Policy Insights from the
Behavioral and Brain Sciences
2015, Vol. 2(1) 195–202

DOI: 10.1177/2372732215602130
bbs.sagepub.com
SAGE

Video Captions Benefit Everyone

Morton Ann Gernsbacher

Abstract

Video captions, also known as same-language subtitles, benefit everyone who watches videos (children, adolescents, college students, and adults). More than 100 empirical studies document that captioning a video improves comprehension of, attention to, and memory for the video. Captions are particularly beneficial for persons watching videos in their non-native language, for children and adults learning to read, and for persons who are D/deaf or hard of hearing. However, despite U.S. laws, which require captioning in most workplace and educational contexts, many video audiences and video creators are naïve about the legal mandate to caption, much less the empirical benefit of captions.

Keywords

captions, video, second language, D/deaf, reading, literacy

Tweet

Everyone should turn on video captions; captions improve comprehension, memory, and attention, for everyone.

Key Points

- Captions benefit everyone who watches videos, from younger children to older adults.
- Captions are particularly beneficial to persons watching videos in their non-native language, children and adults learning to read, and persons who are D/deaf or hard of hearing.
- Captions generated via automated speech recognition are not yet without interfering error, but when auto-generated captions reach parity with human-transcribed captions, technology will be able to harness the power of captions.
- Despite U.S. laws, which require captioning in most workplace and educational contexts, many video audiences and video creators are naïve about the legal mandate to caption, much less the empirical benefit of captions.

Introduction

Imagine a technique that can improve children's reading skills (Linebarger, Piotrowski, & Greenwood, 2010), boost adolescents' written and spoken vocabulary (Davey & Parkhill, 2012), increase college students' attention to lectures (Steinfeld, 1998), enhance second-language learners' pronunciation (Mitterer & McQueen, 2009), and raise literacy rates in developing countries (Kothari, Takeda, Joshi, & Pandey, 2002). The technique is simple: Display captions on videos.

Captions are like foreign-language subtitles; they translate a spoken language into a written language (Garza, 1991). Like foreign-language subtitles, captions appear at the bottom of the screen. Unlike foreign-language subtitles, captions translate into writing the same language that is heard in speaking, which is why captions are also called same-language subtitles. Captions also translate sound effects ("raindrops falling," "footsteps approaching," "horses galloping"); captions transcribe song lyrics, and captions offer other helpful clues, such as identifying conversational partners by their name and indicating off-screen voices with italics.

More than 100 empirical studies, listed in the appendix, document the benefits of captions. These studies report benefits to a wide swath of participants as measured by a wide swath of criteria: summarizing main ideas (Markham, 2000-2001), recalling facts (Brasel & Gips, 2014), drawing inferences (Linebarger et al., 2010), defining words (Griffin & Dumestre, 1992-1993), identifying emotions (Murphy-Berman & Whobrey, 1983), and of course, answering multiple-choice comprehension questions (Hinkin, Harris, & Miranda, 2014; Markham & Peter, 2002-2003; Murphy-Berman & Jorgensen, 1980).

Eye-movement studies document that captions are read easily (d'Ydewalle & de Bruycker, 2007), attended to effortlessly

[1]University of Wisconsin–Madison, USA

Corresponding Author:
Morton Ann Gernsbacher, University of Wisconsin–Madison, 1202 W. Johnson Street, Madison, WI 53706, USA.
Email: MAGernsb@wisc.edu

(d'Ydewalle, Praet, Verfaillie, & van Rensbergen, 1991), and integrated smoothly with the soundtrack of the video (d'Ydewalle & Gielen, 1992). Standard verbatim captions are as effective as more detailed or elaborated captions (Anderson-Inman, Terrazas-Arellanes, & Slabin, 2009; Murphy-Berman & Jorgensen, 1980).

The numerous empirical studies referenced in the appendix demonstrate that captions benefit everyone who watches videos, from younger children to older adults. Captions are particularly beneficial to persons watching videos in their non-native language, children and adults learning to read, and persons who are D/deaf or hard of hearing, as illustrated below.

Captions Benefit Persons Who Are D/deaf or Hard of Hearing

The early 20th century's golden age of cinema had created a level playing field for D/deaf and hard of hearing viewers. Silent films, with their interwoven screens of captions (called intertitles), created "the one brief time that deaf and hard of hearing citizens had comparatively equal access to motion pictures" (Schuchman, 2004, p. 231). But in the late 1920s, as talkies (films with synchronized speech) pushed out silent films, the D/deaf community was shut out.

In response, the D/deaf community created captions (Downey, 2010), first by recapitulating the intertitles of the silent film era and then by reconfiguring the bottom-of-the-screen foreign-language subtitles that carried U.S. films across the world. In the late 1950s, U.S. President Eisenhower authorized a federal Captioned Films for the Deaf agency (as "part of the post-Sputnik, cold war education boom," Downey, 2008, p. 193).

Captions began appearing on television shows in the 1970s (with their earliest appearances on ABC's *Mod Squad* and PBS's *The French Chef*; Withrow, 1994). In the 1980s, a handful of television shows began displaying captions in real time (e.g., the launch of the space shuttle *Columbia* and the acceptance speeches at the Academy Awards; Block & Okrand, 1983). By the 1990s, captions on TV shows were mandated by the U.S. law (Erath & Larkin, 2004). The Twenty-First Century Communications and Video Accessibility Act of 2010 requires that captioned TV shows also be captioned when displayed on the Internet.

