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Toward A Theory of Media Reconciliation: An Exploratory Study of Closed Captioning

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TOWARD A THEORY OF MEDIA RECONCILIATION:
A CLOSED CAPTIONING EXPLORATORY STUDY

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A Dissertation
Presented to
the Graduate School of
Clemson University

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In Partial Fulfillment
Of the Requirements for the Degree
Doctor of Philosophy
Rhetorics, Communication, and Information Design

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By
Nicole Elaine Snell
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Accepted by:
Dr. Tharon Howard, Dissertation Chair
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ABSTRACT

This project is an interdisciplinary empirical study that explores the emotional experiences resulting from the use of the assistive technology closed captioning. More specifically, this study focuses on documenting the user experiences of both the D/deaf and Hearing multimedia user in an effort to better identify and understand those variables and processes that are involved with facilitating and supporting connotative and emotional meaning making. There is an ever present gap that defines closed captioning studies thus far, and this gap is defined by the emphasis on understanding and measuring denotative meaning making behavior while largely ignoring connotative meaning making behavior that is necessarily an equal participant in a user's viewing experience. This study explores connotative and emotional meaning making behaviors so as to better understand the behavior exhibited by users engaged with captioned multimedia. To that end, a mixed methods design was developed that utilizes qualitative methods from the field of User Experience (UX) to explore connotative equivalence between D/deaf and Hearing users and an augmented version of S. R. Gulliver and G. Ghinea's (2003) quantitative measure Information Assimilation (IA) from the field of Human Computer Interaction (HCI) to measure the denotative equivalence between the two user types. To measure denotative equivalence a quiz containing open - ended questions to measure IA was used. To measure connotative equivalence the following measures were used:

1) Likert scales to measure users' confidence in answers to open - ended questions.

2) Likert scale to measure users' interest in the stimulus.

3) Open - ended questions to identify scenes that elicited the strongest emotional responses from users.

4) Four- level response questions with accompanying Likert scales to determine strength of emotional reaction to three select excerpts from the stimulus.

5) An interview consisting of three open - ended questions and one fixed - choice question.

This study found that there were no major differences in the denotative equivalence between the D/deaf and Hearing groups; however, there were important differences in the emotional reactions to the stimulus that indicate there was not connotative equivalence between the groups in response to the emotional content. More importantly, this study found that the strategies used to understand the information users were presented with, in order to create both denotative and connotative meaning, differed between groups and individuals within groups. To explain such behaviors observed, this work offers a theory of *Media Reconciliation* based on Wolfgang Iser's (1980) phenomenological theory about the "virtual text".

DEDICATION

This dissertation is dedicated to my late Uncle Rupert Richardson who, from the first, believed in me – mind, body, and soul. I love and miss you every day Uncle Rupie.

"Yet not to thine eternal resting place

Shalt thou retire alone ...

The youth in life's green spring, and he who goes

In the full strength of years, matron and maid,

And the sweet babe, and the grey–headed man -

Shall one by one be gathered to thy side,

By those, who in their turn shall follow them."

- William Cullen Bryant

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CHAPTER ONE

INTRODUCTION

1.1 Statement of Research Problem

For the average hearing person, closed captioning is a technology rarely used; only in the context of a crowded bar or a hotel lobby do most use closed captioning and even then its use often produces frustration or uneasiness in the viewer. Such frustration oftentimes stems from the overlay of captions on other textual information presented on the screen, such as game scores and statistics or tickers with information about stocks or current events such as those seen on CNN. An additional and perhaps primary source of frustration stems from the fact that the introduction of captions, changes what was once a passive television act of viewing into an act that requires active and continual attention. Closed captioning alters the viewing process and forces the viewer to adapt their behavior from viewing to reading (Jensema et al., 2000); this change from viewing to reading likely changes the overall user experience. This study is an effort to better understand the nature of users' overall experience with captioning. Through close observation of how both D/deaf and Hearing users attempt to make both denotative as well as emotional meaning from the same video, this study seeks to better understand the mechanisms which operate when captioning changes a users' overall experience with a piece of multimedia.

Closed captioning is defined in the *Oxford English Dictionary* as a "system providing television programme subtitles, accessible through a decoder (now usually integral to the television) and optionally displayed"; as a system designed for processing

and moving information over time and space along a broadcast signal (Downey 2008);

and as "the visual display of the audio portion of video programming, which provides

access to individuals who are deaf or hard of hearing" (FCC *See infra* App. B, §

79.4(a)(6)). Closed captioning[1], in the most basic sense, is a technology charged with the

task of transcribing into text, spoken dialogue and certain audible cues of a media

soundtrack. It is a technology that was developed to bridge the gap left in the transition

from silent films to talkies[2], and has become a technology, as defined by US law, that

ensures the civil right of an individual to have access to emergency information, national

and local news, and public entertainment regardless of their physiological abilities.

Moreover, closed captioning, given the proliferation of computer-based media and the

Twenty-First Century Communications and Video Accessibility Act of 2010, is a

technology that can be used to make certain that individuals with physiological and / or

environmental constraints, such as a quiet office setting, have the ability to view the

auditory dialogue of a multimedia piece broadcast over the Internet.

While such general definitions are effective in conveying what closed captioning

is, they do little, however, to explain how closed captioning creates meaning for its

primary audience that is comprised of D/deaf[3] and hard of hearing (HOH) individuals.

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[1] It should be noted that closed captioning is primarily a U.S. reference. Internationally, closed captioning is known as teletext, subtitles, and other closely related references.

[2] Movies with accompanying verbal soundtracks.

[3] The D/deaf designation derives from a complex history that defines the D/deaf community. Deaf designated with a capital "D" refers to those individuals who identify with and believe that deafness signifies a culture defined not by a lack of ability to hear but by a unique disposition and cultural practices/rituals. Manual communication is often the primary language used by those who identify as Deaf. On the other hand, deaf as designated by a lowercase "d" is associated with the medical community's label applied to those who have a severe to profound hearing loss. Such a label signifies a lack or rather a disability and situates a deaf individual in negative contrast to those individuals who have the ability to

Meaning making using captioning is a necessarily complex process, consisting of denotative and culturally contingent connotative understanding. To begin to understand captioning in this latter sense it is necessary to conceptualize closed captioning as being, beyond its base definitions, a "mediascape" that demands of its viewer an expertise in navigating its scape that is composed of competing sonic and visual features. Such navigation necessitates complete, continual, and yet episodic intervals of intense immersion within a meaning-making panorama that is built upon juxtapositions of images and print that attempt to effectively interconnect the audible with the visual. Closed captioning's success, by this account, lies in its ability to assist the viewer in not only understanding the denotative meaning being expressed in the spoken dialogue of a captioned piece, but also more importantly by captioning's proficiency in facilitating in its users emotional experiences that coincide with those suggested by and made available through the mix of spoken dialogue, music, and the visual action of the captioned media.

Such an understanding of closed captioning departs from general conceptions and studies of it that define its effectiveness and efficiency as being nearly exclusively contingent upon logo-centric variables. That is, the previous conception of it as not only assisting the viewer in understanding the denotative meaning being expressed in the spoken dialogue via its textual translation but also as enabling emotional experiences, departs from the traditional view of captioning's success as being dependent on language –based variables that enable denotative comprehension alone.

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hear. Those who identify as deaf may or may not use manual communication and may or may not identify with and participate in Deaf culture

Departure from this logo-centric paradigm is necessary, however, because traditional conceptions and definitions of captioning are deficient. They are deficient because they assume and position as primary to the success of captioned media, denotative meaning or rather "literal and primary meaning, independent of any connotations – emotional associations or secondary meanings – that a given individual might attach to it" (Murfin & Ray, 2003). Such emphasis on and positioning as primary of denotative meaning actively diminishes the importance, role, and examination of those variables that facilitate denotative meaning's compliment, connotative meaning: meaning that is dependent upon "broad cultural associations" along with certain knowledge or experience, and extends beyond denotation or literal meaning (Murfin & Ray, 2003) to include emotional response.

While traditional conceptions and definitions are deficient, it would be a mistake to say that they were not appropriate and necessary initially. Though overseen by the Federal Communications Commission (FCC), the current generation of closed captioning techniques was and is still currently largely handled by companies functioning within the private sector. This has resulted in variations in captioning, such as the placement of captions on the screen or the way in which captions are displayed. These stylistic variations, along with others, undoubtedly affected and continue to affect the overall effectiveness of captioning and, therefore, throughout the majority of captioning literature have been the focus of empirical investigations. The result of such studies was the establishment of basic parameters that defined what it meant to provide legible and comprehendible captioning to the caption viewing audience. Such parameters aided in the

movement to develop captioning best practices that ultimately enabled, in part, the

establishment of closed captioning as a reliable technology that qualified for exclusive

use of Line 21[4] in the national television broadcast signal. Moreover, since captioning

was originally overseen and funded through the Department of Health, Education, and

Welfare (HEW) it was conceived of first and foremost as an educational, text-based tool

with a focus on literacy and as such required that particular attention be paid to language–

based issues affecting the transmittal of information from which primarily denotative

meaning, with a secondary emphasis on connotative meaning, could effectively be

derived. This conception, however, meant largely ignoring the experiences the captioned

information created in the viewers during the viewing of captioned media and ultimately

resulted in the exclusion, or rather, suppression of the user experience.

The lack of attention to the viewer's experience, that is necessarily tied to the

variables that enable connotative meaning making, is problematic, especially so, when

U.S. Public Law (PL) 85- 905 and PL 87-715, in 1958 and 1962 respectively, introduce

captioning to U.S. legislation with the following explicit goals:

> "(a) to promote the general welfare of deaf persons by (1) bringing to such
>
> persons understanding and appreciation of those films which play such an
>
> important part in the general and cultural advancement of hearing persons,
>
> (2) providing, through these films, enriched educational and cultural
>
> experiences through which deaf persons can be brought into better touch
>
> with the realities of their environment, and (3) providing a wholesome and

---

[4] Line 21 is the vertical blanking interval line containing Northern American standard closed captioning information for analog TV broadcasts (Robson, 2004)

rewarding experience which deaf persons may share together…” (PL 85-905; 87-715).

Such goals, with emphasis on enabling the “understanding and *appreciation*” (emphasis added) of films while facilitating both “enriched educational and cultural experiences” that proffer a better understanding of the environment in which the D/deaf live, implies that in order for captioning to be successful, it must, in addition to facilitating denotative language-based understanding, enable emotional experiences while being viewed. Indeed, captioning, as it is conceptualized within the first public laws that sanction and fund it, requires that captioning facilitate for its audience viewing and meaning-making experiences that coincide with or are *equivalent* to the experiences of their hearing peers so as to enable an “understanding and appreciation” of films that use audio as one of its primary modes of communication. To ensure such a parallel in experience, connotative meaning-making behavior exhibited by caption users, beyond that which facilitates denotative understanding alone, must be examined.

To summarize the points so far:

1)   The traditional definitions of closed captioning focus on the denotative language –based meaning it facilitates while largely ignoring the connotative meaning that enables emotional experiences in its viewers; meaning that is necessary for comprehension.

2)   Closed captioning must be re-conceptualized as a technology that also facilitates emotional experiences in its viewers that coincide with those viewers who do not use closed captioning; and those variables that

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support / create emotional experiences must be investigated with the same intensity as those variables which support / create denotative meaning.

3) While the re-conception of closed captioning is needed, it does not displace nor downplay the importance of the initial and traditional emphasis that has been placed on investigating those variables that effect denotative meaning.

4) The public laws that founded and funded closed captioning imply that it was to be a technology that facilitated viewing and meaning-making experiences for the D/deaf audience that was *equivalent* to their hearing peers, so as to enable the "understanding and appreciation" of media that used audio as one of its primary modes of communication.

5) To ensure a roughly equivalent experience it is necessary examine connotative meaning making behavior.

1.2 Equivalency

The issue of providing equivalent experiences is often overlooked at the expense of accessibility. In fact, assistive technologies such as captioning, architectural designs, and computer interfaces, while promoting and enabling accessibility, provide an alternative rather than normative route to and navigation of information and spaces, both virtual and real. Designing alternative rather than normative navigation of information under the flag of accessibility necessarily marginalizes, among other things, those who must use the alternative route. And while efforts in the fields of disability theory,

universal design, and accessible design have been enacted to move toward developing designs for everyone and not only optimal users, there is still a gap present when it comes to the issue of equivalent experience – a legal requirement that most opt to avoid when speaking about the issue of accessibility.

This issue of accessibility taking precedence over equivalent experience is demonstrated by the regulations that govern captioning. The laws which emphasize making captioning accessible omit reference to equivalent experience, except in regard to maintaining similar captioning standards for Internet-based media[5]. And yet, in the case of captioning particularly, equivalency is central to its efficiency and effectiveness because it keeps captioning in alignment with those goals for which it was originally designed. It does so, by designating the success of captioning as being contingent upon its "power or capacity to produce ['the intended or appropriate effect']" [6](OED). The "effect", in this instance, referring to the original goals for which captioning was designed: to enable the "understanding and appreciation" of films, while facilitating both "enriched educational and cultural experiences" (PL 85-905; 87-715). Indeed, it is not possible for captioning to provide the aforementioned without acknowledging the role connotative meaning plays in enabling and supporting the emotional experiences of users engaged with captioned media and giving attention to the behavior that creates it.

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[5] Refer to "Equal Captioning Experience" in the First Report of the Video Programming Accessibility Advisory Committee on the Twenty-First Century Communications and Video Accessibility Act of 2010 for discussion of equivalent experience with Internet-based captioning.

[6] The definition of "equivalent experience" here is a combination of definitions from the noun "efficacy" and its adjective form "efficacious" and it was arrived at by following the definition of "equivalent" as0"Equal in value, power, efficacy, or import" through to the definition for "efficacy" and its adjective form "efficacious."

What the equivalency of experience, as it is defined here, allows for, with respect to closed captioning, is current investigative efforts of captioning to extend beyond style, placement, word speed, and literacy levels, to incorporate investigations of a user's engagement with closed captioned media that focuses not only on language –based variables but also on the cultural and experiential variables that impact the transference and reception of the emotional content that a viewer is exposed to; content, that necessarily enables the overall user experience. In other words, with the introduction of the equivalency of experience, a paradigmatic shift is put into effect that positions both denotative and connotative meanings as integral parts of the user's experience.

Under such a paradigm, researchers in the field of human-computer interaction (HCI), such Gulliver & Ghinea in their 2003 study "How Level and Type of Deafness Affect User Perception of Multimedia Video Clips; Mori & Fels in their 2009 study "Seeing The Music"; Hong et. al, in their 2011 study **"**Video Accessibility Enhancement for Hearing-Impaired Users"; Rashid, Vy, Hunt, & Fels in their 2007 study "Dancing With Words"; and Lee, Fels, & Udo in their 2007 study "Emotive Captioning" have begun to identify and explore more thoroughly variables that effect the caption viewers' emotional responses and user experiences. Current investigations such as the ones recently mentioned are products of the approximately decade-long interest in affective computing in the field that was established by the 1997 seminal work of Rosalind Picard, *Affective Computing*. In addition, such studies are also an outgrowth of studies focused on user engagement and emotional response to Internet-based multimedia, as

characterized by the 2009 study by Bardzell, S., Bardzell, J., & Pace, "Understanding Affective Interaction: Emotion, Engagement, and Internet Videos."

In addition to HCI, the field of user experience and interaction design, as defined by authors / practitioners such as Bill Buxton, Jon Kolko, and especially Donald Norman (given his emphasis on emotional design) have provided heuristics with which to investigate technologies not only in the standard terms of utility, performance, and / or satisfaction, but with increasing attention to the social / cultural contexts from which technologies arise and within which they operate. More specifically, user experience and interaction design enables investigations of the "physical, emotional, social, and experiential ecology," (Buxton, 2007 p. 97) that a technology facilitates and takes part in.

While such work is promising, it demonstrates and acknowledges that individuals will always have different and unique experiences. Because of this central tenet, it is an accepted truth that equivalence, such as that expressed by the public laws which enabled the development and proliferation of closed captioning, is never possible. However, the ideal of equivalency is a goal that can and should remain central to and continually impact the ongoing development of assistive technologies such as closed captioning.

In order to achieve an adequate level of equivalency, first, a more thorough understanding of the experiences D/deaf and Hearing users undergo while watching captioned and audio based multimedia products must be achieved; to do so acknowledges and builds upon the contributions of previous captioning and related research. However, the endeavor of better understanding the experiences of the D/deaf and Hearing users requires the development of a research method and interpretive framework that can

provide a more granular view of the emotional and connotative meaning making

behavior exhibited while watching closed captioned and audio intact multimedia.

1.3 Empirical Study Design

   This work focuses on the following research question: how do D/deaf caption

users, during their viewing of captioned media, create connotative and emotional

meaning out of the information presented to them compared to their hearing peers who

have access to the audio soundtrack in lieu of captions? This question is novel. While

attempts to gauge the audience's user experiences have been initiated to greater and

lesser extents here in the U.S. and overseas, the previous attempts typically focused on

narrowly defined utility, performance, and satisfaction that aimed at documenting general

and broadly defined viewer satisfaction of caption users. In fact, the strongest attempt to

date to measure the caption viewer's experience was completed in 2010 as part of the

"Digital Television for All" project funded by the European Commission. Though

providing strong data in support of proposed captioning guidelines, the research did not

attempt to investigate the captioning viewer's connotative meaning making behavior as it

is defined in this work, in subsequent chapters.

   In response to the previous work recently mentioned, the aim of this exploratory

research study is to document the experiences of the individual viewer, with a particular

focus on emotion that results in the overall connotative meaning derived from the

captioned media. More specifically, given that the main audience of closed captioning

has historically been the D/deaf and Hard of Hearing (HOH), this work seeks to better

understand their connotative meaning making process and describe those variables that

contribute to and affect the construction of connotative meanings, as characterized by this particular audience's experiences with closed captioned media. This goal is undergirded by the hypothesis: since closed captioning changes the passive viewing experience into an active reading one, it can be predicted that users of closed captioning construct connotative and emotional meaning through viewing and meaning making strategies that are different than the strategies individuals who have access to the audio soundtrack and scene action do.

To investigate how captioning users construct emotional meaning, a descriptive qualitative study was set up to collect data from 18 participants. Nine participants were D/deaf and 9 participants were hearing. The 9 D/deaf participants were shown a closed captioned[7] 5 minute trailer of the HBO movie *WIT* with no sound, while the 9 hearing participants were shown the 5 minute trailer of the HBO movie *WIT* with sound intact and no closed captions. Questionnaire data were collected that included open ended prose, four- level response questions, and free response. More specifically, questionnaire data were collected to:

1) Determine the amount and type of information both the D/deaf and hearing uptake while watching captioned media.

2) Determine whether the D/deaf, while watching a captioned movie trailer, share similar emotional responses and identify the same scenes as evoking

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[7] Due to constraints of the study a subtitled version was used that followed captioning best practices as delineated in the Described and Captioned Media Program (DCMP) handbook

strong emotional response in concert with their hearing peers watching the

same trailer with audio intact and no captions.

In addition, an interview was used to determine ease of use, collect opinions about

accessibility, and determine comfort level regarding discussing emotions. More

specifically, an interview was used in the study to:

1. Determine ease of use relative to stimulus formatting (audio intact versus

   captioned content).

2. Collect opinions / suggestions about how to enhance accessibility of video content

   for the D/deaf and HOH.

3. Determine level of comfort participant had in regards to speaking about their

   emotions.

All of the previous taken together were then examined using a critical theory framework

developed by Wolfgang Iser in an effort to enable a better understanding of those

strategies used by the D/deaf caption user and the Hearing user to construct connotative

and emotional meaning from a multimedia product.

