.

The participants also expressed a strong desire to be able to move the captions or adjust the picture on those occasions when captions tend to interfere with other information.

Return to Table of Contents
Continue to Next Section of Report

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NOTES ON THE RESEARCH

CHALLENGES & CHOICES

1. The Videotape

The first challenge was to determine an effective research tool. A demonstration of actual Advanced Television captioning was not possible, because it was not yet technically feasible. The goal was to simulate Advanced Television captioning as realistically as possible, while staying within the budget and timelines for this project.

The original strategy was to use the ATVCC Simulator, a computer program being designed by the Working Group, as the research tool. However, the capabilities of the simulator needed to be scaled back because of budget restrictions. The scaled back version of the simulator could not produce captions over moving video, which we decided was essential to successful audience testing.

We agreed that the most effective test would be to use real captions over an actual program. By real captions, we mean captions that are directly related to the video. So instead of arbitrary video with self-descriptive captions (e.g. "Here is an example of a Helvetica font"), the captions would be faithful to the audio.

The Project ultimately decided to produce a videotape in NTSC format and use an AVID editing system to create captions that reflected the different styles possible with ATV. In order to maintain a high image quality, Betacam tape was used.

The Project selected a program from WGBH's *NOVA* series in order to simplify many of the logistical issues involved in videotape production (e.g. clearing rights, obtaining a copy of the master). Since this program had already been captioned by The Caption Center at WGBH for television broadcast, the Project was able to use existing caption files, eliminating the time-consuming task of creating the captions from scratch, and ensuring that the text and timing were accurate.

Since the videotape could not be demonstrated on an ATV set (since none exist yet), another question was whether to simulate ATV's 16 x 9 aspect ratio by presenting the video in "letterbox" format. The Project decided against letterboxing because it felt that it would not be an accurate representation of ATV's aspect ration. Whereas the shape of the ATV sets will reflect this new aspect ration and enable the image to fill the screen, letterboxing on an NTSC set maintains the correct proportions, but reduces the overall size of the image, resulting in a black band above and beneath the image. The Project felt that this would be distracting and confusing to the participants and that they might not be able to separate this from what they were being asked to evaluate.

2. The Participants

One concern when conducting market research is that participants tend to be biased or predisposed toward things with which they are already familiar. That was one reason we elected to include in the research hearing participants who do not watch captions. However, the question arose as to whether or not to leave the sound on when hearing participants viewed the tape. We ultimately elected to leave the sound on for two reasons: (1) Experience shows that viewers who are unaccustomed to watching captions have a difficult time keeping up, and we felt that if they were struggling with this, they would not be able to evaluate the features; and (2) We had left the sound on during the interviews with deaf and hard-of-hearing participants and wanted to be consistent. However, the fact that the hearing viewers were not as "dependent" on the captions may have influenced their assessment. If there had been time for additional testing, we believe it would have been interesting and worthwhile to include a group of hearing participants who watched the tape with the sound off.

We had also hoped to include in the research people who identified themselves as "hearing" but who were beginning to lose their hearing as part of the aging process. We contacted several Senior Centers to try and recruit participants, but did not get any response.

Return to Table of Contents

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