It is unsurprising that captions benefit persons who are D/deaf or hard of hearing. But early experiments demonstrating that captions benefit D/deaf persons demonstrated something further: Captions also benefit hearing persons. For example, Figure 1 displays the results of a study by Nugent (1983). More than 30 D/deaf children and nearly 100 hearing children (9-14 years old) were randomly assigned to one of four conditions: watch a video with audio but without captions; read only the captions; watch the video with audio and with captions; or read and watch nothing, thereby serving as a control group.

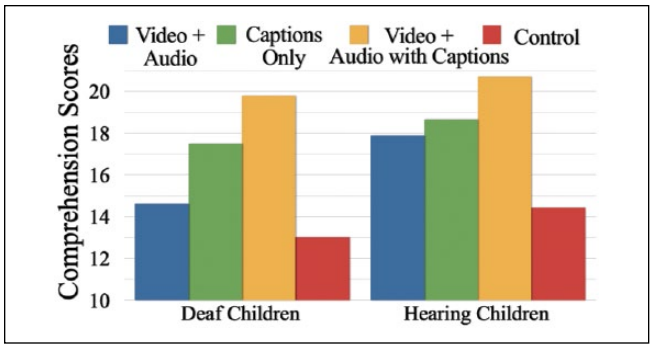

Figure 1. Data from Nugent (1983).

The children's scores on a 23-item comprehension test are illustrated in Figure 1. Statistical analyses identified two main effects: a main effect of hearing status (hearing children scored higher on the comprehension test than D/deaf children) and a second, even more powerful, main effect of captioning. A lack of a statistical interaction between hearing status and captioning indicated that captions were as beneficial to the hearing children as they were to the D/deaf children.

Several other studies demonstrate the same effect: Video with audio and with captions leads to the highest levels of comprehension, both for D/deaf children and for hearing children (Anderson-Inman et al., 2009; Boyd & Vader, 1972; Cambra, Leal, & Silvestre, 2010; Fischer, 1971; Gulliver & Ghinea, 2003; Hertzog, Stinson, & Keiffer, 1989; Murphy-Berman & Jorgensen, 1980; Murphy-Berman & Whobrey, 1983; Nugent, 1983; Steinfeld, 1998; Yoon & Choi, 2010).

Captions Benefit Hearing Children Learning to Read

Even for hearing children, learning to read is a complex process, which requires learning to map sound and meaning onto text (Linebarger, 2001). Soon after captions began appearing on TV shows for D/deaf audiences, educators of hearing children made a striking discovery: Because captions explicitly illustrate the mapping among sound, meaning, and text, captions could also benefit hearing children learning to read (Adler, 1985; Kirkland, Byrom, MacDougall, & Corcoran, 1995; Koskinen, Wilson, & Jensema, 1986; Parkhill, Johnson, & Bates, 2011).

For example, Figure 2 displays the results of a study of 70 hearing children learning to read (Linebarger et al., 2010). Second and third graders were randomly assigned either to watch videos with audio but without captions or to watch videos with audio and with captions. The children watched six ½-hr videos, which were episodes of PBS children's shows (e.g., *Arthur & Friends, Magic School Bus, Zoom*).

As Figure 2 illustrates, watching videos with audio and captions leads to significantly better reading skills. Children who watch captioned videos are better able to define content

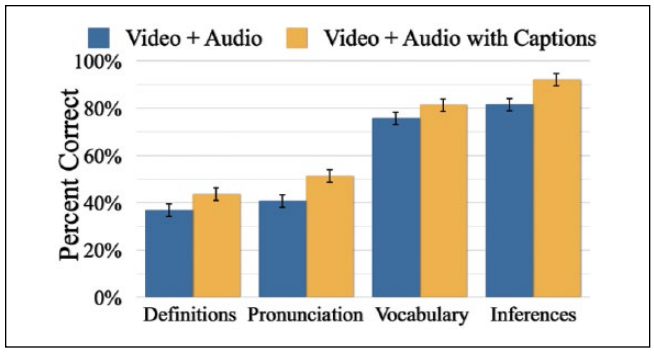

Figure 2. Data from Linebarger, Piotrowski, and Greenwood (2010).

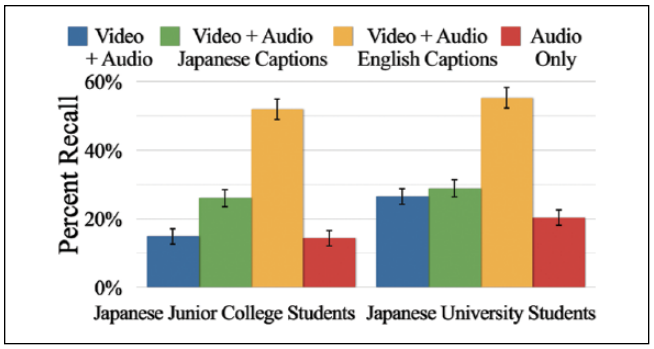

Figure 3. Data from Yoshino, Kano, and Akahori (2000).

words that were heard in the videos, pronounce novel words, recognize vocabulary items (which may or may not have been heard in the videos), and draw inferences about what happened in the videos. Other studies demonstrate cumulative benefits from watching videos with captions, for example, cumulative growth in vocabulary both for hearing children (Koskinen et al., 1986) and for hearing adults (Griffin & Dumestre, 1992-1993).