1.4 Chapter Content and Sequence

This dissertation contains six chapters in all and follows the IMRAD [8] model. The

following is a brief synopsis of each chapter.

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[8] IMRAD is an acronym for the introduction, methods, results, and discussion formatting widely used to report empirical research. It is important to note that since this study is phenomenological in nature an additional chapter (Chapter 3) was added to explain the theoretical interpretive framework for the data collected.

Chapter One works as an introduction to the research problem. A brief

introduction to those issues that form and impact the problem were discussed to orient the

reader with the conversation this work is involved in. In addition, the chapter summarizes

the research design of the study developed to better understand and contribute to the

solution of the research problem.

Chapter Two is a literature review of studies and scholarly texts that are

representative of the literature, theory, and methodology that this work builds on and

seeks to add to. It provides the reader with necessary background information about

closed captioning, and the viewers of closed captioning, along with past and current

empirical investigations.

Chapter Three provides the theoretical framework that is used to analyze and

make sense of the quantitative and qualitative data collected. To that end, it introduces

the concept of "interaction criticism" and details how it is instituted in the current study

in the form of *Media Reconciliation*.

Chapter Four presents the design and methods used. Explanation of the research

design, participants, objective, and methods is executed. In addition, analysis methods are

described with a brief explanation of the appropriateness of their use.

Chapter Five provides the major findings of the study.

Chapter Six discusses the major findings of the study and uses *Media

Reconciliation* theory to explain them. In addition, limitations of the study and future

research are presented.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter will define the D/deaf and hard of hearing audience, provide an overview of important background information about closed captioning, and present a survey of past and current empirical investigations and scholarly texts that are representative of the literature, theory, and methodologies traditionally used to assess closed captioning.

2.2 Defining the D/deaf and Hard of Hearing (HOH) Audience

Within the D/deaf and hard of hearing (HOH) audience exists pre-lingual D/deaf (those who developed hearing loss prior to language acquisition) and post-lingual D/deaf (those who developed hearing loss after language acquisition). The same designations apply to HOH individuals along with an additional component: degree of hearing loss. Degree of hearing loss is defined by three groupings: mild, moderate, and severe. While those functioning within the mild category typically function without assistive devices and heavy reliance on visual stimuli, moderate and severe HOH typically do. Another defining factor among the D/deaf and HOH audience is communication preferences. Communication preferences among the D/deaf and HOH vary. The varying communication preferences consist of manual language (also called sign language) as first language in the form of American Sign Language (ASL), Signed Exact English (SEE), and / or speaking and lip-reading.

Pre and / or post-lingual, manual language users along with HOH manual language users, are by default positioned as individuals functioning within a primarily "oral culture" that is defined by the fact that the primary mode of communication is a language composed of visual signs that cannot be transcribed into written language. As such, members of it are not defined by an auditory landscape, as often is the case with individuals who function within an "oral culture", but a visual one, a description that actively acknowledges, enables, and encourages observation of manual language users in light of their propensity to function primarily within a visually mediated environment.

Because of the D/deaf and HOH manual language user's functioning within a visually mediated versus auditory mediated environment they provide a particularly rich area of research for cognitive / neuro - science, as they provide a counterpoint to research driven by auditory-based information uptake and comprehension. Given the difference in modes of information intake exhibited by D/deaf and HOH manual users, with specific emphasis on visual primary instead of auditory primary reception and comprehension, such subjects enable the evaluation of the validity of assumptions made about what parts of the brain and what types of interactions are involved with language processes and comprehension. For example, it is primarily accepted that the role of the left hemisphere in the comprehension of language is dominant (Petitto et al., 2000). More specifically, studies have demonstrated that the *planum temporale* site is used to process auditory information (Petitto et al., 2000). Research undertaken with the D/deaf and HOH manual users, however, challenge such assumptions and has brought them into question, primarily because sign language appears to activate the *planum temporale* in addition to

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those sites historically attributed to auditory language processing (Neville et al., 1998; Petitto et al., 2000; Finney, Fine, & Dobkins, 2001). Such assertions stem from a larger body of studies that have sought to demonstrate and / or understand plasticity, the idea that the brain reorganizes processes to accommodate a diminished or lacking mode of information intake such as hearing (Bavelier, Dye, & Hauser, 2006; Muir & Richardson, 2005; Nishimira et al., 1999; Finney et al., 2005; Lambertz, Gizewski, de Greiff & Forsting, 2005). More current investigations of plasticity with the D/deaf and hearing have found that "specific retinal adaptations in early onset deaf adults … are significantly correlated with peripheral vision sensitivity" which may demonstrate that "cross-modal plasticity after early onset deafness may not be limited to the sensory cortices" (Codina et al., 2011 p. e20417). This finding and other similar findings are significant in that they suggest that pre-lingual D/deaf may indeed develop enhanced or differing modes of sensory information uptake and accordingly exhibit different information uptake behaviors than their hearing peers during the same tasks.

With regards to written language, studies such as one undertaken by Neville et al. (1998) have discovered discrepancies between hearing and D/deaf native manual language users with regards to brain activity. The studies demonstrate, in accordance with earlier hypotheses, that D/deaf native manual language users in fact process the written word primarily within the right hemisphere as opposed to the left; the same hemisphere within which hearing English natives process written words. Neville et al. hypothesize that such difference may derive from the pre-lingual D/deaf native manual language user's dependency on visual stimuli, such as letter shape, to contextualize text based

language. The concept is expanded upon by Proksch & Bavelier (2002) who suggest that while hearing subjects associate letters with auditory representations, the pre- lingual D/deaf do not.

Studies, such as the ones previously discussed, rely, stem from, and build upon another body of research that investigates the ways in which motion, space, and visual attention are processed and differ within the D/deaf and HOH individual (Bavelier et al., 2006; Finney & Dobkins, 2000; Neville & Lawson, 1987; Sladen et al., 2005). Studies have shown superior capabilities in facial processing, spatial construction and transformation of objects, mental transformation and rotation, and gestalt completion while providing mixed data in regards to shape identification, and discrimination (Finney et al., 2001). In addition, studies have proven to varying degrees that there is a detectable difference in the amount of visual information received by peripheral fields of vision, along with differences in light sensitivity, and motion detection (Codina et al., 2011; Finney et al., 2001; Neville & Lawson 1987). Furthermore, studies have suggested that pre-lingual D/deaf are more "careful overall with their visual resources" (Sladen et al., 2005 p.1536). In fact, one of the most current investigations has shown a correlation between the fields of vision of active video gamers and the pre-lingual D/deaf; while video gamers' visual fields tended to increase overall, pre-lingual D/deaf visual fields tended to increase in the lower fields of vision (Buckley, Codina, Bhardwaj, Pascalis, 2010).

Overall, the literature stemming from cognitive and neuro – science investigations with D/deaf and HOH participants suggests that the D/deaf and HOH *may* process

different, similar and identical visual information the same or better than their hearing

peers from adolescence onward. This literature, however, has not heavily informed the

creation nor development of the assistive technology closed captioning. The reason for

such an omission may lie in the fact that most studies and research that has informed the

development of closed captioning stems from field of literacy and psycho-linguistics. The

focus and approach of such fields is top down in their investigation of the nature,

acquisition, and use of language, whereas, cognitive and neuro - science uses a bottom-up

approach that focuses on those physical properties that work to enable the acquisition and

use of language. In essence, neuro and cognitive science enable literacy and psycho-

linguistic inquiry and vice versa. Because of this relationship, it is necessary for research

that seeks to improve or modify closed captioning to ground and operate from amongst

these fields of work.

2.5 Captioning Law: Then and Now

Initially, within the US, closed captioning was the result of a series of laws.

Particularly, Public Law (PL) 85-905, PL 90-247, PL 87-715, PL 89 -258, superimposed

captioning onto the landscape of special education and handicap accessibility because the

previously stated public laws dealt with the establishment and funding of the federal

program Captioned Films for the Deaf (CFD), a program overseen by the Office of

Education in the Department of Health, Education, and Welfare (HEW) and executed in

large part by D/deaf educators.

CFD served to provide captioned films to the D/deaf community and was in part

the catalyst for studies initiated initially to proving a connection between learning

outcomes and media use, such as seen in Allen (1960), Chu & Schram (1967), and

Tickton (1971). These studies served to strengthen the position of captioning within the

field of special education and more particularly literacy studies. In addition, studies that

sought to evaluate the effectiveness of captions with the D/deaf audience such as those

undertaken by Fischer (1971), Davila (1972) Boyd & Vader (1972), and Propp (1972)

tested captioning and comprehension of individuals within the D/deaf community. They

also begin a trend of similar studies such as Braverman, Harrison, Bowker, & Hertzog

(1981), Caldwell (1981), and Koskinen, Wilson, Gambrell, & Jensema (1987). One

landmark study in particular had far reaching effects and was both either undergirded by

or foundational to most of the previously mentioned research. This study was

administered by Dr. Malcolm Norwood (1967) who tested the effectiveness of captioning

versus American Sign Language (ASL) interpretation. His findings suggested that

captioning was superior to the ASL interpretation of audio content within the context of

movies / videos. This study, along with the previously mentioned, attested to the

effectiveness of and preference for the textual delivery of audio information and in doing

so assured the continuance of captioning technology.

   While initially in exclusive service for the Deaf community, CFD eventually

became Media Services and Captioned Films (MSCF) as a result of the Bilingual

Education Act PL 90-247 of 1968, and as such became the "Bureau's Educational

Technology program responsible for the support of a systematic approach to enhance the

learning of all handicapped children through the interrelated utilization of human,

material, and technical resources" (Norwood, 1971). This expansion is of merit because

through such expansion, captioning was positioned to serve audiences beyond the D/deaf community. In serving a larger audience, captioning gained ground in its trajectory toward becoming a universally usable technology and as such evolved into what we know it to be today: a technology currently regulated by both the Television Decoder Circuitry Act of 1990 and the Telecommunication Act of 1996, and enforced by the US Federal Communications Commission (FCC) captioning law, as detailed in Section 47 §79.1 (a-i) of the Telecommunications Act, that is undergirded by Section 504 of the Rehabilitation Act and bolstered by Section 508 of the Americans with Disabilities Act (ADA). And now, with the advent and development of the Internet along with the transition of television from analog to digital, additional legislation governing captioning has been enacted in the form of Twenty -First Century Communication and Video Accessibility Act [9] and EIA 708-B [10] regarding captioning within digital signals.

2.6 Captioning Studies: ESL and Language Minority Students

Captioning has been envisioned as a technology that assists the learning of language. Positioned as a tool that facilitates language acquisition, captioning is thought to be effective because it provides users with an entertaining mixture of pictures and sounds and print that supports cognitively active viewing experiences (Koskinen & Neuman, 1992). This idea stems from theories put forth by Noam Chomsky along with Steven Krashen's "input hypothesis", which propose that language acquisition is dependent on subconscious factors and immersion in situations within which language is contextualized.

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[9] Also referred to as Public Law 111-260
[10] As defined in. 47 C.F.R. §79.102

Working out of this knowledge base, Susan B. Neuman and Patricia Koskinen conducted a study, in 1990 (published in 1992) funded by the National Institute of Captioning (NCI), that investigated whether bilingual students improved their language comprehension and literacy skills from the use of captioning. The results of the study demonstrated that indeed students "incidentally learned more words from captioned television" than from: reading and listening to text; viewing television without captions; and reading from textbooks only (p. 104). Concluding remarks stated that there was strong data to support that captioned television provides "a particularly rich language environment which enable[s] students to incidentally learn through context as they developed [discipline based] concept[s]" (p.104). The "rich language environment" to which they refer is based on research done by Betsy J. Blosser (1988), Gavriel Salomon (1984), and others who provided evidence that the "entertaining qualities of television, make it [an] … easier medium to access than text [alone]" and that along with its entertainment qualities television's "combination of picture and sounds" make it a medium with which individuals can "establish relationships between words and meanings" (Neuman and Koskinen 1992, p. 96) .

Expanding on the previously mentioned research are Hsing- Chuan Huang and David E. Eskey of the University of Southern California. In 1999, they conducted a study that "investigated the effects of closed- captioned TV on the listening comprehension of intermediate English as second language (ESL) students." Stemming from a similar knowledge base as Neuman & Koskinen, with particular emphasis on Krashen's language acquisition hypothesis, Huang & Eskey sought to investigate more thoroughly correlating

factors (i.e. length of time in the United States, length of ESL instruction the subject had undergone, etc.) that influenced caption-based language acquisition, along with bringing back into question whether captioned television made a difference in student's language acquisition. Their findings were consistent with Neuman & Kosiken and other studies on the topic and failed to find any significant correlation between other factors.

2.7 Closed Captioning Studies: D/deaf and Hard of Hearing Audience

Current research with regards to the D/deaf and hard of hearing (HOH) audience stems mostly from Dr. Carl Jensema's work relating to caption rate and the readability of captions. Feeding into such research were literacy studies that looked at variables of reading comprehension within D/deaf and HOH subjects. More specifically, research such as that undertaken by Shroyer & Birch (1980) and Braverman et al. (1981), which sought to better understand comprehension as facilitated by the relationship between language and video, impacted the direction and variables explored within Jensema's qualitative work.

As a second motive of Jensema's research was the need to provide a snapshot of nationwide captioning practices to see whether it was serving the Deaf and HOH, in particular, as well as its secondary audience in ways that were effective. To that end, Jensema and his associates conducted two major studies among a thread of related smaller studies: "Presentation Speed and Vocabulary of Closed Captioned Television" and the "Presentation Rate and Readability of Closed Captioned Television" both of which included D/deaf / HOH and hearing subjects. The results of the studies demonstrated that:

1) The average captioning rate of a program was 141 word per minute (wpm) though readers (regardless of hearing status) were comfortable with 145 (WPM).

2) The frequency of captioning use was a factor in comprehension and rate made evident by the hearing subjects' data.

3) Age, sex, education, and hearing status were not factors in captioning comprehension.

4) Most captioning was verbatim.

To further understand how captioning is comprehended, Jensema, Sharkawy, Burch, & Hsu (2000) utilized eye tracking equipment to capture the eye movements of viewers. The results from the first studies demonstrated, to a limited degree of generalization due to population size, that:

1) D/deaf children subjects use captioning more as their reading ability improved.

2) People viewing particular segments have similar eye movement patterns.

3) The addition of captioning to video results in a major change in eye movement patterns.

4) The viewing process, once captions are added, becomes much more of a reading process.

5) As caption speed is accelerated more time is spent looking at the caption then the video which infers that reading takes precedence.

6) Subjects spend the majority of the time looking at the caption.

In particular, Jensema et al. discovered that:

> "When captions are present there appears to be a general tendency to start by looking at the middle of the screen and then moving the gaze to the beginning of the captioning within a fraction of a second. Viewers read the captioning and then glance at the video action after they finish reading. When a new caption comes on the screen, they move their gaze to the new caption and begin reading again. It appears that viewing captioned television is basically a reading task. Caption reading dominates eye movement; viewing the screen action tends to be secondary…Of course, exceptions to our general finding can occur. For instance, the personal characteristics of the viewer can influence the approach that is used [to view captions]." (p. 284)

Further studies, undertaken by Jensema, in particular "The Relationship Between Eye Movement and Reading Captions and Print" provided evidence that "caption reading skills appeared to develop concurrently with paragraph reading skills" and as such, reading levels should be focused on, as an important variable in caption utilization and comprehension (p. 2). With a similar focus, Margaret Lewis and Dorothy Jackson in their 2001 study "Television Literacy: Comprehension of Program Content Using Closed Captions for the Deaf" discovered that indeed caption comprehension was strongly correlated to reading levels and suggested that it may also be related to language processing skills[11]. In addition, they provide evidence that video provides a specific type

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[11] This assertion is based primarily on Jackson et al.'s work on comprehension and prior knowledge and

of context to captions that informs the overall comprehension of D/deaf / HOH viewers and as such may point to a difference between hearing and the D/deaf / HOH in their visual processing of the same captioned material.

From this body of research emerges the more contemporary work focused on captioning and the D/deaf / HOH. In 2008, Denis Burnam et al. conducted the study "Parameters in Television Captioning for Deaf and Hard of Hearing Adults: Effects of Caption Rate Versus Text Reduction on Comprehension". Their findings bolster the assertion made by both Jensema et al. (2000) and Lewis & Jackson (2001) about the correlation between reading level and caption comprehension. Furthermore, they found correlations, again in alignment with previous studies, between the rate of captions and viewer comprehension. Burnam et al. also found data that suggests that within the D/deaf / HOH population, there is no difference in caption comprehension that can conclusively be attributed to the preferred mode of communication (manual sign vs English native) utilized by a caption viewer. More explicitly, they state, in the discussion component of the study's findings, "comprehension did not differ as a function of communication and language preference" (p. 297). Lastly and perhaps of greatest interest is their finding that text reduction, the practice of replacing words with contractions, omitting redundant words, shortening phrases, and simplifying sentences, does not improve caption comprehension. What is of greatest import concerning Burnam et al.'s research is that it compared D/deaf and HOH individuals based on hearing status *and* preferred communication methods. In looking at both factors, the researchers sought to understand

C. Ewoldt's work on context and generalizable prior knowledge

the differences in comprehension not only between the hearing and D/deaf / HOH population but differences *amongst* those within the said groups as well. In doing so, the study sets the groundwork for further studies into these differences and, as explicitly stated in their conclusion, determining ways in which to tailor caption delivery to individuals so as to make captioning truly accessible.

2.8 Closed Captions: Usability

In addition to studies undertaken with the focus of the previous two sections is another body of work emerging from the field of human factors. Frank Thorn and Sondra Thorn, in 1996, found evidence that "captions may not serve many of the intended users because captions are too small and fast for them to appreciate" (p.462). Furthermore, they suggest that "a second style of captioning with larger words and a slower rate or presentation may respond to the special needs of caption viewers" (p.462). The limits of the generalization of their findings are minimal as their sample consisted of hearing, graduate level students. In addition, further research, which they stated they were undertaking at the time the study was published, with the D/deaf / HOH to confirm their findings was not able to be located.

Bridging a gap between captions as presented and comprehended on television and as presented and comprehended on computers is the 2003 study "How Level and Type of Deafness Affect User Perception of Multimedia Video Clips" conducted by Stephen Gulliver and George Ghinea. Their study investigates how the varying levels of deafness affect what they refer to as the "Quality of Perception" (QOP): the result of user satisfaction and assimilation of information (comprehension). The study stems, in part,

out of a similar base of knowledge as those studies previously mentioned. In addition, it draws from the fields of cognitive psychology in relation to memory and comprehension and work within HCI focused on visual factors.

Gulliver & Ghinea's findings suggest that, "Captions were found not to have any significant effect on the average overall level of information assimilation for both D/deaf and hearing participants" (p.384). However, the study did indicate that the type of information assimilated between deafness levels varied. The difference suggests, PoLMMoD[12] users as using captions solely to provide clarification of audio that is confusing or absent which positions them as parallel in perception and comprehension activity to hearing users. Another find of the study was in the self-perception of information assimilation. The study provides data to support that pre-lingual profoundly deaf users more readily anticipated the level of information they assimilated (comprehended) than PoLMMoD users which lends weight to the investigation of other factors, aside from hearing loss, that play into information comprehension of visual and auditory stimuli. Moreover, the level of information assimilation and enjoyment in both PoLMMoD and pre-lingual profoundly deaf groups correlated, prompting further investigations into that relationship. Given the focus and the scope of the study it has been used an as authoritative source for studies such as the 2011 "Video Accessibility Enhancement for Hearing Impaired Users" that seek to provide innovative captioning techniques to better suit the D/deaf and HOH user.

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[12] POLMMoD - Post- lingual Mild to Moderately Deaf

With a focus on innovative captioning techniques, are a string of qualitative studies stemming primarily from Ryerson University in Toronto, Canada: "Towards Emotive Captioning" (2001), "Emotive Captioning" (2007), "Dancing with Words" (2007) and "Expressing Emotions Using Animation" (2006). Each study investigated the effects of different captioning styles on D/deaf and HOH viewers primarily. The most relevant of the studies are: "Emotive Captioning", "Dancing with Words", and "Seeing the Music".

Emotive Captioning

Lee, Fels, & Udo's (2007) "Emotive Captioning" is a between subjects exploratory / observational study with a 2:3 factorial design with 11 participants. The stimuli were 2, 1.5 minute videos with audio captioned in enhanced, dynamic, and conventional captioning styles. Study participants were presented with a pre-study questionnaire, then viewed the stimuli. After viewing the stimuli, participants completed a post study survey of 16 fixed choice and 3 open ended questions that were evaluated using a cross tabulation analysis. In addition, verbal summaries of the videos and reactions to captioning styles were evaluated using Mann and Whitney analysis. Results show HOH participants were more positive about emotive captioning than the D/deaf and that some believed that the enhancement to the captions were beneficial and improved their viewing experience.

Dancing with Words

This study is a 2:2 factorial design experiment that studied 25 participants (10 hearing, 10 hard of hearing, and 5 deaf) reaction to 3 different captioning styles. The caption styles were conventional captions, enhanced animated text in a fixed bottom of the screen location, and animated text in dynamic screen locations. The investigation was based on the landmark "Non-Speech Information" (1995) consumer-opinion study that showed participants as having a strong interest in accessing additional background sound information and in the use of technology, animated text or kinetic text that had previously been shown to be a viable option for conveying emotional content in virtual spaces. Post-viewing questionnaires were used to rate the effectiveness of style, and determine between style preferences. Results show that there is a 70% positive / very positive rating for the enhanced animated text in a fixed bottom of the screen location. Closing suggestions by the authors are summarized as followed:

1) Ensure readability before effect.

2) Meaningful animated symbols can replace certain words or phrase.

3) Animated text may improve understanding of the context without distracting users.

4) Extreme captioning in which captions are moving is discouraged due to the high disapproval rating.

5) Additional studies must be undertaken in which film / television program genre are tested along with full length episodes.

Seeing the Music

This online study investigated the effects animated text lyrics, created by The Emotive and Affective Captioning Tool (EmACT), have on viewers. 49 participants first completed a pre-study questionnaire of demographics and experience with captions, then watched one video that utilized EnACT created textual lyrics. After viewing, the participants answered 3 open-ended and 17 likert scale questions. Likert scale questions were analyzed using descriptive Chi-square and Student T-test statistics to examine difference in opinion and preference between individuals and amongst videos. Overall, there was a positive reaction to the animated text. In addition, the text did not interfere with readability or comprehension.

To summarize the findings of the studies recently discussed, each study demonstrated overall positive reactions to certain types of enhanced captioning, with HOH individuals being more accepting of the introduced captioning styles than D/deaf viewers.

In a different but related vein, are studies that examine practices to optimize caption readability. Among such studies are those regarding caption placement. Studies that have looked at caption placement include LaSasso, King, & Short (1996), and Bartoll & Tejerina (2010), both of which focus primarily on whether viewers enjoy or prefer certain caption placement. Two landmarks studies consist of "DTV For All" (2010) and "The State of Closed Captioning in the United States" (2003) the latter of which was executed by Jordan, Albright, & Branner. While both take a qualitative approach in assessing, among other variables, how caption placement affects comprehension and

enjoyment of captioned media clips, the former also collected eye tracking data; however, given the inability to efficiently analyze it, excluded it from the findings.

To conclude, the studies recently reviewed focus on style, placement, and logo-centric variables. In addition, it is evident that there is a rapid progression to innovative captioning techniques for the purpose of enhancing the caption viewing experience. The rapid progression strongly suggests a narrow focus and definition of caption usability that necessarily eclipses qualitative descriptive inquiries of standard closed captioning such as this work presents.

2.9 Multimedia and Emotions

Emotion is a topic that has been the site of increasing interest over the last several years in the fields of Human Computer Interaction (HCI) and User Experience (UX). Stemming from research in the field of psychology, work in the fields of HCI and UX has attempted to better understand the role emotion plays in the interaction between the user and the multimedia interface. Given that video is a technologically rich medium that has the ability to evoke emotions in individuals and encourage certain beliefs, along with the proliferation of video on the Internet and more specifically social media videos, such as those found on YouTube, the need to assess the way in which such videos affect viewers has emerged.

While a body of literature currently exists that engages the concepts of emotion and aesthetics, from which works such as Donald A. Normans *, Emotional Design;* P.W. Jordan's *Designing Pleasurable Products;* Nathan Shedroff's *Experience Designs;* and Jon Kolko's *Thoughts on Interactive Design* stem, the emphasis in such works typically

focuses on designing principles and defining the features involved with how users will interpret an interface / product without focusing in any type of satisfactory depth on multimedia video / film. Moreover, the aforementioned do not demonstrate how to quantitatively evaluate the emotional or aesthetic content of an interface nor present protocols for quantifying an interface's emotional / aesthetic effect on users. Jeffrey Bardzell (2008) argues that this is the case because such works exemplify the practice of the field to "blur the distinction" between design interfaces, user, and designer instead of operating from an *interaction criticism* stand point that provides a "rigorous interpretive analysis of subjective phenomena that explicates how elements of the interface through their relationships with each other produce certain meanings, affects, moods and institutions in the people that interact with them" (p. 2464). Although user experience literature is a valuable resource given that it has shifted focus from tasks to be completed, to how users interact with products and vice versa, it still does point to a gap that current studies seek to fill. A gap defined by attempting to determine and develop optimal ways of initiating and sustaining positive user / interface interaction, based on the understanding of how the development, design and use of multimedia interfaces affect their users and vice versa.

In an attempt to better understand, determine, and develop optimal ways of initiating and sustaining positive user / interface interaction Bardzell, S., Bardzell, J., & Pace, in their 2009 study "Understanding Affective Interaction: Emotion, Engagement, and Internet Videos" focus on user engagement and emotional response to Internet-based multimedia. Their four-tier mixed methods approach collected: physiological, behavioral,

and emotional response data from 21 participants. Bio-harnesses were used to collected physiological data such as heart and breathing rate. In addition, emotional descriptors developed by Klaus R. Scherer (2005) were presented to users for use in describing emotional responses to videos along with open-ended prose and star rating of interest and enjoyment levels. All data was triangulated to determine if there was a pattern in data that suggested certain behaviors and emotions correlated with particular types of videos and video sharing practices. Findings suggest that users are responsive to the "emotional complexity" of videos and that it plays a role in users' critical evaluations of video. In addition, findings also suggest that factors external to the video stimulus play an active role in the overall user experience and as such must be accounted for.

In a similar vein, Cambra, Leal, & Sylvestre (2010) executed the study "How Deaf and Hearing Adolescents Comprehend a Televised Story" that explores how captioned multimedia affects the user. The goal of the study was to explore "the diversity of interpretations that can arise in cases where people with hearing loss perceive information deriving from sound and language differently" than their hearing peers (p.34). The study consisted of three treatments administered to 20 hearing and 20 pre-lingual, oral based, English native deaf adolescents. The treatments were based around one video montage that adhered to Stein & Glenn's (1978) narrative structure. The first treatment was viewing of the video without voice. The second treatment was viewing the video with voice and sound. The third treatment was viewing the video with sound, voice, and caption for the deaf participants. The results demonstrated that both groups had similar interpretations when no audio input was available. In addition, the deaf

presented greater narrative coherence than their hearing peers in their interpretation. Hearing participants during the second treatment benefitted more from the audio than the deaf, though both groups demonstrated better comprehension of the video. In addition, the deaf demonstrated more sensitivity to the emotion and feeling expressed by the actors than did their hearing peers and chose more action packed scenes as representative of the narrative than did their hearing peers. Finally, differences between the hearing and deaf participants emerged in interpretation of the narrative structure, the selection of scenes as important for comprehension, and the representation of character's emotional state. Moreover, the deaf exhibited lesser comprehension of the narrative structure than their hearing peers by a 10% margin.

While the study presents insightful information it also has flaws. The most severe flaw of the study is maturation. The same stimulus was used on three different occasions which lends that memory may be a factor that impacted the results of treatments two and three. In addition, the deaf participants wore assistive devices, were oral-based, and non-manual language users. Also, the deaf participants' hearing loss ranged from profound to severe. This group is not representative of all or most deaf individuals currently, as they were oral-based and in many cases wore cochlear implants, though it may represent future generations.

The literature reviewed in this section is promising. It brings into conversation, the relationship between psycho-linguistics, literacy and neuro-cognitive science, while acknowledging, building upon, and responding to those empirical investigations that founded and helped to develop the laws and guidelines that govern closed captioning

today. It is within this nexus that this work operates from with the goal of more fully understanding the viewing strategies and meaning making behaviors that play a role in creating connotative and emotional meaning as facilitated by the interaction of the user with audio / visual media.

2.10 Chapter Summary

In this chapter we have seen that the body of knowledge that currently informs captioning practices consists mainly of:

1) Studies that suggest perceptual / cognitive differences between D/deaf / HoH and hearing individuals.

2) Studies that correlate learning outcomes with media use, mainly emphasizing literacy.

3) Studies that correlate rich context and enjoyment factors with primarily denotative comprehension.

4) Studies that correlate caption rate with viewer comprehension.

5) Studies that attempt to present improvements on captioning by incorporating more visual emotion cues into captions.

6) Studies that suggest perceptual / cognitive differences in comprehension between D/deaf / HoH and hearing users of captions.

In the next chapter, we will address how this study builds upon and contributes to the current body of knowledge that exists.

CHAPTER THREE

A CONCEPTUAL FRAMEWORK FOR UNDERSTANDING HOW D/dEAF AND
HEARING USERS MAKE CONNOTATIVE AND EMOTIONAL MEANIING

3.1 Overview

This chapter explicates the conceptual framework that informed the

development of the current exploratory study. It begins by demonstrating the need for a

conceptual framework by discussing Jeffrey and Shaowen Bardzell's work that calls for

the integration of critical theory and interaction design. This chapter will show that,

because previous approaches to captioning research have overemphasized the denotative

meaning that users make from captions, there is a need for a theory like interaction

criticism which reasserts the importance of the aesthetic and emotional dimensions of the

meaning making experience. In discussing the Bardzells' work the chapter seeks to

establish that the current exploratory research is a phenomenological endeavor that

requires "interaction criticism" because it investigates the way in which a user interacts

with an aesthetic cultural form (a motion picture trailer). The chapter then combines a

quantitative based methodology in the form of "Information Assimilation" with

Wolfgang Iser's phenomenological theory about the "virtual text" to aid in interpreting

both the quantitative and qualitative data collected in the study. Ultimately, this work's

unique "interaction criticism" provides the basis for *Media Reconciliationt t*heory which

is an interpretive framework for better understanding how closed caption users create

emotional meaning from captioned media.

3.2 Interaction Criticism

In two consecutive works (2008, 2009) Jeffery and Shaowen Bardzell present the theoretical framework "interaction criticism" that necessarily broadens the interpretive capacity of current HCI and UX analytical frameworks. The Bardzells define interaction criticism theory as an interpretive framework that utilizes critical, aesthetic, and cultural theories to diversify ontological assumptions about the construction of and relationships that exist between the user, artifact, and interaction within the fields of HCI and UX. Through the diversification of ontological assumptions the theories are able to offer epistemological possibilities and constraints. Moreover, the theories offer methodological strategies to evaluate the relationships that exist between the user, artifact, and interaction based on the ontological construction of them.

The purpose of developing interaction criticism was based on the historically limited interpretation of performance, utility, and satisfaction, in terms of the user and their interaction with a product. The Bardzells argue that such limited interpretation is incompatible with aesthetic and critical theory both of which are needed to contribute to a broader and deeper understanding of those things that HCI and UX are concerned with such as: experience, symbolic density and cohesion, beauty … form and meaning, taste and judgment, ideological encodings, interpretation … signifying structure … and many others (2009, p. 2357). In an effort to bring into conversation critical theory and aesthetics with HCI and UX tools of analysis thereby strengthening the interpretive power of HCI and UX taxonomies and heuristics, the Bardzells demonstrate the interpretive power of critical theory and aesthetics as it applies to design interaction.

Beginning with base definitions of aesthetics, critical theory, and cultural theory Jeff Bardzell demonstrates that "user- centered" design is fundamentally phenomenological because it originates in the understandings, interpretations, and everyday practices of users rather than the external world (p.2360). He states that even though this is the case, the challenge of persuading HCI and UX practitioners to institute" interaction criticism" by integrating critical theory and interaction design is difficult because it requires that the HCI and UX communities overcome the perceptions held by the majority of scientists and practitioners. Bardzell argues that scientists and engineers historically view critical theory, aesthetics and cultural theory, as dense, fuzzy and absurd which makes them predisposed to be hostile to interaction criticism. A second challenge to operationalizing interaction criticism theory is the "piecemeal use" of key concepts of critical, aesthetic or cultural theory by scientists and engineers who attach the concepts to rationalistic approaches (p. 2360). Critical and cultural theorists believe that such use diminishes the explanatory power of the theory. They argue that the interpretive power of the theories is abused by translating them into mechanistic approaches and methods and stripping them of their original context.

In an effort to operationalize "interaction criticism" Jeffrey Bardzell (2009) bridges the gulf present between critical theory, aesthetics, cultural theory and interaction design. He demonstrates how critically informed exploration of the construction and relationships between the user, artifact and interaction (as they exist within the fields of HCI and UX) has the ability to stimulate innovation while enabling the development of new paradigms as they apply to the fields. He asserts and bolsters his assertion by

explaining how critical approaches expose and explore alternative assumptions about the

relationships between the user, artifact, and context of use by demonstrating how

conceptions of them have been treated traditionally within various interpretive

frameworks offered by critical theory, aesthetics, and cultural theory. In addition,

Bardzell demonstrates how such conceptions aid in more thorough and comprehensive

understandings of the interactions and engagement users have with products. Through

Bardzell, S., Bardzell, J., & Pace, "Understanding Affective Interaction: Emotion,

Engagement, and Internet Videos", that explores user engagement and emotional

response to Internet-based multimedia by using triangulation with cultural theories put

forth by theorists such as Roland Barthes, and subsequent works about the way in which

"interaction criticism" can be effectively implemented (as seen in the 2010 and 2011

works "Feminist HCI: Taking Stock and Outlining and Agenda for Design" and

"Towards a Feminist Methodology") the Bardzells have been able to prove that

"interaction criticism" harbors explanatory power regarding the interactions observed

between users and multimedia products.

3.3 Interaction Criticism and Closed Captioning

What "interaction criticism" allows for in the case of closed captioning is a way

to extend beyond current research efforts that have focused on closed captioning's utility,

performance, and or customer satisfaction that were positioned as being contingent upon

the successful transference of denotative meaning and did very little to explain the

process the caption viewer undergoes in making not only denotative but connotative and

emotional meaning as well. By expanding traditional HCI and UX methods to

incorporate critical, aesthetic, and cultural theory, interpretive frameworks can be established to more thoroughly explain the interaction and processes users undergo when immersed in a multimedia context that is complete with the cinematic and plot devices of film, and augmented by an assistive technology that requires one medium (text) to be wholly responsible for comprehensively capturing and representing another (audio).

Interaction criticism as it relates to this exploratory study involves building on the work of HCI practitioners Gulliver and Ghinea. Their work provides a quantitative method for identifying and measuring the type and amount of information a caption viewer recognizes as being available to them in comparison to the amount and type of information actually available. In addition, the method is designed to quantify the subjective aspects of user satisfaction and confidence. As stated in Chapter Two their method provides a useful metric in assessing how the varying levels of deafness affect what they refer to as the "Quality of Perception" (QOP): the result of user satisfaction and assimilation of information (comprehension). Their method, however, does very little to explain the process the caption viewer undergoes in making not only denotative, that is necessarily accounted for by IA, but connotative and emotional meaning which involves more than the subjective aspects confidence and user satisfaction. In response to this, this study collected, beyond IA quantitative information, qualitative information about the viewing experience from users in the form of four- level response questions, free response questions, and an interview. In addition, this study provides a critically informed theory to aid in describing how meaning is created for the caption viewer based on the relationships they create between the information sources they perceive as being

available and useful to them. To that end, the following discussion delineates the

quantitative measure of IA and the interpretive context it provides to better understand

the quantitative data collected, followed by Wolfgang Iser's phenomenological theory of

the "virtual text" to explain what the quantitative and qualitative data, when examined

together, suggest about the meaning making behavior of D/deaf and Hearing users.

3.4 An Interpretive Context for the Information Assimilation (IA) Data

In this study Gulliver & Ghinea's "Information Assimilation" (IA) will be used to

identify and measure the type and amount of information a caption viewer recognizes as

being available to them versus the type and amount of information actually available.

Information Assimilation (IA), originally developed by Gulliver & Thomas (1998) and

later revised by Gulliver & Ghinea (2003) is an objective measure that enables

researchers to measure a user's ability to understand and assimilate the content of a video

clip (Gulliver & Ghinea, 2006 p.6). IA, therefore, is used to determine how much

information a user gains from viewing a video clip and also to determine from what sites

of a multimedia piece users are gaining their information. As all questions measuring IA

have unambiguous answers, since they are designed so that they can only be answered if

specific information is assimilated from a specific source (2003, p.375), it is possible to

calculate the percentage of correctly assimilated information, facilitating examination of

user information assimilation and understanding (2006 , p. 7). Data resulting from the

calculation of IA respective to D/deaf closed caption users and hearing users of non-

captioned audio intact video is helpful in objectively determining where participants are

gaining the most information from along with documenting differences in information
assimilation that exist between the two groups.

3.5 An Interpretive Context for Confidence in (IA) Data

To ascertain whether there were significant differences between the D/deaf and
Hearing groups regarding the amount of confidence they had in their IA answers. A
nonparametric 2x4 Pearson's Chi Squared test was used. The results from the Chi-
Squared test contrasted with the results of the IA enables insight into the amount of
information each group perceived as being available to them (as provided by a particular
information source (i.e. video, caption / audio, etc.) to answer the IA questions and
demonstrates how proficient the participants of each group judged themselves to be at
answering IA questions.

3.6 An Interpretive Context for Interest Level Data

Given that the success of multimedia is based on subjective factors and because
measurement of the technical quality of a multimedia product is inadequate in
determining the level of enjoyment / engagement of a piece, it is necessary to provide a
metric that assesses the "infotainment" quality of the stimulus. Such measurement is
useful in that it enables speculation about the "intrinsic motivation to experience" (which
is defined in a subsequent chapter) of each group participant. While it is important to
measure motivation independently from its consequences and to establish that it cannot
be assumed that intrinsic motivation will produce cognitive, affective, and behavioral
consequences (Vallerand,1997 p. 284), it is possible to compare the relative impact of

intrinsic motivation on the outcomes of the IA questions, because it allows investigation of participants' assimilation of information from the stimulus, as it relates to the participants' perceptions of pleasure and satisfaction .