Captions Benefit Hearing Adults

After discovering that captions benefit hearing children learning to read, researchers investigated whether captions also benefit hearing adults learning to read. They do (Koskinen, Knable, Markham, Jensema, & Kane, 1995-1996; Kothari, Pandey, & Chudgar, 2004; Kruger, Kruger, & Verhoef, 2007).

For example, in the late 1990s, researchers encouraged India's national television network to begin captioning popular Bollywood music videos, which were sung and captioned in Hindi. The literacy of thousands of adults was assessed before the captioned music videos began airing and several years later. The literacy of adults who frequently watched the captioned videos increased at a much greater pace than the literacy of adults who rarely or never watched the captioned videos (Kothari & Bandyopadhyay, 2014).

Even highly literate adults benefit from captions. For example, when highly literate adults watch television commercials that are captioned, they remember brand names better (Brasel & Gips, 2014), and when highly literate college students watch course lectures that are captioned, they remember course content better (Steinfeld, 1998). Captions benefit hearing adults, just as captions benefit hearing children.

Captions Benefit Hearing Persons Learning a Second Language

Captions for D/deaf persons were co-opted from foreign-language subtitles for hearing persons. In the early 1980s, as captions for D/deaf persons became more prominent, second-language instructors began re-co-opting captions for hearing persons, to improve second-language literacy (Price, 1983; Vanderplank, 2013). Scores of studies demonstrate that captions in a second language benefit hearing persons learning that second language; indeed, captions in a second language benefit hearing persons learning that second language even more than captions in the persons' native language.

For example, Figure 3 displays the results from nearly 150 Japanese junior college and university students learning English as a second language (Yoshino, Kano, & Akahori, 2000). The students watched three types of videos: videos with English audio but without any captions, videos with English audio and Japanese captions, videos with English audio and English captions. In a fourth condition, the students listened to only the English audio.

After watching each type of video (or listening to only the audio) twice, in counter-balanced order, the students recalled as much content as they could using either Japanese and English. The students recalled substantially more content after they watched the videos with English captions than after they watched the same videos with Japanese captions. In fact, after watching the videos with Japanese captions, the students recalled as little as they recalled after not even watching the videos (the audio only condition).

Captions (same-language subtitles) also improve second-language learners' listening comprehension. Figure 4 displays data from University of Southern California students learning English as a second language (Huang & Eskey, 1999-2000). The students were randomly assigned to watch videos with English audio and English captions or with English audio but without captions. Watching videos with English captions not only improved the students' performance when tested with a written comprehension test, but also improved the students' performance when tested with an auditory, listening, comprehension test.

Captions benefit hearing persons learning a second language, regardless of genre. Figure 5a displays data from 70 college students learning English as a second language, and Figure 5b displays data from 40 English-speaking college students learning Russian as a second language (Garza, 1991). The students learning English as a second language were randomly

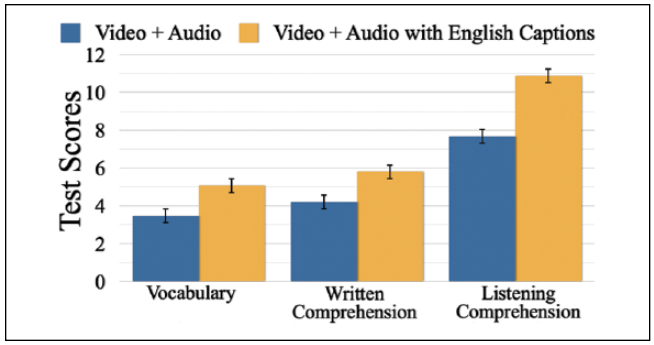

Figure 4. Data from Huang and Eskey (1999-2000).

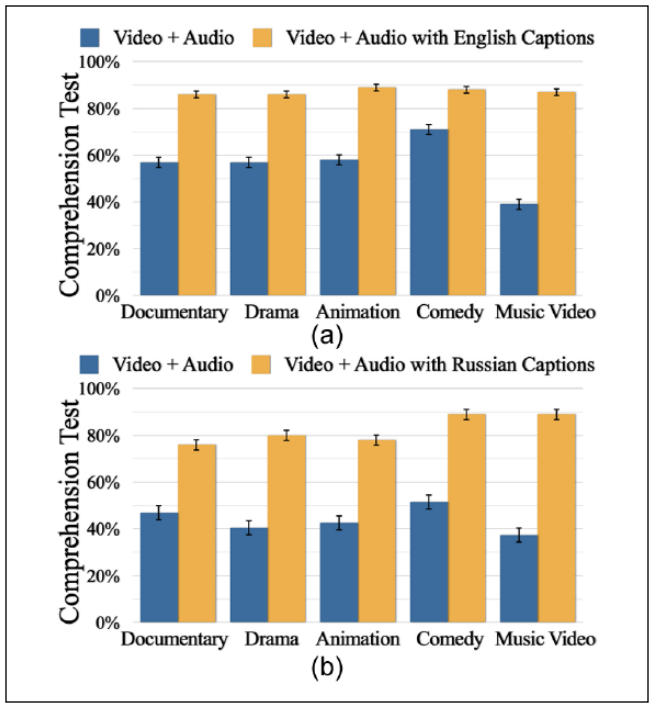

Figure 5. Data from Garza (1991).

assigned to watch videos with English audio and with or without English captions. The students learning Russian as a second language were randomly assignment to watch videos with Russian audio and with or without Russian captions.