Information Assimilation, self –reported confidence in IA questions, and the self –reported interest in the stimulus provide a sketch of the information sources available and utilized by the caption viewer along with providing subjective information about how interested participants were in the stimulus and how much confidence they had in their answers. The sketch of the previously mentioned quantifiable information in this study will be viewed in tandem with the qualitative information collected through four- level response questions, free response questions and interviews. The tandem viewing of both types of data, however, requires a critically informed theoretical framework in order to make sense of the data collected about the caption viewer. Wolfgang Iser's1980 work provides a critically informed theoretical framework that can help to bring the (IA) quantitative data into conversation with the qualitative data collected to provide a more comprehensive understanding of the caption viewer.

3.7 Wolfgang Iser and the "Virtual Text"

Figure 1 Orion Constellation

According to Wolfgang Iser, in his 1980 work, *The Act of Reading: A Theory of Aesthetic Response,* readers and texts are involved in a meaning making interaction that is defined by the plurality of interpretations that may be constructed in the absence of a set singular meaning. This

indeterminacy of meaning is based on the active assemblage of information into a

coherent whole by the reader as it becomes available from the text. The reader's action of

assembling information can be seen as being analogous to the common activity of

searching out and locating constellations in the night sky. Each star represents a piece of

information that the text provides. The reader has the responsibility of

connecting the stars by actively filling in the gaps that exist between

the stars. Just as a constellation only exists if the gaps are filled in, so

it is true for a text. A text that exists after the gaps have been filled in

is referred to by Iser as the "virtual text". The text is "virtual" because

its existence depends on two things: 1) the actual text that was written

Figure 2 Orion Constellation

by the author and 2) the aesthetic text that is created by the

subjectivities of the readers when they "pass through the various perspectives offered by

the [author's text], and relate the different views and patterns to one another" (p. 1674).

The constellation and "virtual text" metaphors help to better understand how

closed captioning works. Closed captioned media provides its viewer with several

information sources to choose from simultaneously just as the night sky provides the star

gazer with many stars from which to choose. The information sources available to the

caption user include text on the screen, visual element, dynamic action, audio, and of

course, captioning information. The caption user must identify and choose the different

information sources they can and want to use and relate them in a meaningful way to

each other, just as the star gazer relates stars to each other.

But how do the reader, caption user, and star gazer identify and fill in the gaps that exist between the information and stars they choose? Iser attempts to answer this question by explaining that the gaps that exist between information sources (or stars) indicate opportunities for them to be connected in meaningful ways even though the author's text (or sky) might not explicitly say so (p.1677). The gaps that can take various forms (the end of a chapter, unspoken dialogue, the sudden break off of a plot, or an abrupt change in perspective) invite the viewer to link together the information they do have to make the gaps disappear. By making the gaps disappear by joining the information available to the viewer together, the viewer produces a determinate relationship between the formerly disjointed information sources. The determinate relationship is characterized by viewing each information source in regard to the sequence in which they become available. As such, each viewing of an information source becomes the background for interpreting the viewing of each subsequent information source. Each subsequent information source takes on a unique meaning that is augmented with the introduction of the next source so as to allow for meaning to continually develop. To explain the previous succinctly, Iser states:

> The shifting blank [or gap] is responsible for a sequence of colliding images, which condition each other in the time flow of reading. The discarded image imprints itself on its successors, even though the latter is meant to resolve the deficiencies of the former. In this respect the images hang together in a sequence, and it is by this sequence that the meaning of the text comes alive in the reader's imagination. (p.1682)

So, according to Iser meaning is ultimately the result of active reconciliation on the part of the reader. The reader must engage in "the act of bringing a thing or things to agreement, concord, or harmony" (OED). Since gaps in the text's denotative information leaves in the mind of the reader a blank that needs to be filled in, the reader corrects the gap by creating virtual connections between the information sources they have available to them in a way that results in connotative and emotional meaning.

In the case of closed captioning, reconciliation is especially complex in that one medium (text) is responsible for comprehensively capturing another (audio). In addition, the multimedia context in which closed captioning functions, complete with the cinematic and plot devices of film, further complicates the reconciliation activities of the caption viewer. However, the IA quantitative information juxtaposed with the qualitative data collected from this study under Iser's lens of reconciliation enables the identification of information sources used and available, the use of the information sources by viewers, and the resultant connotative and emotional meanings that are created once the information sources are virtually connected and thus reconciled; all of which enables a better understanding of the behaviors caption viewers exhibit.

3.8 Chapter Summary

In this chapter we have seen the need for interaction criticism that expands traditional HCI and UX methods to incorporate critical, aesthetic, and cultural theory so that interpretive frameworks can be established to more thoroughly explain the interaction and processes humans undergo when immersed in a multimedia context.

Closed captioning provides the opportunity to utilize interaction criticism because the user is immersed in a multimedia context that is complete with the cinematic and plot devices of film, and augmented by an assistive technology that requires one medium (text) to be wholly responsible for comprehensively capturing and representing another (audio). This study executes interaction criticism by utilizing Iser's theory of the "virtual text" to start explaining the reconciliation behaviors exhibited by closed caption users; behaviors which may facilitate connotative and emotional meaning making.

In the next chapter, we will address the research design, participants, objective, and methods used for this study.

CHAPTER FOUR
METHODOLOGY

4.1 Overview

In Chapter Three we discussed the theoretical framework that is used to aid in interpreting both the quantitative and qualitative data collected in the study. In this chapter the study's research design and methods are discussed. The research design, participants, objective, and methods are explained and accompanied by the analysis methods used to evaluate them along with the appropriateness of their use.

4.2 Objective

Building on the captioning research reviewed in Chapter Two and using the conceptual framework presented in Chapter Three the objective of this study was to better understand the connotative and emotional meaning making behaviors D/deaf and hearing users exhibit while watching a motion picture trailer that was either closed captioned for the D/deaf participants or had audio in lieu of captions for the hearing participants. The study collected IA data to determine what information viewers tended to assimilate and what comprehension resulted from the information assimilated. In addition, the study collected qualitative data about: 1) the emotional responses / reactions D/deaf and hearing viewers had to the same content matter delivered in different formats and 2) opinions about the ease of use and accessibility of the stimulus. The study collected both the IA and qualitative data through:

1) Distribution of a quiz containing open-ended questions to measure IA, along with accompanying Likert scales to measure a participant's confidence in answers to open-ended questions.

2) A Likert scale to measure a user's interest in the stimulus.

3) Distribution of open – ended questions to identify those scenes that elicited the strongest emotional response.

4) Distribution of statements describing degree of emotion felt, accompanied by Likert scales to identify attitude toward select episodes from stimulus.

5) The use of personal interview to:

   a. Determine ease of use relative to stimulus formatting (audio intact versus captioned content).

   b. Collect opinions / suggestions about how to enhance accessibility of video content for the D/deaf and HOH.

   c. Determine level of comfort participant had in regards to speaking about their emotions

4.3 Participants

The sample consisted of two groups. The first group was composed of 9 (2 men, 7 women) self -identified profoundly deaf participants. Participants ranged in age from 29 – 45. Seven of the 9 individuals were pre-lingual deaf. None of the 9 had cochlear implants and only 1 of 9 wore a hearing aid during their participation in the study. All of the participants were fluent in and used ASL (American Sign Language). Only 1 of the 9 did not use ASL as their main form of communication. Since literacy is an issue that has

been documented as having an effect on caption comprehension, all of the D/deaf

participants chosen had earned at least a Bachelor's degree from an accredited college /

university.

The second group was composed of 9 (3 men, 6 women) self-identified hearing

participants with no more than a 20Db hearing loss. Participants ranged in age from 19-

45 years of age. All participants were native English speakers. All participants used

English as their main form communication, and all except for one (19 year old) had

earned a Bachelor's degree from an accredited college / university. The one participant

who had not earned their Bachelor's degree had not attended college.

4.4 Stimulus: Audio –Visual Document

The study used an audio-video document as the stimulus. The stimulus was a 5

minute trailer of the movie *Wit* that was posted to YouTube by user "baskraaijestein" on

July 30, 2009. It was chosen because it reproduced a series of emotionally charged events

that closely correspond to those which could otherwise be experienced in real life. In

addition, the stimulus was selected given the sensitive nature of the narrative told and

because it was a narrative that most people could identify with to varying degrees. To

ensure the latter, the narrative chosen focused on mid to late life individuals with subject

matter that all study participants could relate to. Additionally, the narrative structure

adhered to Stein and Glenn's (1978) (as qtd. in Cambra, Leal, Sylvestre, 2010) narrative

structure which consists of:

1) An initiating event or internal reaction

2) An intentionality or execution of events

3) A consequence or internal reaction

The document consisted of the following scenes and events:

Table 1 Audio Visual Document Scene Summary

	Summary of Events
	The doctor in the first frame tells the protagonist pictured on the right that she has stage 4 advanced metastatic ovarian cancer.
	The protagonist agrees to aggressive experimental treatment. She undergoes a series of invasive tests and physically debilitating treatments after which she comes to terms with her own mortality.
	Nearing the end of the protagonist's life, her nurse asks her to decide her "code status" (i.e. what she would like them to do if her heart stops beating). Her health plummets quickly thereafter and in what appears to be her final waking moments, a maternal figure comes and reads her a children's story. This is the last time the protagonist is seen awake.

	The protagonist passes away and against her will is submitted to resuscitation attempts ordered by her doctor who has ignored her wish not to be resuscitated. When the nurse enters the room she intervenes. In response, the doctor tells the nurse that the protagonist "is research".
	The resuscitation team arrives and while the nurse attempts to stop resuscitation attempts, the team ignores her and submits the protagonist to defibrillation. After many moments, the doctor admits he's "made a mistake" at which point the resuscitation team leaves the room.
	Once the team leaves, the nurse straightens and covers the protagonists' body. There is a quick transition to the final scene. The final scene is a close up of the protagonist's face. The protagonist appears to be lifeless but the audience is left to guess if she has passed away.

4.5 Instruments for Collecting & Analyzing Data

Information Assimilation (IA)

Information Assimilation is composed of five different categories based on information sources available from a multimedia piece. The first category is "caption / audio" (C/A) which is defined by information that is available either in closed caption form or in the audio stream. The second category is "dynamic information" (D); this category focuses on movement and placement of people and objects within the video. The third category is "video" (V) which is focused on what is present on screen at any given moment. The fourth category is "textual" (T); this category focuses on any text that is present on the screen but is not closed captioned. The fifth category is "captions" (C) and focuses on any caption, aside from closed captions, that is present in the video such as a spokesperson's name.

Using IA in the current study makes it possible to compare the differences in the amount of information users' gain and also assists in identifying what aspects of the video viewers are gaining their information from. After watching the *Wit* video clip in its entirety, each participant was asked to complete a series of open - ended questions that were designed based on the five IA categories as seen in Table 2. Open-ended questions were chosen as opposed to fixed-questions to increase the likelihood of accuracy based on the participant's memory of specific information and not on the random selection of an item, based on its availability.

Table 2 IA Categories

Caption / Audio (C/A)	Information which is presented in both the audio stream and (transcribed) in the caption window. *Ex. Question: What is the main character diagnosed with?*
Dynamic (D)	Dynamic information contained in the video window, for example: whether an actor exited to the left or right of the screen *Ex Question: Which side of the screen does the doctor stand on when he discovers the patient's heart has stopped beating?*
Video (V)	Other information relating to the video window, ex. number of lions in a documentary clip *Ex. Question: Does the patient at any time during the film wear a hat?*
Textual (T)	Textual information contained in the video yet not contained in any captions ex.the number on a rugby shirt window, yet not in the caption box. *Ex. Question: What was the title of the book that was read to the patient?*
Caption (C)	Information from captions in the video window ex. Newsreader's name *Ex. Question: N/A*

The data collected via IA was analyzed using binary success and Cochran's Q Test.

Binary success is a measurement of task success (Albert & Tullis, 2008). It is appropriate to use when the success of the product depends on the users completing a task or set of tasks (Albert & Tullis, 2008 pg. 66). In the instance of this study, the success of the product in quantitative terms depends on both D/deaf and hearing users being able to assimilate a certain level of information from the stimulus. As such, binary success was used to measure the answers answered correctly.

Additionally, the IA data was analyzed using Cochran's Q Test to determine

whether there was a difference in preference between the two groups regarding which IA

information sources were used to gain information. The Cochran's Q test theorem is :

$$T = k(k-1) \frac{\sum\limits_{j=1}^{k} \left(X_{\bullet j} - \frac{N}{k} \right)^2}{\sum\limits_{i=1}^{b} X_{i\bullet} (k - X_{i\bullet})}$$

Where:
       k is the number of IA sources
       $X_{\bullet j}$ is the column total for the jth information source
       b is the number of blocks
       $X_{i\bullet}$ is the row total for the ith block
       N is the grand total

The hypothesis tested was:

H_0: There is no difference in preference between the two groups regarding which IA
information sources were used to gain information.

The null hypothesis being:

H_a: There is a difference in preference between the two groups regarding which IA
information sources were used to gain information.

Likert Scale to Measure Confidence in Answers to IA Question

An additional measure added to IA was a Likert scale to measure the confidence

participants had in each of their answers. This was done to document differences that

might be present in the perceived ease and difficulty of information assimilation between

the D/deaf and hearing user. The Likert scale was used in addition to Gulliver & Ghinea's

(2003) "predicted level of information assimilation" which was used as a summative

measurement contained in a single question completed after answering the IA questions.

"Predicted level of information assimilation" was used by Gulliver & Ghinea to

determine how much information a participant thought they had assimilated and was contrasted with the actual level of assimilated information. Gulliver & Ghinea's use of the "predicted level of assimilation" was to enable analysis of how much information the participant perceived to be available as well as how proficient the participants judged themselves to be at answering IA questions (p.376).

The Likert scale used in this study consisted of an equal number of favorable and unfavorable statements about participants' answers to each open-ended question. Likert-type or frequency scales uses fixed choice response format and are designed to measure attitudes or opinions (Bowling 1997, Burns & Grove 1997). These ordinal scales measure levels of agreement/disagreement. A Likert-type scale assumes that the strength/intensity of experience is linear, i.e. on a continuum from strongly agree to strongly disagree, and makes the assumption that attitudes can be measured (McLeod, 2008).

Participants were asked to circle a response on the Likert scale for each open-ended question to measure their degree of confidence in their answer choice. The scale provided four options ranging from "Yes, I strongly agree" to "No, I strongly disagree" as shown in Table 3. To avoid ambiguity based on answers of "undecided", the central (undecided) option was left out forcing the participant to either agree or disagree.

1) What is the main character diagnosed with?			
1.A) I am confident in my answer.			
Strongly disagree	Disagree	Agree	Strongly agree

Table 3 Confidence Likert Scale

The data collected via IA was analyzed with the data collected about the confidence each participant had in their answer to determine whether there was a difference in the amount of confidence each group (hearing and D/deaf) felt in the correctness of their answer for specific IA question types. The data was analyzed using the nonparametric Pearson's chi-square test in 2 x 4 form. The chi – square test is used to compare categorical or nominal data (Tullis & Albert 2008, p.33) thereby determining the significance of differences between two independent groups. Chi - square is calculated as follows:

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

In this study the independent groups were D/deaf and hearing. The null hypothesis is that there is no relationship within groups with regards to the amount of confidence felt in the correctness of answers for specific IA question types.

Likert Scale (Interest Level)

Gulliver & Ghinea (2006) define the "symbiotic infotainment" characteristic of multimedia as the ability to transfer information to the user, yet also provide the user with a level of subjective satisfaction in respect to its perceived quality (p.242). In an effort to gauge user satisfaction with a multimedia product, they devised Quality of Perception (QOP) that measures the infotainment impact of a presentation. QOP's importance lies in the fact that a technical perspective alone is inadequate when attempting to evaluate multimedia quality. As such, QOP enables investigation of subjective variables such as enjoyment of content matter that are thought to be of importance and paramount to a

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user's experience, while also enabling evaluation of objective factors such as the successful facilitation of content information (p.242).

Building on Gulliver & Ghinea's QOP an additional and alternate metric was designed for this study to gauge the interest level of the user of a multimedia piece. A Likert scale was used to determine the user's interest in the video shown. Participants were asked to choose from four anchored statements that ranged from "Very interested" to "It was very boring for me" to rate the degree of interest they had in the stimulus they had just viewed. Such information enables speculation about the" intrinsic motivation to experience" of each participant, that is defined as performance that is initiated:

> …when one engages in an activity in order to experience pleasant sensations associated mainly with one's senses (e.g.,sensory and aesthetic pleasure). This type of intrinsic motivation … would appear to be related to constructs such as aesthetic experiences (Berlyne, 1971), flow (Csikszentmihalyi, 1975, 1978), sensation seeking (Zuckerman, 1979), and peak experiences (Maslow, 1970). [For example] individuals who swim … because they enjoy the pleasant sensations they experience while their bodies glide through water display this type of intrinsic motivation. (Vallerand,1997 p. 280-81)

 In essence, measurement of "intrinsic motivation to experience" allows investigation of participants' assimilation of information from the stimulus, as it relates to the perceptions of pleasure and satisfaction .

	How interested were you in the clip just shown: 1. Very interested 2. Quite interested 3. Quite boring 4. It was very boring for me

<div align="center">Table 3 Interest Level Metric</div>

4.6 Measuring Emotional Response

Emotional Response: Free Response

Participants had the opportunity to freely respond to the content matter of the video by describing their reaction to the stimulus after viewing it in its entirety. Free responses are designed to elicit opinion, accompanied by a descriptive narrative to support and explain the opinion expressed. Free response is used in this study to identify those scenes that elicited strong emotional response in contrast to those that elicited minimal response.

Free Response Question #1	Can you recall <u>two</u> moments in which you felt a strong emotional response? For each, please describe what was happening in the moment, and how you felt in reaction to it.
Free Response Question #2	Were there moments when you felt quite flat, emotionally? If you can, please describe two such moments: what was happening in the moment, and why you think the moment missed the point?

Table 4 Free Response Questions

Episode-Based Emotional Response: Likert Scale / Free Response

To determine similarity and differences in emotional responses to the same scene, an excerpt from the video, identified as an "episode", was presented in differing formats (i.e. closed captioning / audio intact with no closed captioning) to participants.

Participants were shown three select episodes, described in Table 6, and asked to self-report their emotional response to the episode shown. More specifically, after each scene, participants rated the intensity of their emotional response to the episode. Four mutually exclusive anchors were used to define the strength of the emotional reaction to a scene, as seen in Table 5. Each anchor was further defined by an even numbered Likert scale ranging from "hardly" to "very much" with no middle point. In addition, participants were asked to identify, via free response, the emotion/s they felt along with a description detailing what in the episode caused them to react in such a way.

Episode 1

1. I experienced very strong emotion and had accompanying physical symptoms (e.g. giggling, stomach churning, tearing eyes, lump in the throat, etc.)

Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

2. I experienced strong emotion but no physical symptoms

Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

3. I experienced a moderate emotional response.

Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

4. I experienced just a weak flash of emotion that barely registered.

Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

Table 5 Likert Scale for Episode Response

Table 6 Episodes 1-3 Summaries

Episode 1	The episode begins with the protagonist being diagnosed with Stage 4 Metastatic Ovarian Cancer. The scenes that follow are of the protagonist being submitted to physical exams, one of which is especially invasive. The voiceover, during the episode explains her cancer, states that her treatments are to be experimental and physically debilitating, and closes by telling the patient she must rely on her "resolve" to suffer through the more pernicious side effects.
Episode 2	The episode opens with the close up of the protagonist lying on a pillow with a bald head. A single tear drops from her eye. The following scene is that of her being wheeled down the hall with a blank expression while a voice over by the protagonist states that she has cancer and that there is no stage beyond the one she has. The scene closes with the protagonist lying on her pillow with a worried expression on her face.
Episode 3	The scene opens with a maternal character cradling the protagonist. As classical music plays, the maternal character reads from a children's book inaudibly to the protagonist. The scene closes with a close up of the maternal character kissing the top of the protagonist's head.

The fixed response and Likert data were analyzed using the Paired Student T-Test. The T-test allows for comparison of the means within the same set of participants to determine if there was a difference between two groups (D/deaf and hearing) watching

the same stimulus (2008, pg 29). The responses were first coded as seen in the following

table:

Episode 1

1. I experienced very strong emotion and had accompanying physical symptoms (e.g. giggling, stomach churning, tearing eyes, lump in the throat, etc.)

8	7	0	0
Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

2. I experienced strong emotion but no physical symptoms

6	5	0	0
Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

3. I experienced a moderate emotional response.

4	3	0	0
Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

4. I experienced just a weak flash of emotion that barely registered.

2	1	0	0
Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

For each participant the sum of all three episodes were calculated. The sum of all

participants for each group was then calculated and the T-test was applied. The theorem

used was as follows:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S_{X_1 X_2} \cdot \sqrt{\frac{2}{n}}} \quad S_{X_1 X_2} = \sqrt{\frac{1}{2}(S_{X_1}^2 + S_{X_2}^2)}$$

Interview

Participants were interviewed to ascertain information about the usability of the

video relative to the closed captioning / audio intact format it was delivered in. The

interview followed a well-defined structural inquiry resembling the format of an

objective questionnaire with questions that were designed to fit the purpose of the study:

to investigate the connotative and emotional meaning making behaviors of users of

closed captioned media and users of audio intact media. Such a structure enabled

clarification and elaboration about the information sought within a narrowly defined limit

(Isaac & Michael, 1971). The interview contained three open-ended questions so that

participants had a frame of reference with which to react and without placing constraint

on the reaction. The interview also contained one fixed choice answer to determine how

comfortable the participant was in discussing their emotions. The interview's well-

defined structure supported its use as an exploratory device to help identify variables and

relationships that may suggest hypotheses, and to guide later phases of research (Isaac &

Michael, p.98).

The three open-ended questions were assigned the following categories:

equivalency, ease of use, and recommendation. The equivalency question was designed

to determine whether participants felt they were undergoing a similar experience as those

who viewed the video in an alternate format and if not, to identify those variables that

were generally thought to change the experience so as to not enable an equivalent

experience. The question was scenario based so that all participants shared a similar

interpretive framework for their answers. The "ease of use" question was designed to

provide insight into the experience participants had while navigating the stimulus and to

identify any variables that may have adversely affected the viewing experience (Tullis &

Albert, 2008). The "ease of use" question was purposely left open-ended instead of

defined by a Likert scale or semantic differential since either technique provides a crude measure of perceived usability (Tullis & Albert, 2008). The "recommendation" section was designed to elicit user feedback to help improve the overall user experience and was defined by an unambiguous scenario so that participants all shared a similar interpretive framework for their answers.

4.6 Procedure

Every effort was made to meet with participants in environments (home, office etc.), they were comfortable in. The sessions followed this rubric:

1) Participants first completed the demographic information sheet.

2) Participants were shown the 5 minute *Wit* trailer on a Dell Studio XPS laptop.

3) After the clip, each participant was asked to complete the IA questions to determine what information they assimilated during their viewing.

4) After the IA questions were completed, participants identified two scenes from the *Wit* trailer that they had strong emotional responses to and when possible identified the emotion they felt and why.

5) The second part of the procedure required participants to watch three excerpts (episodes) from the *Wit* trailer. After each excerpt participants rated their emotional response to the excerpt, identified (when possible) the emotion/s they felt, and identified what in the episode caused them to feel the emotion/s.

6) The third and final part of the procedure required participants to verbally answer a series of questions related to their viewing experience.

4.7 Institutional Review Board (IRB) Informed Consent & Study Instruments Information

See Appendices C-H

4.8 Chapter Summary

In this chapter the current study's methodology was presented. The objective of the study, the participants, the stimulus, procedure, and metrics and method of analysis along with their justification were explained.

In the next chapter, we will address the major findings of the study.

CHAPTER FIVE

RESULTS

5.1 Overview

The current research involved the collection of data in an effort to better understand the connotative and emotional meaning making processes of the D/deaf caption and hearing user. Presented in this chapter is a delineation of the IA findings and episode responses followed by the users' free responses during the interview.

5.2 Information Assimilation

Binary Success Results

Caption / Audio (C/A)

Question 1: What is the main character diagnosed with?

Question 2: What does "code status" mean?

Question 3: What is the main character's name?

Table 8 Caption / Audio Binary Success Results

	# of Hearing Participants to Answer Correctly	*# of D/deaf Participants to Answer Correctly*
C/A Question 1	*8*	*9*
C/A Question 2	*6*	*6*
C/A Question 3	*0*	*2*

Table 9 Caption/Audio Binary Results Graph

Finding: Overall, there is a small margin of difference between the two groups pertaining to caption / audio questions. The D/deaf group answered more answers correctly than the hearing group. The largest margin of difference is seen in question 3. No Hearing participants answered question 3 correctly while two D/deaf participants did. In the main, however, there was little difference between the two groups and the equivalence predicted by traditional denotative, logocentric approaches to captioning were born out in this area. In other words, on these denotative questions, no major difference between the two groups was found.

Video

Question 4 Does the patient at any time during the film wear a hat?

Question 5: What color is the popsicle that the patient and nurse eat?

Question 8: Which ethnicity best describes the assistant pushing the patient's wheelchair immediately following the patient's diagnosis?

Question 9: The patient's eyes are what color?

Question 10: The shirts of the medical team that tries to revive the patient are what color?

Table 10 Video Binary Success Results

	# of Questions Hearing Participants Answered Correctly	# of Questions D/deaf Participants Answered Correctly
(V) Question 4	6	4
(V) Question 5	7	6
(V) Question 8	2	3
(V) Question 9	7	3
(V) Question 10	8	7

Table 11 Video Binary Success Results Graph

Finding: By a small margin more hearing participants tended to answer video questions correctly. The most substantial difference is between the number of D/deaf and hearing participants able to answer question 9 correctly. Thus once again, on these denotative

questions, no major difference between the two groups was found and denotative

equivalence was maintained.

Textual

Question 7: What was the title of the book that was read to the patient?

(T) Textual Questions	# of Hearing Participants to Answer Correctly	# of D/deaf Participants to Answer Correctly
(T) Question 7	1	2

Finding: There is a slight difference in the amount of information assimilated from

textual information between the D/deaf and hearing groups. But the extremely low

number of participants in both groups who were able to correctly answer this denotative

question, again suggests that denotative equivalence was maintained.

Dynamic

Question 6: Which side of the screen does the doctor stand on when he discovers the patient's heart has stopped beating

Table 14 Dynamic Binary Success Results

Dynamic Questions	*# of Hearing Participants to Answer Correctly*	*# of D/deaf Participants to Answer Correctly*
(D) Question 6	*8*	*8*

Table 15 Dynamic Binary Success Results Graph

Finding: There is no difference in the amount of information assimilated from dynamic information between the D/deaf and hearing groups.

Summary of (IA) Performance by Deaf and hearing participants

Table 16 Summary of IA Performance by D/deaf and Hearing Participants

Finding: The D/deaf participants tended to answer caption / audio (C/A) questions

correctly more often than the hearing participants. Conversely, the hearing group tended

to answer video (V) question types correctly more often than the D/deaf. This suggests

that hearing participants were focusing more heavily on the video elements as their

primary information source in the complex mediascape, while the D/deaf were dependent

on captioning.

5.3 Cochran's Q Test

Cochran's Q test was used to determine whether there was a difference in using particular information types to assimilate information within groups.

Table 17 Cochran's Q Test Results

Cochran's Q test on Hearing and Deaf groups separately.									
HEARING									
k=4	**A/C**	**V**	**T**	**D**	**TL**	**TL^2**			
Participant 1	0	1	0	1	2	4			
Participant 2	1	1	0	1	3	9			
Participant 3	1	1	0	0	2	4		S TC^2	150
Participant 4	0	1	0	1	2	4		S TL	22
Participant 5	1	0	0	1	2	4		(S TL)^2	484
Participant 6	0	1	0	1	2	4		S TL^2	58
Participant 7	1	0	0	1	2	4		k	4
Participant 8	1	1	0	1	3	9			
Participant 9	1	1	1	1	4	16		Q	11.600
TC	6	7	1	8	22	58		df	3
TC^2	36	49	1	64	484			p	0.009
DEAF									
k=4	**A/C**	**V**	**T**	**D**	**TL**	**TL^2**			
Participant 1	1	0	1	1	3	9			
Participant 2	1	0	0	1	2	4			
Participant 3	1	1	1	1	4	16		S TC^2	120
Participant 4	1	1	0	1	3	9		S TL	20
Participant 5	1	0	0	0	1	1		(S TL)^2	400
Participant 6	1	1	0	1	3	9		S TL^2	54
Participant 7	0	0	0	1	1	1		k	4
Participant 8	0	1	0	1	2	4			
Participant 9	0	0	0	1	1	1		Q	9.231
TC	6	4	2	8	20	54		df	3
TC^2	36	16	4	64	400			p	0.026

Finding: For the hearing group there is a statistically reliable difference between the amounts of information participants assimilated from the four different information sources. The P value calculated for the hearing group was .009 which is <.05 thus indicating there is a reliable difference. Findings suggest that for hearing participants the textual (T) information source provided the least amount of information.

For the D/deaf group there is a statistically reliable difference between the amounts of information participants got from the four different information sources. The P value calculated for the D/deaf group was .026 which is <.05 thus indicating there is a reliable difference. Findings suggest that for D/deaf participants textual (T) and video (V) information sources provided the least amount of information.

5.4 Participants' Self - Reported Confidence in Responses

To determine if there was a correlation within groups between confidence and correctly answered questions a 2x4 Chi Squared was applied to the data. (See Appendices I and J)

Finding: For both D/deaf and hearing groups, the test results demonstrate irrespective of whether the respondents answered the question right or wrong, there was usually little difference in the amount of confidence they felt in the correctness of their answer; therefore, their feeling of confidence was not associated with the correctness of their answer.

5.5 Overall Self - Reported Confidence in Responses

Question 11 on the questionnaire asked users whether they felt confident in the answers to their questions overall.

Table 18 Overall Confidence Results

Question 11	Hearing	Deaf
Strongly Agree	33.3%	0
Agree	55.6%	88.8%

Finding: Overall D/deaf users had less confidence in their answers. Three out of nine (33.3%) hearing users selected "strongly agree" while no D/deaf users selected "strongly agree". Five out of nine (55.6%) hearing users selected "agree" that they were confident in their answers while 8 out of 9 (88.8 %) D/deaf users selected "agreed".

5.6 Participants' Interest Level

Table 19 Interest Level Results

Interest Level	Hearing	Deaf
Very Interested	77.8%	44.4%
Quite Interested	22.2%	55.6%

Finding: Overall, the hearing users were "very interested" (7 out of 9 or 77.8%) in the stimulus while D/deaf users were only "quite interested" (5 out of 9 or 55.6%). This

finding is interesting since it points to the lack of equivalence between the two groups.

Although there was little difference on denotative measures previously discussed, the

difference here begins to address the differences in emotional experiences. It reinforces

Jensema's observation that hearing users are engaged in a viewing experience, while

D/deaf users who choose captioning as their primary information source are engaged in a

reading behavior.

5.7 Summary of IA, Confidence and Interest Level Major Findings

The finding of the Cochran's Q test suggests that though both the hearing and

D/deaf groups had video (V), (D) dynamic, (T) textual, and (C/A) caption / audio

information available to them, the hearing identified more high information sources in

contrast to the D/deaf viewer who viewed the (V) video and textual (T) as being low

information sources. This finding coincides with the IA binary success rates because the

D/deaf group tended to answer caption / audio (C/A) questions (a source they perceived

as being a high information source) correctly more often than their hearing peers, while

the hearing group tended to answer (V) video questions (a source perceived as a low

information source by the D/deaf group) correctly more often than their D/eaf peers.

Moreover, it appears that the less sources identified as being high information sources for

use in understanding the stimulus may affect the confidence in their IA answers and

interest in the stimulus since the D/deaf group exhibited less confidence and less interest

than the hearing group.

5.8 Emotional Response to Episodes

To ensure that the information collected about emotional response to episodes and interview questions accurately reflected the participant's feelings about the stimulus the participants were asked, during the interview portion of the study, to rate the level of agreement they had with the statement: "I am comfortable discussing my emotions".

Finding: Four out of nine (44.4%) D/deaf users answered "strongly agree" while 5 out of 9 (55.6%) hearing participants answered "strongly agree". 5 out of 9 (55.6%) D/deaf users answered "agree" while 4 out of 9 (44.4%) hearing users answered "agree". Overall, all users were comfortable expressing / talking about their emotions.

Implication: We can assume that the information provided on questionnaires and during the interview was factual, accurate, and indicative of how the participants felt.

5.9 Student T –Test and Mode for Emotional Episodes

To determine similarity and differences in emotional responses to the same scene, an excerpt from the video, identified as an "episode", was presented in differing formats (i.e. closed captioning / audio intact with no closed captioning) to participants. Participants were shown three select episodes and asked to self-report their emotional response to the episode shown. More specifically, after each scene, participants rated the intensity of their emotional response to the episode. Four mutually exclusive anchors were used to define the strength of the emotional reaction to a scene. For each group, participants' responses for all episodes were calculated, summed and then submitted to a

Student T- test. In addition, to determine if there was a difference in responses between groups to a particular episode, the mode was used as a measure of central tendency to determine the overall emotional response elicited from each distinct group.

Table 20 Student T-Test and Mode Results

DEAF	Episode 1	Episode 2	Episode 3	SUM		t-test probability on SUM results		
Participant 1	5	6	3	14		0.258115	=	probability of there being a difference between the two groups
Participant 2	7	1	5	13				We would accept there is a difference between the two groups
Participant 3	7	8	8	23				if the probability was 0.05 or less.
Participant 4	8	7	7	22				We cannot do so in this case.
Participant 5	3	3	3	9				
Participant 6	7	7	7	21		average deaf	17.00	
Participant 7	3	7	8	18		average hearing	15.11	
Participant 8	7	7	8	22				
Participant 9	4	2	5	11		Conclusion		There is a slight tendency for the deaf group to have stronger emotions in
Mode	7	7	8	22				their reactions but this difference is not statistically reliable.
HEARING								
Participant 1	6	7	7	20				
Participant 2	7	8	7	22				
Participant 3	3	0	1	4				
Participant 4	3	8	5	16				
Participant 5	5	3	7	15				
Participant 6	3	2	3	8				
Participant 7	3	3	3	9				
Participant 8	6	8	8	22				
Participant 9	5	7	8	20				
Mode	3	8	7	18				

Finding: Overall, there was a slight tendency for D/deaf participants to exhibit stronger emotions in response to episodes, however, it is not statistically significant. The most compelling find of the emotional intensity section is the difference observed between the modes of the two groups in response to Episode 1. The D/deaf participants identified Episode 1 as eliciting very strong emotions accompanied by physical symptoms while the Hearing participants identified Episode 1 as eliciting a moderate emotional response. For Episodes 2 and 3 the findings between the groups were the same.

Implication: The D/deaf participants register as having less high information sources to use, however, they document higher emotional response to the meaning they make from the information that is available to them.

5.10 Free Response 1

Participants had the opportunity to freely respond to the content matter of the video by describing their reaction to the stimulus after viewing it in its entirety. Free responses are designed to elicit opinion, accompanied by a descriptive narrative to support and explain the opinion expressed. Free response is used in this study to identify those scenes that elicited strong emotional response in contrast to those that elicited minimal response. Users' responses were grouped based on scene chosen. Such grouping enables a determination of which scenes tended to evoke strong emotional response.

The findings are as follows:

Hearing

The following is the self – reported data of hearing users pertaining to scenes that were identified as evoking a strong emotional response. In cases where it was possible, the emotion/s felt was/were also identified

Table 21 Hearing Free Response 1 Answers

HEARING	Scene 1	Emotion Identified	Scene 2	Emotion Identified
Participant 1	Resuscitation		Protagonist wheeled down hall looking frail.	
Participant 2	Reading scene	De ja vu – Foreshadow	Resuscitation: The ignoring of the nurse.	Sad
Participant 3	Final Scene	Uncertainty	Reading	Very sad
Participant 4	Diagnosis: Statement of "there is no stage five"	loneliness / mortality	Resuscitation: When doctor screams he's made a mistake.	Empathy
Participant 5	Reading scene	sad / frustrated	Resuscitation: Doctor ignoring patient's wishes. Ignoring of the nurse.	Angry
Participant 6	Resuscitation: Buildup of music	sad / frustrated	n/a	
Participant 7	DNR scene	sympathy / horror	Resuscitation: when doctor screams he's made a mistake	Sympathy
Participant 8	Protagonist is diagnosed	identification	When protagonist appears with no hair	Sad
Participant 9	Protagonist racked with pain	sad/ashamed	Doctor talking about patient while ignoring her.	Disgust

D/deaf

The following is the self – reported data of D/deaf users pertaining to scenes that were identified as evoking a strong emotional response. In cases where it was possible, the emotion/s felt was/were also identified.

Table 22 D/deaf Free Response 1 Answers

D/dEAF	Scene 1	Emotion Identified	Scene 2	Emotion Identified
Participant 1	Resuscitation: ignoring the nurse	Angry	Reading	Touched
Participant 2	DNR scene		Reading	
Participant 3	Protagonist alone in room	Sympathy	Reading	
Participant 4	Resuscitation: When protagonist's shirt is stripped off.	Sense of loss		
Participant 5	Protagonist is diagnosed		DNR	
Participant 6	Protagonist states: "I have cancer"	Bad/ scared	Reading	Sad / Sorrow
Participant 7	Protagonist gazes into camera after diagnosis.	Disbelief/ numb	Reading	
Participant 8	diagnosed	Touched	Resuscitation (dr)	Annoyed
Participant 9	DNR scene		Nurse and Protagonist eating ice cream together.	Glad

Hearing and D/deaf Compared

The following table identifies overlap between the self – report data pertaining to

scenes that were identified as evoking a strong emotional response:

Table 23 Hearing and Deaf Free Responses Compared

Scenes	Number and Percentage of Hearing Participants	Number and Percentage of D/deaf Participants
Resuscitation	6 (66.6%)	3 (33.3%)
Reading	3 (33.3%)	5 (55.5%)
DNR	1 (11.1%)	3 (33.3%)
Diagnosis	2 (22.2%)	2 (22.2%)

*Finding***:** The majority (66.6%) of hearing users in contrast to (33.3%) D/deaf users

identified the "resuscitation" scene as evoking a strong emotional response. The majority

(55.5%) of D/deaf users in contrast to (33.3%) of hearing participants selected the

"reading" scene as evoking strong emotional response. In addition, 33% of D/deaf users

also selected the DNR scene while (11.1%) of hearing users selected that scene.

5.11 Free Response 2

Hearing

The following is the self – reported data of hearing users pertaining to scenes that were identified as "emotionally flat". In cases where it was possible, reasons for the scene being flat were identified.

Table 24 Hearing Free Response 2 Answers

HEARING	Emotionally Flat	Emotionally Flat 2
Participant 1	n/a	n/a
Participant 2	n/a	n/a
Participant 3	n/a	n/a
Participant 4	n/a	n/a
Participant 5	n/a	n/a
Participant 6	Scenes showing protagonist being examined at different angles.	A scene (not identified) in which dialogue was not audible
Participant 7	n/a	n/a
Participant 8	Protagonist vomiting	n/a
Participant 9	Diagnosis of patient	n/a

D/deaf

The following is the self – reported data of D/deaf users pertaining to scenes that were identified as "emotionally flat'. In cases where it was possible, reasons for the scene being flat were identified.