As both Figures 5a and 5b illustrate, watching videos with same-language captions leads to significantly better comprehension. Captions benefit comprehension, regardless of the language being learned (Russian or English) and regardless of the genre being watched, from documentaries *(The Sharks)* to dramas *(Hoosiers)* to animations *(An American Tail)* to comedies *(The Secret of My Success)* to music videos *(The Authority Song)*.

What Are the Policy Implications?

The empirical evidence is clear: Captions, also known as same-language subtitles, benefit everyone who watches videos. More than 100 studies document that captioning a video improves comprehension of, memory for, and attention to videos, for children, adolescents, college students, and adults. Although captions particularly benefit persons watching videos in their non-native language, children and adults learning to read, and persons who are D/deaf or hard of hearing, captions also benefit highly literate, hearing adults.

With so many studies documenting the benefits of captions, why does everyone not always turn on the captions every time they watch a video? Regrettably, the benefits of captions are not widely known. Some researchers are unaware of the wide-ranging benefits of captions because the empirical evidence is published across separate literatures (deaf education, second-language learning, adult literacy, and reading acquisition). Bringing together these separate literatures is the primary purpose of this article.

Reaping the benefits of captions is also impeded by erroneous attitudes (e.g., Weasenforth, 1994). Many people think captions are intended for, and therefore only beneficial to, persons who are D/deaf. For example, in a survey of several hundred K-12 educators across 45 U.S. states, almost all of whom were experienced teachers who frequently showed videos in their classroom, the majority had never turned on the captions on those videos. The minority who had, reported their students having reaped benefits from the captions (Bowe & Kaufman, 2001).

Similarly, faculty and administrators in higher education are unlikely to be aware of the benefits of captions for university students, despite the fact that captions perfectly illustrate the fundamental principle of Universal Design. Like curb cuts and elevators, captions were initially developed for persons with disabilities, and, like curb cuts and elevators, captions benefit persons with and without disabilities. Indeed, the overwhelmingly vast majority of persons who benefit from curb cuts and elevators are not persons with disabilities, and the same could be true for captions.

The Institute of International Education reports that international students are enrolling in U.S. colleges and universities at an all-time high, a whopping 72% increase in only the past decade. Nearly a third of the international students studying in the United States are from China (Redden, 2014). Given the increasing number of students in U.S. institutions of higher education who are not native English speakers and given the powerful benefits of captions to non-native speakers, it would behoove professors to turn on captions.

Unfortunately, a primary reason that everyone who watches videos is not benefitting from captions is that not all videos are captioned. Despite U.S. laws, which cover many workplace and educational contexts, many video audiences and video creators are naïve about the legal mandate to caption, much less the empirical benefit of captions. Some organizations rely solely on automatically generated captions (e.g., the auto-generated captions found on many YouTube videos).

However, as recent litigation (Orzeck, 2015) as well as empirical data (Pan, Jiang, Yao, Picheny, & Qin, 2010) demonstrate,

captions generated via automated speech recognition are not yet without interfering error. When auto-generated captions reach parity with human-transcribed captions, further technologies, including real-time captioning of lectures for all students (Bain, Basson, Faisman, & Kanevsky, 2005), will be able to harness the power of captions for the broadest population ever.

References

Studies cited in the article are in boldface.

Benefits of Captions: D/Deaf and Hard of Hearing Children, Adolescents, and Adults

Anderson-Inman, L., Terrazas-Arellanes, F. E., & Slabin, U. (2009). Supported eText in captioned videos: A comparison of expanded versus standard captions on student comprehension of educational content. *Journal of Special Education Technology*, *24*, 21-34.

Austin, B. A. (1980). The deaf audience for television. *Journal of Communication*, *30*, 25-30.

Bain, K., Basson, S., Faisman, A., & Kanevsky, D. (2005). Accessibility, transcription, and access everywhere. *IBM Systems Journal*, *44*, 589-603.

Boyd, J., & Vader, E. A. (1972). Captioned television for the deaf. *American Annals of the Deaf*, *117*, 34-37.

Braverman, B. B., Harrison, M. F., Bowker, D. O., & Hertzog, M. (1981). Effects of language level and visual display on learning from captioned instruction. *Educational Communication and Technology Journal*, *29*, 147-154.

Burnham, D., Leigh, G., Noble, W., Jones, C., Tyler, M., Grebennikov, L., & Varley, A. (2008). Parameters in television captioning for deaf and hard-of-hearing adults: Effects of caption rate versus text reduction on comprehension. *Journal of Deaf Studies and Deaf Education*, *13*, 391-404.

Caldwell, D. C. (1973). Use of graded captions with instructional television for deaf learners. *American Annals of the Deaf*, *118*, 500-507.

Cambra, C., Leal, A., & Silvestre, N. (2010). How deaf and hearing adolescents comprehend a televised story. *Deafness & Education International*, *12*, 34-51.