Table 25 D/deaf Free Response 2 Answers

DEAF	Emotionally Flat	Emotionally Flat 2
Participant 1	Final scene (music)	n/a
Participant 2	Reading (no cc)	Final scene (music)
Participant 3	Scene showing diagnosis and protagonist being checked by doctor.	Protagonist gazing as at screen
Participant 4	n/a	n/a
Participant 5	n/a	n/a
Participant 6	Doctor talking to unresponsive patient	Scene when (inaudible speech) was present on the screen
Participant 7	Resuscitation (nurse)	n/a
Participant 8	Ice cream scene	n/a
Participant 9	n/a	n/a

Hearing and D/deaf Compared

Of the scenes identified only selection of the diagnosis scene overlapped between the hearing and D/deaf. The scene was selected by 11.1% of both the hearing and D/deaf users.

Finding: The majority (66.7%) of hearing users reported no scenes as being emotionally flat. In contrast, the majority (66.7%) of D/deaf users identified emotionally flat scenes. Four of the nine scenes identified indicated that the C/A information source was a factor in scene selection.

5.12 Summary of Emotional Response Major Findings

Though D/deaf participants register as having less high information sources, less confidence, and less interest in the stimulus (as documented by the IA, confidence and interest level data) they document slightly higher emotional responses to the episodes. In addition, there were differences observed between groups in the selection of scenes that evoked high emotional responses and in the identification of emotionally flat scenes. Indeed, the majority of the hearing group selected no scenes as being emotionally flat as compared to the majority of the D/deaf group who identified emotionally flat scenes. Such differences may provide insight into how D/deaf and hearing users prefer multimedia information to be presented to them to facilitate reconciliation strategies in support of connotative and emotional meaning making.

5.13 Interview Data[13]

1) *Question 1: Imagine you're an HBO subscriber and you see this trailer on HBO. Do you believe you had the same or similar experience watching this trailer as hearing/D/deaf people? Why or why not? If no, what could HBO do to provide a more equal experience?*
    a) Responses from D/deaf users

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[13] For complete transcripts of interview refer to appendices K and L

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In response to this question, six users responded that the experience would be different. User five answered that they believed that the experience would be the same based on both hearing and D/deaf users having access to the plot. User Seven believed that the experience would be the same in some ways (that were not identified) and different based on viewing strategies of the D/deaf in comparison to hearing users, using his own visual strategies as an example. In addition, he emphasized the presence of sound (C/A information) and its effect on hearing users. In agreement with User Seven, User Eight felt that the experience would be the same; however, a difference would be present based on the difference in the presentation of sound (C/A information). Out of all of the suggestions the majority centered on the C/A information source which points to the difficulty inherent in the requirement of one medium (text) being wholly responsible for comprehensively capturing and representing another (audio). In addition, the syncing of caption with video information (and lack of understanding without it), the speed and location of caption information and the speed of video information were also noted as variables that impacted the viewing experience.

b) Responses from hearing users

In response to this question all of the hearing users felt there would be some type of difference in experience based on the difference presented by the (C/A) information source. Only User Nine mentioned that information largely accounted for by the video (V) information source might not register with the D/deaf the way it was intended. In addition, User Two stated that the D/deaf would register higher emotional responses due to the lack of sound as he himself felt higher emotional response in the absence of sound

during the clip. Descriptive closed captioning (ex. sad violin music) and symbolic language that accounts for music were recommended as reconciling the gap left in the absence of music.

5.14 Summary of Question One Responses

Both D/deaf and hearing users identified the (C/A) information source as the source of different experiences. This was expected and has been the focus of many studies to date. Additionally, D/deaf users also noted the syncing of (C/A) information with (V) information source (and lack of understanding without it), the speed of (C/A) presentation, and the location of (C/A) information as impacting their experiences while one hearing user identified the (V) Video information source as potentially affecting the overall experience for the D/deaf.

Question 2: Was it easy to follow the events of the video trailer stimulus?

      a) Responses from the D/deaf

Five out of nine D/deaf users found the stimulus easy to follow. Three out of nine found D/deaf users found it "easy" to follow at times and one out of nine D/deaf users found it emotionally difficult to process and therefore not easy to follow.

The responses indicate that the difficulty lies in the remediation of the information provided by the (C/A), (V), and (T) textual sources. The rapid flow of events and scene changes in the beginning of the trailer caused participants one, two, three, four, six and nine difficulty in following the video. In addition, interview answers indicate that the

difficulty stemmed from the short time allowed to read the (C/A) information and to reconcile it with the (V) information. Participant Three stated "I was too busy looking at the captions and that made me miss the video. I didn't have enough time to recognize what was going on in the background of the scene." D/deaf User Five, while finding it easy to follow the video also supported participant three's statement stating that while she was able to follow the events it was not possible to pick up details, like the book title, from the (T) textual information source. Another source of difficulty was identified by Participant Six who indicated the editing of the (V) video information. She felt the editing failed to seamlessly integrate the scenes which in turn brought attention to the scene changes and cuts. Deaf User Six stated specifically "I feel the editing was harsh filled with alternating close up and far shots."

b) Responses from the Hearing

Nine out of nine hearing users found it "easy" to follow the events that occurred throughout the video. Participant Four indicated personal identification with the plot as the source of ease.

5.14 Summary of Question Two Responses

While the hearing group found the stimulus easy to follow the D/deaf indicated that remediating the information provided by the (C/A), (V), and (T) information sources was challenging and at some points not possible.

Question 3: Imagine you're an HBO subscriber and you see this trailer on HBO. The head of HBO would like to know how to improve the accessibility of their trailers for D/deaf and HOH individuals. What would you recommend? Why?

a) Responses from the D/deaf

Two D/deaf users referred to combining (D) dynamic and (C/A) information. Users One and Eight suggested moving the caption within the vicinity of the character speaking to ease viewing. Other suggestions centered on the (V) information source. The main recommendations about (V) information were to leave the scene up longer for the viewer to take in after reading the (C/A) and to incorporate shots to show body language. In support of the latter suggestion Participant Five stated, "I feel like the close up shots when the patient was diagnosed were too close. A different shot to show body language would be better … maybe starting with a shot that shows the body language and then zooms to a close up." A total of four suggestions were made about the presentation and location of (C/A) information. The recommendations were to locate the caption closer to the video information, to provide more descriptive captions (ex. music lyrics), and to color code (C/A) information based on intonation and emotion expressed by the actor.

b) Responses from the Hearing

In response to this question all hearing users, except one who did not offer a recommendation, referred to the (C/A) information source. Descriptive captioning (ex. sad violin music), and captioning that was highlighted to bring attention to it were offered as possibly providing a more equivalent experience, though all acknowledged that captioning would still be deficient in some ways. An emphasis on translating the emotional resonance of the music was central to the responses of Users One, Four and Six. In addition, Users One and Five referred to the (V) information source's importance in accessing the trailer's emotional and connotative meaning. User five states, "… I think

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deaf or hard of hearing people would generally get the important parts of the information

… there's a lot of very expressive shots of her face."

5.15 Summary of Question Three Responses

The D/deaf users' responses provide more specific suggestions than the H/hearing users' comments regarding improvement of the C/A information source. This was expected. In addition, there are two differences between the group's recommendations that expose remediation practices of both: 1) D/deaf participants' requested modification of (V) information (i.e. slowing down the presentation of scenes) and the merger of (D) and (C/A) information to facilitate remediation required by the user to fill the gap left between the (C/A) and (V) information; 2) Hearing participants continually emphasized the need for and difficulty of transcribing the music (a part of the (C/A) source) which implies that it plays a primary role in facilitating the remediation of gaps that may be present between the (C/A), (V),(T), and (D) information sources in support of emotional meaning.

CHAPTER SIX

DISCUSSION AND CONCLUSION

6.1 Overview

For this study a mixed methods design was developed that utilizes research methods from the field of User Experience (UX) to explore connotative equivalence between D/deaf and Hearing users and an augmented version of Gulliver and Ghinea's (2003) quantitative measure Information Assimilation (IA) from the field of Human Computer Interaction (HCI) to measure the denotative equivalence between the two user types. To measure denotative equivalence a quiz containing open-ended questions to measure IA was used. To measure connotative equivalence the following measures were used:

1. Likert scales to measure users' confidence in answers to open-ended questions.
2. Likert scale to measure a users' interest in the stimulus.
3. Open – ended questions to identify scenes that elicited the strongest emotional responses from users.
4. Four- level response questions with accompanying Likert scales to determine strength of emotional reaction to three select excerpts from the stimulus.
5. An interview consisting of three open- ended questions and one fixed – choice question.

This study found that there were no major differences in the denotative equivalence between the D/deaf and Hearing groups which support the findings of

Gulliver and Ghinea, Carl Jensema and other researchers who have developed methods to assess the transference and reception of logocentric information from captioned and audio-intact media; however, when we start looking at differences in emotion and viewing strategies D/deaf and hearing participants use to make sense of the stimulus' content we find that there is not connotative equivalence exhibited between the two groups. Indeed, there were important differences identified in the emotional reactions to the stimulus and more importantly this study found that the strategies used to reconcile the information users were presented with in order to create both denotative and connotative meaning differed between groups and individuals within groups.

To better understand the differences exhibited between groups *media reconciliation theory*, based on Iser's "virtual text" theory, is utilized. The use of *media reconciliation theory,* as an interpretive framework for the data collected during this study, enables insightful observations to be made that aid in understanding the role closed captioning plays in facilitating emotional and connotative experiences. Understanding of the emotional and connotative experiences of the D/deaf and hearing groups in this sense, in tandem with the denotative meaning making experiences makes it possible for researchers and practitioners to move closer to creating equivalent denotative *and* connotative experiences for both the Hearing and the D/deaf multimedia user.

What follows in this chapter is a discussion of the findings presented in Chapter Five using *media reconciliation theory* as it was explained in Chapter Three and is followed by the limitations of the current study and suggestions for future research.

6.2 Information Assimilation (IA), Confidence and Interest Levels

IA, self-reported confidence and interest levels all provide observation of the users' understanding of denotative meaning or the "actual text" as created by the author. In this instance, the author is the YouTube user "baskraaijestein" who edited HBO's movie *Wit* into a motion picture trailer that documents the major events of the story. As stated in Chapter Three, data resulting from the calculation of IA respective to D/deaf closed caption users and Hearing users of non-captioned audio intact video is helpful in objectively determining what information sources participants are gaining the most information from along with documenting differences in information assimilation (IA) that exists between the two groups. Additionally, IA provides categories that identify and define the types of information sources available to a user. Moreover, self-reported confidence and interest level data provide a rough sketch as to how well the user feels they were able to assimilate the information along with supplying information that demonstrates the level of enjoyment and engagement a user has as a result of their interaction with the stimulus.

The results of this study show that the hearing group performed better than the D/deaf group on (V) question types and exhibited the most confidence in their answers to this question type. According to Cochran's Q Test, the (V) source registered as one of two sources that provided the least amount of information available to the D/deaf. The D/deaf group performed better than the hearing group on (C/A) questions, as documented by the Binary Success Rate results. The D/deaf also exhibited the most self- reported confidence in their answers to this question type. Additionally, the results from the self-

report confidence question 11 demonstrated that the D/deaf group had less confidence overall in their answers than the hearing group. This might be explained by the results of the Cochran Q test which demonstrated that the D/deaf perceived two low information sources ((C/A) and (T)) as opposed to the hearing groups' one (T). It may be that if a user perceives more low information sources than another user, then the interest in a stimulus may be impacted as well. Indeed, the interest level data seems to support this, as the majority of the D/deaf group registered as only being "quite interested" in the stimulus whereas the hearing group was "very interested". This behavior is exemplified by D/deaf User Two who:

1) Missed four out of the five V questions.

2) Answered two out of three of C/A questions correctly.

3) Missed the one textual question.

3) Answered "disagree" for confidence in answers (Question 11).

4) Selected "quite interested" as opposed to "very interested" in the stimulus.

In addition, out of the four other D/deaf participants who selected only "quite interested" in the stimulus:

1) Two answered the majority of V answers incorrectly.

2) Three answered the majority of C/A questions correctly.

3) Four answered only "agree" as opposed to "strongly agree" for self –reported confidence in answers (Question 11).

6.3 Episode Response and Interview

While the IA information provides observation of the users' understanding of denotative meaning or the author's text and as such is useful in determining denotative equivalence, it does little to explain the "aesthetic" text that is necessarily created by the subjectivities of the users. The questionnaire response data collected about emotional response in this study, however, provide an overview of the connotative and resultant emotional meanings of the aesthetic text, while the interview data provide insight into the reconciliation behaviors that led to the creation of the aesthetic text. When the questionnaire response and interview data are viewed together, insight into connotative equivalency and differences between the two groups emerge.

Episode Responses

The results of this study indicate that there was a slight tendency for D/deaf participants to exhibit stronger emotions in response to episodes, though not statistically significant. This seems to support a suspicion suggested by Hearing Participant Two who stated that D/deaf persons, in the absence of sound, are more likely to "have a more emotional experience than a hearing person" watching the stimulus with sound. In addition, the majority of D/deaf users identified emotionally flat scenes as being present throughout the stimulus in contrast to the majority of the hearing users who reported that no scenes were emotionally flat. This finding might be explained by the IA's Binary Success and Cochran's Q Test findings. If the majority of the D/deaf group perceived more low information sources than the hearing group, then they might also identify more scenes as being emotionally flat, especially in the instance that the scene is highly

dependent on a perceived low information source for conveying emotional meaning. This seems to be the case, given that the scenes selected as emotionally flat tended to have (C/A) information that did not provide comprehensive information (ex. inaudible dialogue, classical music). This assumption is challenged, however, because the Emotional Episode findings also indicate that the majority of D/deaf participants chose the reading scene as evoking a high emotional response. The reading scene constructs the majority of the emotional meaning on (D), (T), and (V) information sources in captioned format, while (C/A) information is limited to "classical music playing" and "no audible speech". This contradiction suggests that there is more to be considered as contributing to the formation of emotional meaning than just the availability of information sources.

Interview

Information Source Presentation

The interview data provides clarification about the contradiction that emerged in the overview provided by the emotional episode data and offers some explanation concerning the construction of emotional and connotative meaning beyond the availability of information sources. Indeed, the interview data is a rich source of information concerning how D/deaf users constructed their own aesthetic text from the stimulus while also documenting barriers they perceived as impacting their construction of it. For example, D/deaf participants chose the reading scene as evoking a high emotional response and yet the reading scene constructs the majority of the emotional meaning on (D), (T), and (V) information sources, while (C/A) information is limited to "classical music playing" and "no audible speech". Interview information suggests that

this is the result of the information source *presentation*. The presentation (style, speed,

etc.) of information sources directly influenced the D /deaf users' construction of

connotative and emotional meaning as can be seen in the following observations:

D/deaf User Nine stated, "Emotionally, [the video] was not easy to follow." She, in

admitting her difficulty in following the video emotionally, stated the source of her

problem was the speed of the sequence of events. The user stated she would have

preferred that the scenes were longer in duration so as to allow for time to take in and

reflect on the (C/A), (V), (T), and (D) information presented to her. In fact, the same user

was aware that the scenes were emotionally profound and impactful; however, she stated

explicitly that she had no time to emotionally process the information sources she was

confronted with. D/deaf Users One, Two and Three also shared similar sentiments as

User Nine. They felt that at times the video was difficult to follow because the speed of

the sequence of scenes was rapid. Participant Two states "In the beginning [of the trailer]

it was fast … I missed what kind of cancer it was … the captions and scenes went FAST.

Then later at the end I was able to follow … when they slowed down the video…then I

understood. But in the beginning I was totally lost. I felt no sense of connection."

Moreover, D/deaf Users One and Two stated the speed of (C/A) information associated

with the quick sequence of (V) information was an issue as it did not provide the

participants with enough time to re-read the (C/A) information nor connect (C/A)

information with the (V) information in certain instances. These observations begin to

explain the selection of the reading scene as evoking high emotions by the majority of the

D/deaf group, given that it was composed of a series of shots that faded in and out slowly

and contained limited (C/A) information. The combination of both (V) and (C/A) information sources presented at a slower pace, with limited amounts of (C/A) seemed to aid in facilitating users' reconciliation of information sources that in turn supported their construction of emotional meaning.

Additional observations that may further explain why the majority of the D/deaf group selected the reading scene were provided by D/deaf Users Two and Six. They both mention editing and shot angles as affecting their viewing experience. User Six states:

> I feel like the close up shots … when the patient was diagnosed … were too close.
> A different shot to show body language would have been better… maybe, start
> with a shot that shows the body language and then zoom to a close up ... Some
> different types of angles too. I noticed often that the angles were taken from the
> side. .. I liked the part where the patient and the nurse were sitting together … the
> angle for the scene was a good one. It seemed more natural than a side shot.

While User Two states, "The scene editing should be modified because it went too fast". The reading scene provided a variety of angles including a close up of the book being read and a medium shot of the maternal figure cradling the protagonist.

6.4 Reconciliation Strategies

While scene presentation speed, editing technique and camera angles are indicated by D/deaf participants as affecting the construction of emotional meaning, they are not and should not be viewed as comprehensively accounting for all such aspects. Individual *reconciliation* strategies also affected the construction of emotional meaning. User Five felt the unifying feature or suture that was necessary to reconcile the

information sources was the plot as discerned from (C/A) information. She felt there was

a lot of information available about the plot that could be used in identify and follow the

events; however, the (T) information (i.e. the title of the book read), she did not pay

attention to. It is unclear as to whether she chose not to pay attention to the (T)

information in order to maximize the amount of denotative (C/A) information

assimilated. As a result of her reconciliation strategy, that largely ignored (V),(D), and

(T) information as shown in her IA results, she had a moderate emotional response to all

three emotional episodes that were shown and resulted in her documenting "no personal

emotional effect" for two of the three emotional episodes shown. This information taken

together suggests that while the participant was able to reconcile the gaps present

between the (C/A) information sources during different events throughout the trailer

using the (C/A) information provided about the plot, she was unable to access or

uninterested in the emotional information available via (V), (T), and (D) information

sources. In other words, the reconciliation strategy utilized by the user was defined by her

actively ignoring details including emotionally saturated information from other

information sources and focusing almost exclusively on the (C/A) information source

which allowed her to construct and thus follow the plot.

D/deaf User Seven in contrast to D/deaf User Five positioned as primary the (V)

information source over the (C/A) information. Indeed, the user stated that when he

watched an exceptionally emotionally charged scene he was more concerned about the

(V) information itself than giving attention to the (C/A) source. Accordingly, the

participant rated the three emotional episodes as evoking higher emotional response than

Participant Five. This information suggests that user's reconciliation strategy was based on the belief that more information about the plot was embedded in the (V) information source than in the (C/A) source. As such, the reconciliation strategy used was defined by either primarily using the (V) information source to construct emotional meaning or the (C/A) to construct denotative meaning; the user preferring the former over the latter. In doing so, User Seven's viewing strategy does not reconcile the (V) with the (C/A) information continually throughout the viewing of the stimulus; on the contrary, he selects to only do so during certain scenes that, while they were not identified, are suspected of occurring later in the trailer when the speed of the (V) and (C/A) information allowed for it.

In yet another contrast, D/deaf User Four felt there seemed to be a slight disjuncture between the captions and the scene action which affected her emotional response to the scene (i.e. the caption was slightly delayed therefore the emotional reaction was slightly delayed). In addition, scene speed was noted as a being a "bit" fast at times. Her observation seems to suggest that her media reconciliation strategy was dependent upon continually reconciling the (V) and (C/A) information. The user registered in alignment with User Seven in terms of emotion felt. Taken together the information suggests that User Four finds emotional content as being embedded primarily within the reconciliation of (C/A) and (V) information sources as opposed to User Seven who thought the emotional content was primarily embedded within the (V) information source and User Five who largely ignored the emotional content embedded in the (V) information source. The difference documented between Users Seven and Four, however,

does not seem to affect the perceived emotional intensity of the video as they both

registered in alignment with each other; while the difference between User Five as

compared to Four and Seven seems to affect the perceived emotional intensity of the

video to a great degree.

In addition to the differences already discussed, the difference in media

reconciliation strategies may also affect what scenes a user perceives as being

emotionally charged. D/deaf Participant Four selected the resuscitation scene at the end

of the video and the scene in which the patient was crying as evoking the most emotion,

while D/deaf Participant Seven selected the reading scene and the scene in which the

protagonist looks into the camera after diagnosis. In contrast, D/deaf Participant Five

selected the diagnosis and the DNR scene as evoking the most emotion.

6.5 Section Summary

The previous section has shown that emotional and connotative meaning for the

caption user relies in part on the presentation style of information sources, (i.e.

presentation speeds, editing, and camera angles). While style of captions has been a

variable that has been explored, editing and camera angles in tandem with captions have

not. Research into this relationship should be conducted. In addition, it has been

demonstrated that D/deaf participants vary in their media reconciliation strategies.

Moreover, the data suggests that reconciliation strategy variance may translate into the

construction of diverse emotional meanings and ratings. While variance in such behaviors

is expected, studies with larger representative sample sizes focused on documenting

media reconciliation strategies should be conducted to discern:

1) Whether there are particular reconciliation strategy types used by individuals with certain attributes (ex. age, education, literacy level).

2) What reconciliation strategy types are most useful in facilitating the creation of emotional meaning while viewing multimedia.

6.6 Conclusion

Ultimately this observatory study was productive. The study introduced a mixed methods approach that provided metrics to measure connotative and emotional meaning making behaviors along with *media reconciliation* theory as an interpretive framework to understand the data collected using those metrics. Both the metrics and theory together enabled the identification of potential variables and processes that both support and facilitate emotional meaning making during the viewing of multimedia products. Most importantly, however, the metrics and media reconciliation theory demonstrate that connotative or emotional equivalency is not necessarily maintained between D/deaf and hearing groups watching the same content in differing formats and as such provides a starting point for practitioners and researchers to build upon in an effort to better understand how and to improve upon current captioning technologies and practices

6.7 Limitations

As is known, qualitative research is not prescriptive. It cannot answer questions nor predict future behaviors. Thus the current study while mixed methods should be viewed only as initiating a conversation about the emotional and meaning making behaviors of D/deaf caption users and providing a helpful conceptual framework for use in drawing out insightful information with the goal of better understanding exhibited

viewing behaviors. A second limitation of the study is the sample. The sample used cannot be viewed as representative of the larger population. In all instances, however, participant selection was based on availability and satisfactory meeting of hearing level. In the case of the D/deaf a college degree was required. A third limitation that should be noted is researcher bias. Research bias is always present. "When tentative hypotheses are held … evidence is unconsciously selected in such a way that it tends to confirm the hypothesis" (Lauer & Asher, 1998 p.47). Every effort was made during this study to acknowledge conflicting data to alleviate such bias.

6.8 Future Research

This study is the first step in the exploration of connotative equivalency between Hearing and D/deaf users of multimedia stimuli. Future studies should focus on further identifying variables that contribute to connotative and emotional meaning for Hearing and D/deaf viewers of multimedia content.

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APPENDICES

Public Law 85 - 905

AN ACT

September 2, 1958

[H.R. 13678]

To provide in the Department of Health, Education, and Welfare for a loan service of

captioned films for the deaf.

Be it enacted by the Senate and House of Representatives of the United States of America

in

Congress assembled, That the objectives of this Act are—

(1) to bring to deaf persons understanding and appreciation of those films which play

such an important part in the general and cultural advancement of hearing persons;

(2) to provide, through these films, enriched educational and cultural experiences through

which deaf persons can be brought into better touch with the realities of their

environment; and

(3) to provide a wholesome and rewarding experience which deaf persons may share

together.

SEC. 2.

As used in this Act—

(1) The term "Secretary" means the Secretary of Health, Education, and Welfare.

(2) The term "United States" means the several States, Territories, insular possessions,

and the District of Columbia.

(3) The term "deaf person" includes a person whose hearing is severely impaired.

SEC. 3.

(a) In order to carry out the objectives of this Act, the Secretary shall establish a loan service of captioned films for the purpose of making such films available for nonprofit purposes to groups of deaf persons in the United States in accordance with regulations promulgated by the Secretary.

(b) In carrying out the provisions of this Act, the Secretary shall have authority to—

(1) Acquire films (or rights thereto) by purchase, lease, or gift.

(2) Provide for the captioning of films.

(3) Provide for distribution of captioned films through State schools for the deaf and such other agencies as the Secretary may deem appropriate to serve as local or regional centers for such distribution.

(4) Make use, consistent with the purposes of this Act, of films made available to the Library of Congress under the copyright laws.

(5) Utilize the facilities and services of other governmental agencies.

(6) Accept gifts, contributions, and voluntary and uncompensated services of individuals and organizations.

SEC. 4. There are hereby authorized to be appropriated not to exceed $250,000 annually to carry out the provisions of this Act.

Approved September 2, 1958.

Public Law 87 – 715

Public Law 87-715

42 USC 2491.

September 28, 1962

[S. 2511]

AN ACT

To provide for the production and distribution of educational and training films for use by deaf persons, and for other purposes.

Be it enacted by the Senate and House of Representative of the United States of America in Congress assembled, That (a) the first section of the Act entitled "An Act to provide in the Department of Health, Education, and Welfare for a loan service of captioned films for the deaf," approved September 2, 1958 (72 Stat. 1742), is amended to read as follows:

42 USC 2491.

"That the objectives of this Act are

"(a) to promote the general welfare of deaf persons by (1) bringing to such persons understanding and appreciation of those films which play such an important part in the general and cultural advancement of hearing persons, (2) providing, through these films, enriched educational and cultural experiences through which deaf persons can be brought into better touch with the realities of their environment, and (3) providing a wholesome

and rewarding experience which deaf persons may share together; and "(b)to promote the educational advancement of deaf persons by (1) carrying on research in the use of educational and training films for the deaf, (2) producing and distributing educational and training films for the deaf, and (3) training persons in the use of films for the deaf."

42 USC 2493.

(b) Paragraphs (4), (5), and (6) of section 3(b) of such Act are redesignated as paragraphs (5), (6), and (7), respectively, and there is inserted after paragraph (3) the following:

"(4) provide for the conduct of research in the use of educational and training films for the deaf, for the production and distribution of training films for the deaf, and for the training of persons in the use of films for the deaf."

42 USC 2494.

(c) Section 4 of such Act is amended by striking out "$250,000" and inserting in lieu thereof "$1,500,000."

Approved September 28, 1962.

Full Information Letter

Information about Being in a Research Study

Clemson University

Closed Caption Study

Description of the Study and Your Part in It

Dr. Tharon Howard, along with Nicole E Snell are inviting you to take part in a research study. Dr. Tharon Howard is a Professor of English at Clemson University. Nicole E Snell is a student at Clemson University, running this study with the help of Dr. Tharon Howard. The purpose of this research is to determine if deaf people, while watching a captioned video, have similar emotional experiences and uptake similar information, as compared to hearing people that watch the same video with the audio intact with no captions. The findings are to be shared via academic publication and conference presentation.

Your part in the study will be to: watch a video clip, and answer some brief questions about it. During the brief videotaped interview, you will be asked to answer brief questions about the video clip viewed.

It will take you about 20 minutes to be in this study.

Risks and Discomforts

There are minimal risks associated with this research, emotional distress (no more than what one would undergo while watching primetime television or movies) due to content and brief medical -related nudity may occur.

Possible Benefits

Potential benefits are a greater understanding of the differences and similarities between deaf viewers of captioned media and hearing viewers of media with audio intact in lieu of captions, with regards to information uptake and emotional response.

Protection of Privacy and Confidentiality

We will do everything we can to protect your privacy and confidentiality. During this study, your name will be omitted from record. Your data will be assigned to a single identification number for analysis purposes only and will in no way be correlated with your personal identity. All video and video consent form information will be stored in a secured location within Strode Tower at Clemson University that is accessible only by the primary and student investigator. Hence, your identity will not be revealed in any publication that might result from this study.

We might be required to share the information we collect from you with the Clemson University Office of Research Compliance and the federal Office for Human Research Protections. If this happens, the information would only be used to find out if we ran this study properly and protected your rights in the study.

Choosing to Be in the Study

You do not have to be in this study. You may choose not to take part and you may choose to stop taking part at any time. You will not be punished in any way if you decide not to be in the study or to stop taking part in the study.

If you choose to stop taking part in this study, the information you have already provided will be used in a confidential manner.

Contact Information

If you have any questions or concerns about this study or if any problems arise, please contact Dr. Tharon Howard at Clemson University at 864-656-3488.

If you have any questions or concerns about your rights in this research study, please contact the Clemson University Office of Research Compliance (ORC) at 864-656-6460 or irb@clemson.edu. If you are outside of the Upstate South Carolina area, please use the ORC's toll-free number, 866-297-3071.

A copy of this form will be given to you.

Release Form for Use of Videotape

Project Title: IRB2012-085 The User Experience of Closed Captioning

Primary Investigator: Dr. Tharon Howard of the English Department

Co-Investigator: Nicole E. Snell

Academic Affiliation: Clemson University

_____

Please Print:

Name of Participant: _____

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Signature: _____ Date: _____

Demographic Information Questionnaire

Participant #___

Demographic Information

1) Age _____
2) Which of the following best describes the highest level of education you have completed:
   GED ____

   High School degree ____

   Few years of college _____

   4 year college degree ____

   Graduate school degree _____

   Phd / MD / JD / Ed.D _____

3) Which of the following best describes your hearing status :
   Profoundly deaf (hearing loss of 90 Db or greater) ____

   If deaf, are you pre-lingual deaf? ____

   Hearing (hearing loss of no greater than 20 Db) ____

4) Are you:
   Female ____
   Male _____

5) Have you watched the HBO film WIT?
   Yes __
   No __

Post – Video Questionnaire and Quiz

Information : *Complete the response to the best of your ability and then rank how confident you are in your answer*

1) What is the main character diagnosed with?

    1.A) I am confident in my answer.

1	2	4	5
Strongly disagree	Disagree	Agree	Strongly agree

2) What does "code status" mean?

    2.A) I am confident in my answer.

1	2	4	5
Strongly disagree	Disagree	Agree	Strongly agree

3) What is the main character's name?

    3.A) I am confident in my answer.

1	2	4	5
Strongly disagree	Disagree	Agree	Strongly agree

4) Does the patient at any time during the film wear a hat?

    4.A) I am confident in my answer.

1	2	4	5
Strongly disagree	Disagree	Agree	Strongly agree

5) What color is the popsicle that the patient and nurse eat?

    5.A) I am confident in my answer.

1	2	4	5
Strongly disagree	Disagree	Agree	Strongly agree

6) Which side of the screen does the doctor stand on when he discovers the patient's heart has stopped beating?

6.A) I am confident in my answer.

1	2	4	5
Strongly disagree	Disagree	Agree	Strongly agree

7) What was the title of the book that was read to the patient?

7.A) I am confident in my answer.

1	2	4	5
Strongly disagree	Disagree	Agree	Strongly agree

8) Which ethnicity best describes the assistant pushing the patient's wheelchair immediately following the patient's diagnosis?

8.A) I am confident in my answer.

1	2	4	5
Strongly disagree	Disagree	Agree	Strongly agree

9) The patient's eyes are what color?

9.A) I am confident in my answer.

1	2	4	5
Strongly disagree	Disagree	Agree	Strongly agree

10) The shirts of the medical team that tries to revive the patient are what color?

10.A) I am confident in my answer.

1	2	4	5
Strongly disagree	Disagree	Agree	Strongly agree

11) Overall, I am confident in my answers.

1	2	4	5
Strongly disagree	Disagree	Agree	Strongly agree

Interest Level: *Circle the response that best represents your interest level in the clip just shown.*

How interested were you in the clip just shown:

1. Very interested
2. Quite interested
3. Quite boring
4. It was very boring for me

Response

1)   Can you recall <u>two</u> moments in which you felt a strong emotional
response? For each, please describe what was happening in the moment,
and how you felt in reaction to it.

2)   Were there moments when you felt quite flat, emotionally? If you can,
please describe two such moments, what was happening in the moment, and
why you think the moment missed the point.

Episode Response: *Circle the response that best represents your reaction to the episode just viewed, and explain your response.*

Episode 1

5. I experienced very strong emotion and had accompanying physical symptoms (e.g. giggling, stomach churning, tearing eyes, lump in the throat, etc.)

1	2	4	5
Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

6. I experienced strong emotion but no physical symptoms

1	2	4	5
Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

7. I experienced a moderate emotional response.

1	2	4	5
Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

8. I experienced just a weak flash of emotion that barely registered.

1	2	4	5
Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

Please explain your personal reaction to this episode. If possible, identify what emotion, if any, you felt and what you saw in the movie that caused that emotion.

Episode 2

1. I experienced very strong emotion and had accompanying physical symptoms (e.g. giggling, stomach churning, tearing eyes, lump in the throat, etc.)

1	2	4	5
Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

2. I experienced strong emotion but no physical symptoms

1	2	4	5
Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

3. I experienced a moderate emotional response.

1	2	4	5
Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

4. I experienced just a weak flash of emotion that barely registered.

1	2	4	5
Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

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Please explain your personal reaction to this episode. If possible, identify what emotion, if any, you felt and what you saw in the movie that caused that emotion.

Episode 3 Check box that best matches your response.

1. I experienced very strong emotion and had accompanying physical symptoms (e.g. giggling, stomach churning, tearing eyes, lump in the throat, etc.)

1	2	4	5
Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

2. I experienced strong emotion but no physical symptoms

1	2	4	5
Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

3. I experienced a moderate emotional response.

1	2	4	5
Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

4. I experienced just a weak flash of emotion that barely registered.

1	2	4	5
Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

Please explain your personal reaction to this episode. If possible, identify what emotion, if any, you felt and what you saw in the movie that caused that emotion.

Interview Questions

Equivalency	Imagine you're an HBO subscriber and you see this trailer on HBO. Do you believe you had the same or similar experience watching this trailer as hearing/D/deaf people? Why or why not. a. If no, what could HBO do to provide a more equal experience?
Ease of Use	How easy was it for you to follow the events occurring throughout the video?
Recommendation	Imagine you're an HBO subscriber and you see this trailer on HBO. The head of HBO would like to know how to improve the accessibility of their trailers for D/deaf and HOH individuals. What would you recommend? Why?

I am comfortable talking about my emotions?

Yes, I strongly agree	Yes, I agree	No, I disagree	No, I strongly disagree

2X4 Chi Table and Calculation

HEARING					Expected				Chi					DEAF					Expected				Chi			
C/A Question 1														C/A Question 1												
SD	D	A	SA	Sum	SD	D	A	SA	SD	D	A	SA		SD	D	A	SA	Sum	SD	D	A	SA	SD	D	A	SA
0	0	3	5	8	0	2.667	5.333	0	0	0.042	0.021	0	Correct	0	0	1	8	9	0	0	1	8	0	0	0	0
Correct	0	0	0	1	1	0	0.333	0.667	0	0	0.333	0.167	Wrong	0	0	0	0	0	0	0	0	0	0	0	0
Wrong	0	0	3	6	9	Chi =	0.563		p =	0.905	Not Sig.			0	0	1	8	9	Chi =	0		p =	1	Not Sig.	

C/A Question 2					Expected				Chi					C/A Question 2					Expected				Chi			
SD	D	A	SA		SD	D	A	SA	SD	D	A	SA		SD	D	A	SA		SD	D	A	SA	SD	D	A	SA
0	1	1	4	6	0	0.667	1.333	0	0.167	0.083	0		Correct	0	0	1	5	6	0	0	2	4	0	0	0.5	0.25
Correct	0	0	1	2	3	0	0.333	0.667	2	0	0.333	0.167	0	Wrong	0	0	2	1	3	0	0	1	2	0	0	1	0.5
Wrong	0	1	2	6	9	Chi =	0.75		p =	0.861	Not Sig.			0	0	3	6	9	Chi =	2.25		p =	0.522	Not Sig.	

C/A Question 3					Expected				Chi					C/A Question 3					Expected				Chi			
SD	D	A	SA		SD	D	A	SA	SD	D	A	SA		SD	D	A	SA		SD	D	A	SA	SD	D	A	SA
0	0	0	0	0	0	0	0	0	0	0	0	0	Correct	0	0	1	1	2	0	0.75	0.5	0.75	0	0.75	0.5	0.083
Correct	2	1	0	4	7	2	1	0	4	0	0	0	0	Wrong	0	3	1	2	6	0	2.25	1.5	2.25	0	0.25	0.167	0.028
Wrong	2	1	0	4	7	Chi =	0		p =	1	Not Sig.			0	3	2	3	8	Chi =	1.778		p =	0.62	Not Sig.	

V Question 4					Expected				Chi					V Question 4					Expected				Chi			
SD	D	A	SA		SD	D	A	SA	SD	D	A	SA		SD	D	A	SA		SD	D	A	SA	SD	D	A	SA
0	2	0	4	6	0	2	0.667	3.333	0	0	0.667	0.133	Correct	0	0	1	3	4	0	1.778	0.889	1.333	0	1.778	0.014	2.083
Correct	0	1	1	1	3	0	1	0.333	1.667	0	1.333	0.267	Wrong	0	4	1	0	5	0	2.222	1.111	1.667	0	1.422	0.011	1.667
Wrong	0	3	1	5	9	Chi =	2.4		p =	0.494	Not Sig.			0	4	2	3	9	Chi =	6.975		p =	0.073	Not Sig.	

V Question 5					Expected				Chi					V Question 5					Expected				Chi			
SD	D	A	SA		SD	D	A	SA	SD	D	A	SA		SD	D	A	SA		SD	D	A	SA	SD	D	A	SA
0	0	3	4	7	0	0	3.111	3.889	0	0	0.004	0.003	Correct	0	0	3	3	6	0	1.333	2.667	2	0	1.333	0.042	0.5
Correct	0	0	1	1	2	0	0	0.889	1.111	0	0	0.014	0.011	Wrong	0	2	1	0	3	0	0.667	1.333	1	0	2.667	0.083	1
Wrong	0	0	4	5	9	Chi =	0.032		p =	0.998	Not Sig.			0	2	4	3	9	Chi =	5.625		p =	0.131	Not Sig.	

V Question 8					Expected				Chi					V Question 8					Expected				Chi			
SD	D	A	SA		SD	D	A	SA	SD	D	A	SA		SD	D	A	SA		SD	D	A	SA	SD	D	A	SA
0	0	1	1	2	0.5	0.25	0.5	0.75	0.5	0.25	0.5	0.083	Correct	1	1	1	0	3	0.75	1.125	0.375	0.75	0.083	0.014	1.042	0.75
Correct	2	1	1	2	6	1.5	0.75	1.5	2.25	0.167	0.083	0.167	0.028	Wrong	1	2	0	2	5	1.25	1.875	0.625	1.25	0.05	0.008	0.625	0.45
Wrong	2	1	2	3	8	Chi =	1.778		p =	0.62	Not Sig.			2	3	1	2	8	Chi =	1.022		p =	0.388	Not Sig.	