Cambra, C., Silvestre, N., & Leal, A. (2009). Comprehension of television messages by deaf students at various stages of education. *American Annals of the Deaf*, *153*, 425-434.

Carney, E., & Verlinde, R. (1987). Caption decoders: Expanding options for hearing impaired children and adults. *American Annals of the Deaf*, *132*, 73-77.

Dowaliby, F. J., Enders, M., Schragle, P., & Verlinde, R. (1984). A comparison of captioned, classroom, and prose instruction for hearing-impaired learners. *American Annals of the Deaf*, *129*, 375-377.

Fischer, D. C. (1971). *Improvement in the utilization of captioned films for the deaf* (Unpublished doctoral dissertation). University of Nebraska, Lincoln.

Franco, E. P. C., & Araújo, V. L. S. (2003). Reading television: Checking deaf people's reactions to closed subtitling in Fortaleza, Brazil. *The Translator*, *9*, 249-267.

Gulliver, S. R., & Ghinea, G. (2003). How level and type of deafness affect user perception of multimedia video clips. *Universal Access in the Information Society*, *2*, 374-386.

Hertzog, M., Stinson, M. S., & Keiffer, R. (1989). Effects of caption modification and instructor intervention on comprehension of a technical film. *Educational Technology Research & Development*, *37*, 59-68.

Jelinek Lewis, M. S., & Jackson, D. W. (2001). Television literacy: Comprehension of program content using closed captions for the deaf. *Journal of Deaf Studies and Deaf Education*, *6*, 43-53.

Jensema, C. J., El Sharkawy, S., Danturthi, R. S., Burch, R., & Hsu, D. (2000). Eye movement patterns of captioned television viewers. *American Annals of the Deaf*, *145*, 275-285.

Kirkland, C. E. (1999). Evaluation of captioning features to inform development of digital television captioning capabilities. *American Annals of the Deaf*, *144*, 250-260.

Koskinen, P. S., Wilson, R. M., & Jensema, C. J. (1986). Using closed-captioned television in the teaching of reading to deaf students. *American Annals of the Deaf*, *131*, 43-46.

Lang, H. G., & Steely, D. (2003). Web-based science instruction for deaf students: What research says to the teacher. *Instructional Science*, *31*, 277-298.

Loeterman, M., Kelly, R. R., Samar, V. J., Parasnis, I., & Berent, G. P. (1994, April). *Personal captioning for students with language-related learning needs*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Marschark, M., Leigh, G., Sapere, P., Burnham, D., Convertino, C., Stinson, M., . . . Noble, W. (2006). Benefits of sign language interpreting and text alternatives for deaf students' classroom learning. *Journal of Deaf Studies and Deaf Education*, *11*, 421-437.

McCoy, E., & Shumway, R. (1979). Real-time captioning: Promise for the future. *American Annals of the Deaf*, *124*, 681-690.

Murphy-Berman, V., & Jorgensen, J. (1980). Evaluation of a multi-level linguistic approach to captioning television for hearing impaired children. *American Annals of the Deaf*, *125*, 1072-1081.

Murphy-Berman, V., & Whobrey, L. (1983). The impact of captions on hearing-impaired children's affective reactions to television. *The Journal of Special Education*, *17*, 47-62.

Norwood, M. J. (1976). Captioned films for the deaf. *Exceptional Children*, *43*, 164-166.

Norwood, M. J. (1980). Just don't scramble the wrong egg. In B. Braverman & B. J. Cronin (Eds.), *Captioning: Shared perspectives* (pp. 1-9). Rochester, NY: National Technical Institute for the Deaf.

Nugent, G. C. (1983). Deaf students' learning from captioned instruction: The relationship between the visual and caption display. *The Journal of Special Education*, *17*, 227-234.

Orzeck, K. (2015). Deaf advocates sue Harvard, MIT for better webcast captions. *Law360*. Retrieved from http://www.law360.com/articles/621255/deaf-advocates-sue-harvard-mit-for-better-webcast-captions

Schuchman, J. S. (2004). The silent film era: Silent films, NAD films, and the deaf community's response. *Sign Language Studies*, *4*, 231-238.

Shroyer, E. H., & Birch, J. (1980). Captions and reading rates of hearing-impaired students. *American Annals of the Deaf*, *125*, 916-922.

Steinfeld, A. (1998). The benefit of real-time captioning in a mainstream classroom as measured by working memory. *Volta Review*, *100*, 29-44.

Stinson, M. S., Elliot, L. B., Kelly, R. R., & Liu, Y. (2009). Deaf and hard-of-hearing students' memory of lectures with speech-to-text and interpreting/notetaking services. *The Journal of Special Education*, *43*, 52-64.

Strassman, B. K., & O'Dell, K. (2012). Using open captions to revise writing in digital stories composed by D/deaf and hard of hearing students. *American Annals of the Deaf*, *157*, 340-357.

Thorn, F., & Thorn, S. (1996). Television captions for hearing-impaired people: A study of key factors that affect reading performance. *Human Factors*, *38*, 452-463.

Yoon, J.-O., & Choi, H. (2010, June). *The effects of captions on deaf students' contents comprehension, cognitive load and motivation in online learning*. Paper presented at the Technology and Deaf Education Symposium: Exploring Instructional and Access Technologies, Rochester, NY.

Benefits of Captions: Hearing Children and Adolescents

Adler, R. (1985). Using closed-captioned television in the classroom. In L. Gambrell & E. McLaughlin (Eds.), *New directions in reading: Research and practice* (pp. 11-18). Silver Spring, MD: Yearbook of the State of Maryland International Reading Association.

Bowe, F. G., & Kaufman, A. (2001). *Captioned media: Teacher perceptions of potential value for students with no hearing impairments: A national survey of special educators*. Spartanburg, SC: Described and Captioned Media Program.

Davey, R., & Parkhill, F. (2012). Raising adolescent reading achievement: The use of sub-titled popular movies and high interest literacy activities. *English in Aotearoa*, *78*, 61-71.

Goldman, M., & Goldman, S. (1988). Reading with close-captioned TV. *Journal of Reading*, *31*, 458-461.

Kirkland, C. E., Byrom, E. M., MacDougall, M. A., & Corcoran, M. D. (1995, April). *The effectiveness of television captioning on comprehension and preference*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Koskinen, P. S., Wilson, R. M., Gambrell, L. B., & Neuman, S. B. (1993). Captioned video and vocabulary learning: An innovative practice in literacy instruction. *The Reading Teacher*, *47*, 36-43.

Koskinen, P. S., Wilson, R. M., & Jensema, C. J. (1985). Closed-captioned television: A new tool for reading instruction. *Reading World*, *24*, 1-7.

Koskinen, P., Wilson, R. M., Gambrell, L. B., & Jensema, C. (1986). Using closed captioned television to enhance reading skills of learning disabled students. *National Reading Conference Yearbook*, *35*, 61-65.

Kothari, B., & Bandyopadhyay, T. (2014). Same language subtitling of Bollywood film songs on TV: Effects on literacy. *Information Technologies & International Development*, *10*, 31-47.

Kothari, B., & Takeda, J. (2000). Same language subtitling for literacy: Small change for colossal gains. In S. C. Bhatnagar & R. Schware (Eds.), *Information and communication technology in development* (pp. 176-186). New Delhi, India: SAGE.

Kothari, B., Takeda, J., Joshi, A., & Pandey, A. (2002). Same language subtitling: A butterfly for literacy? *International Journal of Lifelong Education*, *21*, 55-66.

Linebarger, D. L. (2001). Learning to read from television: The effects of using captions and narration. *Journal of Educational Psychology*, *93*, 288-298.

Linebarger, D., Piotrowski, J. T., & Greenwood, C. R. (2010). On-screen print: The role of captions as a supplemental literacy tool. *Journal of Research in Reading*, *33*, 148-167.

Mechling, L. (2005). The effect of instructor-created video programs to teach students with disabilities: A literature review. *Journal of Special Education Technology*, *20*, 25-36.

Parkhill, F., & Davey, R. (2012). We enjoyed it and we learned at the same time! *Practically Primary*, *17*, 8-11.

Parkhill, F., Johnson, J., & Bates, J. (2011). Capturing literacy learners: Evaluating a reading programme using popular novels and films with subtitles. *Digital Culture & Education*, *3*, 140-156.

Rickelman, R. J., Henk, W. A., & Layton, K. (1991). Closed-captioned television: A viable technology for the reading teacher. *The Reading Teacher*, *44*, 598-599.

Benefits of Captions: Hearing Adults

Bean, R. M., & Wilson, R. M. (1989). Using closed captioned television to teach reading to adults. *Reading Research and Instruction*, *28*, 27-37.

Brasel, S. A., & Gips, J. (2014). Enhancing television advertising: Same-language subtitles can improve brand recall, verbal memory, and behavioral intent. *Journal of the Academy of Marketing Science*, *42*, 322-336.

d'Ydewalle, G., & de Bruycker, W. (2007). Eye movements of children and adults while reading television subtitles. *European Psychologist*, *12*, 196-205.

d'Ydewalle, G., & Gielen, I. (1992). Attention allocation with overlapping sound, image, and text. In K. Rayner (Ed.), *Eye movements and visual cognition: Scene perception and reading* (pp. 415-427). New York, NY: Springer.

d'Ydewalle, G., Praet, C., Verfaillie, K., & van Rensbergen, J. (1991). Watching subtitled television: Automatic reading behavior. *Communication Research*, *18*, 650-666.

Findlater, L., Balakrishnan, R., & Toyama, K. (2009, April). *Comparing semiliterate and illiterate users' ability to transition from audio + text to text-only interaction*. Paper presented at CHI 2009, Boston, MA.

Griffin, R., & Dumestre, J. (1992-1993). An initial evaluation of the use of captioned television to improve the vocabulary and reading comprehension of navy sailors. *Journal of Educational Technology Systems*, *21*, 193-206.

Hinkin, M. P., Harris, R. J., & Miranda, A. T. (2014). Verbal redundancy aids memory for filmed entertainment dialogue. *The Journal of Psychology*, *148*, 161-176.

Kothari, B. (2008). Let a billion readers bloom: Same language subtitling (SLS) on television for mass literacy. *International Review of Education*, *54*, 773-780.

Kothari, B., Pandey, A., & Chudgar, A. R. (2004). Reading out of the "idiot box": Same-language subtitling on television in India. *Information Technologies & International Development*, *2*, 23-44.

Kruger, J.-L., Kruger, H., & Verhoef, M. (2007). Subtitling and the promotion of multilingualism: The case of marginalised languages in South Africa. *Linguistica Antverpiensia*, *6*, 35-49.

Benefits of Second-Language Captions: Hearing College Students

Alkhatnai, M. (2012). The effect of TV captions on the comprehension of non-native Saudi learners of English. *Sino-US English Teaching*, *9*, 1573-1579.

Al-Seghayer, K. (2001). The effect of multimedia annotation modes on L2 vocabulary acquisition: A comparative study. *Language Learning & Technology*, *5*, 202-232.

Berwald, J.-P. (1979). Teaching foreign languages by means of subtitled visuals. *Foreign Language Annals*, *12*, 375-378.

Blane, S. (1996). Interlingual subtitling in the languages degree. In P. Sewell & I. Higgins (Eds.), *Teaching translation in universities: Present and future perspectives* (pp. 183-208). London, England: Association for French Language Studies and Centre for International Language Teaching Research.

Borrás, I., & Lafayette, R. C. (1994). Effects of multimedia courseware subtitling on the speaking performance of college students of French. *The Modern Language Journal*, *78*, 61-75.

Chang, C.-C., Tseng, K.-H., & Tseng, J.-S. (2011). Is single or dual channel with different English proficiencies better for English listening comprehension, cognitive load and attitude in ubiquitous learning environment? *Computers & Education*, *57*, 2313-2321.

Chung, J.-M. (1999). The effects of using video texts supported with advance organizers and captions on Chinese college students' listening comprehension: An empirical study. *Foreign Language Annals*, *32*, 295-308.

Danan, M. (1992). Reversed subtitling and dual coding theory: New directions for foreign language instruction. *Language Learning*, *42*, 497-527.

d'Ydewalle, G., Van Rensbergen, J., & Pollet, J. (1987). Reading a message when the same message is available auditorily in another language: The case of subtitling. In J. K. O'Regan & A. Lévy-Schoen (Eds.), *Eye movements: From physiology to cognition* (pp. 313-321). Amsterdam, The Netherlands: Elsevier Science.

Etemadi, A. (2012). Effects of bimodal subtitling of English movies on content comprehension and vocabulary recognition. *International Journal of English Linguistics*, *2*, 239-248.

Fazilatfar, A. M., Ghorbani, S., & Samavarchi, L. (2011). The effect of standard and reversed subtitling versus no subtitling mode on L2 vocabulary learning. *The Journal of Teaching Language Skills*, *3*, 43-64.

Garza, T. J. (1991). Evaluating the use of captioned video materials in advanced foreign language learning. *Foreign Language Annals*, *24*, 239-258.

Ghasemboland, F., & Nafissi, Z. (2012). The effects of using English captions on Iranian EFL students' listening comprehension. *Procedia—Social and Behavioral Sciences*, *64*, 105-112.

Gorjian, B. (2014). The effect of movie subtitling on incidental vocabulary learning among EFL learners. *International Journal of Asian Social Science*, *4*, 1013-1026.

Grgurović, M., & Hegelheimer, V. (2007). Help options and multimedia listening: Students' use of subtitles and the transcript. *Language Learning & Technology*, *11*, 45-66.

Guillory, H. G. (1998). The effects of keyword captions to authentic French video on learner comprehension. *CALICO Journal*, *15*, 89-108.

Harji, M. B., Woods, P. C., & Alavi, Z. K. (2010). The effect of viewing subtitled videos on vocabulary learning. *Journal of College Teaching and Learning*, *7*, 37-42.

Hayati, A., & Mohmedi, F. (2011). The effect of films with and without subtitles on listening comprehension of EFL learners. *British Journal of Educational Technology*, *42*, 181-192.

Huang, H.-C., & Eskey, D. E. (1999-2000). The effects of closed-captioned television on the listening comprehension of intermediate English as a second language (ESL) students. *Journal of Educational Technology Systems*, *28*, 75-96.

Hui, W. (2007). The effects of captions on Chinese EFL students' incidental vocabulary acquisition. *CELEA Journal*, *30*, 9-16.

Markham, P. (2000-2001). The influence of culture-specific background knowledge and captions on second language comprehension. *Journal of Educational Technology Systems*, *29*, 331-343.

Markham, P. L. (1992-1993). Captioned television videotapes: Effects of visual support on second language comprehension. *Journal of Educational Technology Systems*, *21*, 183-191.

Markham, P. L. (1999). Captioned videotapes and second-language listening word recognition. *Foreign Language Annals*, *32*, 321-328.

Markham, P., & Peter, L. (2002-2003). The influence of English language and Spanish language captions on foreign language listening/reading comprehension. *Journal of Educational Technology Systems*, *31*, 331-341.

Montero Pérez, M. M., Peters, E., & Desmet, P. (2013). Is less more? Effectiveness and perceived usefulness of keyword and full captioned video for L2 listening comprehension. *ReCALL*, *26*, 21-43.

Price, K. (1983). Closed-captioned TV: An untapped resource. *MATSOL Newsletter*, *12*, 1-8.

Redden, E. (2014, December 1). Teaching international students. *Inside Higher Ed*. Retrieved from https://www.insidehighered.com/news/2014/12/01/increasing-international-enrollments-faculty-grapple-implications-classrooms

Shea, P. (2000). Leveling the playing field: A study of captioned interactive video for second language learning. *Journal of Educational Computing Research*, *22*, 243-263.

Stewart, M. A., & Pertusa, I. (2004). Gains to language learners from viewing target closed-captioned films. *Foreign Language Annals*, *37*, 438-442.

Taylor, G. (2005). Perceived processing strategies of students watching captioned video. *Foreign Language Annals*, *38*, 422-427.

Winke, P., Gass, S., & Sydorenko, T. (2010). The effects of captioning videos used for foreign language listening activities. *Language Learning & Technology*, *14*, 65-86.

Yoshino, S., Kano, N., & Akahori, K. (2000). The effects of English and Japanese captions on the listening comprehension of Japanese EFL students. *Language Laboratory*, *37*, 111-130.

Yüksel, D., & Tanriverdi, B. (2009). Effects of watching captioned movie clip on vocabulary development of EFL learners. *The Turkish Online Journal of Educational Technology*, *8*, 48-54.

Zarei, A. A., & Rashvand, Z. (2011). The effect of interlingual and intralingual, verbatim and nonverbatim subtitles on L2 vocabulary comprehension and production. *Journal of Language Teaching and Research*, *2*, 618-625.

Benefits of Second-Language Captions: Hearing Children and Adults

Hsu, C.-K., Hwang, G.-J., Chang, Y.-T., & Chang, C.-K. (2013). Effects of video caption modes on English listening comprehension and vocabulary acquisition using handheld devices. *Journal of Educational Technology & Society*, *16*, 403-414.

Kadoyama, T. (1996). An overview of closed captions research in the United States and its implications to EFL classrooms in Japan. *Studies in the Humanities and Sciences*, *37*, 257-279.

Koolstra, C. M., & Beentjes, J. W. J. (1999). Children's vocabulary acquisition in a foreign language through watching subtitled television programs at home. *Educational Technology Research & Development*, *47*, 51-60.

Koskinen, P., Knable, J. E., Markham, P. L., Jensema, C. J., & Kane, K. W. (1995-1996). Captioned television and the vocabulary acquisition of adult second language correctional facility residents. *Journal of Educational Technology Systems*, *24*, 359-373.

Kruger, J.-L., & Steyn, F. (2013). Subtitles and eye tracking: Reading and performance. *Reading Research Quarterly*, *49*, 105-120.

Mitterer, H., & McQueen, J. M. (2009). Foreign subtitles help but native-language subtitles harm foreign speech perception. *PLoS ONE*, *4*, e7785.

Neuman, S. B., & Koskinen, P. (1992). Captioned television as comprehensible input: Effects of incidental word learning from context for language minority students. *Reading Research Quarterly*, *27*, 95-106.

Pan, Y.-X., Jiang, D.-N., Yao, L., Picheny, M., & Qin, Y. (2010, April). *Effects of automated transcription quality on non-native speakers' comprehension in real-time computer-mediated communication*. Paper presented at CHI 2010: Sound and Speech, Atlanta, GA.

Vanderplank, R. (2010). Déjà vu? A decade of research on language laboratories, television and video in language learning. *Language Teaching*, *43*, 1-37.

Vanderplank, R. (2013). "Effects of" and "effects with" captions: How exactly does watching a TV programme with same-language subtitles make a difference to language learners? *Language Teaching*, *48*, 1-16.

Weasenforth, D. L. (1994, March). *Closed captioning: Students' responses*. Paper presented at the Annual Meeting of the Teachers of English to Speakers of Other Languages, Baltimore, MD.

History and Theory of Captions

Bird, S. A., & Williams, J. N. (2002). The effect of bimodal input on implicit and explicit memory: An investigation into the benefits of within-language subtitling. *Applied Psycholinguistics*, *23*, 509-533.

Block, M. H., & Okrand, M. (1983). Real-time closed-captioned television as an educational tool. *American Annals of the Deaf*, *128*, 636-641.

Caldwell, D. C. (1981). Closed-captioned television: Educational and sociological implications for hearing impaired learners. *American Annals of the Deaf*, *126*, 627-630.

Cronin, B. J. (1980). Closed-caption television: Today and tomorrow. *American Annals of the Deaf*, *125*, 726-728.

Downey, G. (2010). Teaching reading with television: Constructing closed captioning using the rhetoric of literacy. In A. R. Nelson & J. L. Rudolph (Eds.), *Education and the culture of print in modern America* (pp. 191-214). Madison: University of Wisconsin Press.

Downey, G. J. (2008). *Closed captioning: Subtitling, stenography, and the digital convergence of text with television*. Baltimore, MD: Johns Hopkins University Press.

Erath, A. S., & Larkin, V. M. (2004). Making distance education accessible for students who are deaf and hard-of-hearing. *Assistive Technology: The Official Journal of RESNA*, *16*, 116-123.

King, J. (2002). Using DVD feature films in the EFL classroom. *Computer Assisted Language Learning*, *15*, 509-523.

Mayer, R. E., & Anderson, R. B. (1991). Animations need narrations: An experimental test of a dual-coding hypothesis. *Journal of Educational Psychology*, *83*, 484-490.

Withrow, F. B. (1994). Jericho: The walls come tumbling down! *American Annals of the Deaf*, *139*, 18-21.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study was supported by Vilas Research Trust.