V Question 9					Expected				Chi					V Question 9					Expected				Chi			
SD	D	A	SA		SD	D	A	SA	SD	D	A	SA		SD	D	A	SA		SD	D	A	SA	SD	D	A	SA
1	2	0	4	7	0.778	2.333	0	3.889	0.063	0.048	0	0.003	Correct	0	1	1	1	3	0	1.5	0.375	1.125	0	0.167	1.042	0.014
Correct	0	1	0	1	2	0.222	0.667	0	1.111	0.222	0.167	0	0.011	Wrong	0	3	0	2	5	0	2.5	0.625	1.875	0	0.1	0.625	0.008
Wrong	1	3	0	5	9	Chi =	0.514		p =	0.916	Not Sig.			0	4	1	3	8	Chi =	1.956		p =	0.582	Not Sig.	

V Question 10					Expected				Chi					V Question 10					Expected				Chi			
SD	D	A	SA		SD	D	A	SA	SD	D	A	SA		SD	D	A	SA		SD	D	A	SA	SD	D	A	SA
0	2	5	1	8	0	2.667	4.444	0.889	0	0.167	0.069	0.014	Correct	0	2	3	2	7	0	1.556	3.889	1.556	0	0.127	0.203	0.127
Correct	0	1	0	0	1	0	0.333	0.556	0.111	0	1.333	0.556	0.111	Wrong	0	0	2	0	2	0	0.444	1.111	0.444	0	0.444	0.711	0.444
Wrong	0	3	5	1	9	Chi =	2.25		p =	0.522	Not Sig.			0	2	5	2	9	Chi =	2.057		p =	0.561	Not Sig.	

D Question 6					Expected				Chi					D Question 6					Expected				Chi			
SD	D	A	SA		SD	D	A	SA	SD	D	A	SA		SD	D	A	SA		SD	D	A	SA	SD	D	A	SA
0	0	2	6	8	0	0.889	1.778	5.333	0	0.889	0.028	0.083	Correct	0	1	3	4	8	0	1.778	2.667	3.556	0	0.34	0.042	0.056
Correct	0	1	0	0	1	0	0.111	0.222	0.667	0	7.111	0.222	0.667	Wrong	0	1	0	0	1	0	0.222	0.333	0.444	0	2.722	0.333	0.444
Wrong	0	1	2	6	9	Chi =	9		p =	0.029	Significant			0	2	3	4	9	Chi =	3.938		p =	0.268	Not Sig.	

T Question 7					Expected				Chi					T Question 7					Expected				Chi			
SD	D	A	SA		SD	D	A	SA	SD	D	A	SA		SD	D	A	SA		SD	D	A	SA	SD	D	A	SA
0	0	1	0	1	0.125	0.125	0.375	0.375	0.125	0.125	1.042	0.375	Correct	0	0	0	2	2	0	0.857	0.286	0.857	0	0.857	0.286	1.524
Correct	1	1	2	3	7	0.875	0.875	2.625	2.625	0.018	0.018	0.149	0.054	Wrong	0	3	1	1	5	0	2.143	0.714	2.143	0	0.343	0.114	0.61
Wrong	1	1	3	3	8	Chi =	1.905		p =	0.592	Not Sig.			0	3	1	3	7	Chi =	1.738		p =	0.292	Not Sig.	

2X4 Chi Table Graph Key

Graph Key:			
SD = Strongly Disagree			
D = Disagree			
A= Agree			
SA - Strongly Agree			
indicates that all participants did not reply			

Deaf Interview Transcripts

1) *Imagine you're an HBO subscriber and you see this trailer on HBO. Do you believe you had the same or similar experience watching this trailer as hearing people? Why or Why not. If no, what could HBO do to provide a more equal experience?*

Participant 1
If I watch the stimulus will hearing people have the same experience as me? No. The music evokes feelings. Voice intonation, and such is not accounted for in captioning. Captioning provides you with words, that's it. Good question [HBO] should show how the voice sounds. Is it sad, monotone? Give me a description in parentheses that says how the words are said. When music plays, and the caption displays (MUSIC) on the screen …well come on, tell me more. I want to know.. the words or the melody. What's the rhythm? When the caption (MUSIC) stands in for audible music, I feel nothing.

Participant 2
You're saying that if I was a hearing person would I have the same reaction as opposed to myself viewing [the video] through closed captioning? Would I have the same experience? No. It would be different. I think for me, it was more about the rapidity of the captions presented . The captions were presented FAST. I felt I couldn't really connect the captions with the video itself. So I feel if HBO could slow down and modify the video quality[improve editing technique] so that scenes and caption presentation was synced. Sometime the captions were fast sometimes the captions were slow. Looking between the caption and the video I became lost. I didn't feel a strong connection with the patient through the captions . Sometimes the captions were fast sometimes they were slow. I lost the idea that was being conveyed by the scene.

Participant 3
Different. Yes, different. The music was missing . I felt something but come on where are the words to the music? They were missing. [HBO] should improve captions by adding: the words of the music, captioning background noises such as a door closing, crying, or if something crashes. It's better to include them in words

Participant 4
I think the sound probably evokes more emotion in the hearing than for a D/deaf person probably. Sound connected to .. like when you feel vibrations .. I mean [sound] causes you to move emotionally…that's not a very good explanation. Yes, I think hearing people have more of an emotional response than a D/deaf person would. I don't know. Sometimes the captions were delayed and I feel like most of the time the captions should catch up with the emotional response you would expect from the person. I mean if the

captions are delayed, your reaction is delayed too… your understanding. They were just slightly delayed.

Participant 5
 I believe a hearing person would have the same response because the film … what I saw .. had a lot of plot .. it was full of information .. and I feel I can r elate [to the protagonist] .. woman to woman .. I mean I was curious about the level of severity [of the cancer] and what the outcome would be. Hearing and deaf would have the same response

Participant 6
Same or different? I think different because I had the opportunity to read "stage four advanced metastatic ovarian cancer" again and again. As I read it over and over it felt more real than I picture it would be for a hearing person who heard it once. Reading it over and over has a real piercing effect. So could be different . The part that was captioned (classical music) I felt disconnected . Also if [HBO] would offer a line from the book [during the reading scene] ..it would benefit hearing too .. it would register as a familiar line from a book once read .. instead of just the caption "inaudible dialogue" which makes me feel like I can't understand ((but the hearing can understand a little bit)) which causes me to focus on that instead and forget the plot. So HBO should offer a line from the book instead.

Participant 7
I believe in certain ways, yes, but in other ways different. I'm more involved with the visual content of the scene. There were certain emotional scenes I felt like I was less involved with the caption and more involved with the scene action especially if I felt the caption would interfere with my immersion in the scene action. …Good question. Well I saw some mediocre captions that showed sound … whispering etc. .. Maybe [HBO can offer captions that make more]clear the kind of sound that caption is supposed to represent … Hearing benefit because they can identify what kind of sound the sound is but we have to depend on an indistinct caption. It's hard , it's a sticky question.. how do you show that? I know that if I wore a hearing aid I could hear the different sounds .. the sound quality is little different during those scenes.

Participant 8
"Same experience" what do you mean by that? .. oh … Yes, they have the same experience. It doesn't make a difference. I feel both would have the same experience … if there is caption [for the deaf]. But there is something missing. Hearing people hear sound and it produces emotions in them. The D/deaf watch captions like " growling" "crying" they can't hear it while hearing people can. The sound is missing … that's one negative. I have no idea how to improve the accessibility of the video.

Participant 9
Different. .. I feel when I read the captions and then looked to the scene …the scene was already gone. I feel … I wish the scene had faded out slower … So I could look .. Maybe

[HBO] could place the caption on the screen instead of below it. I think the scenes themselves were very profound, and had a big emotional impact. It took time for me to digest them. However, by the time I accepted she [the protagonist] had cancer it was already to the part where she died because it moved so fast.

2) How easy was it for you to follow the events occurring throughout the video?

Participant 1
Sometimes it was easy to follow and sometimes it was a long caption and I had to go back and read it again ..sometimes … it depends .. the video was sometimes fast and sometimes slow. Some of the video was easy to watch some of it was so fast I was like "what?".

Participant 2
In the beginning it was fast. She said … I missed what kind of cancer it was. Then there was the wheelchair scene and more caption and the captions and scenes went FAST. Then later at the end I was able to follow , when they slowed down the video in the end, then I understood. But in the beginning I was totally lost. I felt no sense of connection. .. Trying to catch what the caption was saying but at one point it was so fast.

Participant 3
Like in the scene with the wheelchair I never noticed the woman behind it pushing it. I was too busy looking at the captions and that made me miss the video. I didn't have enough time to recognize what was going on in the background of the scene. I was too busy looking at the words.

Participant 4
It was pretty easy to follow. I think some of the scenes / clips / scenes themselves were a little bit fast. I mean the part where you asked me what color is the popsicle, I couldn't identify nurse's popsicle.. I mean I could identify the person who was in front… who was closest to the camera.

Participant 5
Yes, it was easy to follow the events, but the details like the book .. I'm not paying attention to that.

Participant 6
 From the DNR scene where there wasn't an answer then everything progresses FAST to the doctor ..and me thinking "oh is it really that serious?" I envision the video proceeding month to month. But another thing was the editing of the scenes so that they were integrated in a seamless fashion. I feel the editing was harsh … filled with alternating close up and far shots. I think it was easy to follow.

Participant 7
I felt it was pretty easy for me to follow the events that were going on.

Participant 8
Follow the events? I think it was fine. I could follow the events fine.

Participant 9
Really, I think the scenes themselves were very profound, and had a big emotional impact. It took time for me to process them. By the time I accepted that the situation happened [the protagonist had cancer] so many other things had already happened … you know that I mean? Emotionally, it was not easy for me to follow. Emotionally, no.

3) *Imagine you're an HBO subscriber and you see this trailer on HBO. The head of HBO would like to know how to improve the accessibility of their trailers for D/deaf and HOH individuals. What would you recommend? Why?*

Participant 1
Really, I don't watch movies but .. I'm not a movie enthusiast … I don't care. I'd rather read a book. Sorry. I don't know maybe color code captions with emotions … I don't know … a way to show anger or calm. I've noticed hdtv has color captions … but do they match the tones of the voice .. I don't know a way. Like sometimes captions are presented but you don't know who's talking .. maybe moving captions close to the person who's talking so you can identify the speaker b/c sometimes its hard but if captions move in proximity with the person talking it would make it easier instead of having to go between the caption and video trying to identify the speaker. I don't know.

Participant 2
Motion and change in scene is nice but slow it down. Make sure everyone has access to the scene. Not just for deaf and hearing but for ppl who have visual handicaps, for ppl who have hard time grasping concepts fast. They should be more sensitive to the kind of audience that wants to view the video.

Participant 3
Leave the scenes up longer so we have time to look at them and take them in. The rapid change of scenes makes us miss a lot. Second, include lyrics of music.

Participant 4
That was a pretty convincing clip in and of itself so it really doesn't need that much of an improvement. Music or lack thereof of music. It had enough dramatic content to be able get some kind of reaction..so..I don't think there's all that much to improve.

Participant 5
Should include D/deaf actor/s in the movie.. that's what I think .. for example when the nurse and the patient were talking D/deagf actors could do the same thing in sign. Little

things should be incorporated to make the viewer want to pay attention to it… because it [the msg about cancer] is significant .. I think .. Like now … we [D/deaf] watch and we feel the severity of the outcome of the disease. We can identify with the patient because we are women … so we have sympathy. But the d/deaf may be more aware about the cancer and realize … "I may get cancer" [if there was a d/deaf actress] so we would feel empathy for the patient.

Participant 6
I feel like the close up shots when the patient was diagnosed was too close a different shot to show body language would be better. Maybe starting with a shot that shows the body language and then zooms to a close up. Some different types of angles too. I noticed often the angles were taken from the side. .. I liked the part where the patient and the nurse were sitting together … the angle for the scene was a good one. It seemed more natural than a side shot.

Participant 7
If it's possible to add more background scenes of what's going on in background b/c from watching that hospital scene … it was a little too quiet for me in certain ways because I've gone to the hospital .. it is quiet but sometimes it can be pretty noisy so maybe it would help if more background information was provided to represent what was happening.

Participant 8
Captions were a little bit low so when I was watching them it was possible that I missed something happening on screen. I suggest positioning the captions closer to the screen action so it's easy to switch between the scene and caption information. Also, sound effects should maybe be captioned and presented on the top of the screen. So that a viewer knows if there are captions on the top of the screen it is sound effects. Also, the caption should be within close proximity with the character speaking.

Participant 9
Captions should be placed on the video and the transitions were too fast for me.

1) *Imagine you're an HBO subscriber and you see this trailer on HBO. Do you believe you had the same or similar experience watching this trailer as hearing people? Why or Why not. If no, what could HBO do to provide a more equal experience?*

Participant 1
No, because you have off camera dialogue and monologues that were off camera that would couldn't see plus the music was so the score the soundtrack was so you know it was kind of overpowering and it forced you it was overpowering the soundtrack seemed to guide your emotions kind of seemed that… you couldn't follow … you could think it was a sci fi film if you couldn't hear the narrative of what the doctor was telling her. You wouldn't even know she had cancer .. maybe if you saw the hat and saw the throw up maybe … but that's such a quick clip you don't even know .. it could've been a speculative fiction .. film…because there's no telling why she was sick. You don't know. Or especially, you know … even when she was like being probed by the doctor . I mean it could've been something out of umm a hand maiden's tale. You know what I mean? That doesn't necessarily…it could've been some dystopic drama some dystrophic science fiction. Have something like the kind of sub titles you see in foreign films so then the off camera speech it can be determined and understood in a very in a way that it true to the tone and the language of exactly what's being said. With good punctuation marks.. and a good .. a good foreign film … captioned film.

Participant 2
I don't …because umm when the sound went out in the clips I think I had more emotion when the sound went out in the clips. Umm I had more emotion.. in the …when the clips went in and the sound went out. Yeah when the sound wasn't in .I believe that the deaf person would have a different feel for it also for the video. Would have a more emotional experience than a hearing person. Ummm put some type of words on there like closed captioning I mean I don't know any more digital things they could do with it.

Participant 3
I don't believe I have a similar experience I think primarily because a big way the video conveyed its strong sense of emotion was through the music. Which was really really sentimental and emotional umm and so without that I don't think it would come across. I don't know right now.

Participant 4
I would go with no I felt a lot of the emotional affect was set by the music of the piece. And I don't know if that same affect could come through without it. I think the sound was crucial and important to the composition. That's a difficult question I've never had an opportunity to experience a film with closed captioning and understand what the emotional resonances are so I don't feel I could give guidance on how to affect someone

in the circumstances that I've never had the experience of working through myself. I would like to believe that certain icons can be created that have emotional capacities that are conditioned such that it can carry through the same sort of language.. I know that musicians can for instance can look at the text of a piece…the score of it .. and from that get an understanding of what that score will sound like. In popular mythology I believe it was Mozart or Beethoven had lost their hearing so in the latter parts of their career the composition had to be formed in their mind as based on previous experience with music but the only way for them to have any understanding of the music was through the physical score but in that case the composer had had sound so they had the learn the meaning of the score by hearing it and so by seeing it they could generate from their prior experience. I don't know how transformal that would be. So a long answer the best answer I can come up with is a set of symbolic language that corresponds to music and that's such a broad thing to go for..

Participant 5
Well I guess that would depend on in some degree whether or not the deaf or hard of hearing people would have closed captioning. It seems like they would right? If you have a tv and your deaf you'd probably have that. I definitely htinkn that impact is going to have a different response. Because they would see a little music sign saying that there is sad violin music but they're not going to hear it they're just going to see that. So… I think the music was one of the more moving aspects of that clip.They did a pretty good job finings a tasteful piece that matched the content .. I think.. I think you kind of get the gist of what was going on. More or less. The doctor's face as he was giving her the diagnosis at the beginning might've been a bit confusing but once you see her she has that thousand years stare that really disconnected look like she doesn't even know understand that she is in the situation.. well…won't accept it almost .and you kinda get the idea that something bad is going to happen. As a hearing viewer I obviously I heard she had stage four cancer I don't know really what stage four means from stage three but that sounds pretty severe to me. So I'm getting that. I think deaf or hard of hearing people would have to rely on kinda the facial cues more, more so. I think that they would miss a good deal of that. Because of the dialogue they wouldn't understand really at all what was going on when she died and the medical team was rushing in and the nurse was so upset because she was on the dnr list. I guess deaf or hard of hearing might have trouble understanding that without the closed captioning. One point that was interesting to me was when I guess that was supposed to be the mom when she was reading the book to the patient. That was interesting because there was no dialogue there it was just the music. And then the scene of looking through the book. Sorry what was the question again? Similar yes similar. Same? No. close but not the same. Not equivalent.. It wouldn't be equivalent b/c the music. People don't really understand what a huge impact music has. If its good music it's a good impact if its bad music it's a very bad impact on any sort of visual material like a tv show or a film. There's a saying that I've heard. I'm a musician.. so that saying is if what you're playing is good then people won't listen to you b/c they're off in their own world having their own conversation .. so if what you'er playing is good ppl won't listen. If what you're playing is bad they won't walk b/c they're so

embarrassed about ..what is this guy doing? They're ripped from their own world. It's like car accident you can't help but stop and stare …if everything is honkey dorey than … so definitely not an equivalent experience

Participant 6
Umm I would think umm probably similar umm like at times there seems to be a voice over so there's not a whole lot of talking going on so you have the main character in the background she's expressing some sort of emotion umm but she's not really talking they have a voice over. I imagine umm if you're going to have captions for deaf or hard of hearing it would be kind of similar. Although a part I think would be kind of different was near the ending where they were resuscitating or trying to resuscitate her … there was a lot of people talking over each other a lot and it was really loud and the music was really building I don't know how you would show that with captions. That would be really difficult. The experience would definitely be different in that case. I've seen some tv shows that have "sad violin music playing" or something like that. I'm not part of the culture for the deaf or hard of hearing so I'm not sure how well that actually registers. But I would imagine that would be a little more helpful b/c otherwise you don't know what type of music is in the background and you should ..that helps to play a part. I'm trying to imagine is ppl are talking over each other you could still caption that but I don't think it would have the same effect. B/c you would get pieces of people talking. You wouldn't get that they are all on top of each other kind of mounting… so you could put 'incessant arguing' or something that might help a little bit. I think that's about as close as you could get.

Participant 7
I would say it would be a different experience mostly because of the soundtrack that was behind the trailer. I think that was designed more to evoke emotions than just the subject matter. I think if they created a trailer that wouldn't rely so much on the music or the inflection of the voice. I don't know that else. I think even with and I know with closed captioning it describes the music but even with the description it doesn't seem capture it. I mean they could talk about the inflection of the doctor's tone

Participant 8
The music does play a very large part and how you feel about that. About the characters. Also I think some of the voice over. Some of the voice overs were flat and were non emotional. Like in the beginning when the doctor was reading or telling her what her condition is .. It makes it like he's just reading. You do this and you do this and this is what … that tonelessness of voice kind of gets lost in translation. Maybe if they would add different voices or different types [to captions].. I don't know if that would be a good translation or not.

Participant 9
I feel like a lot of the emotion came from the visual ummm like when she was crying I feel like that would have the same effect on someone who maybe couldn't hear the music

or couldn't hear as well as I could whatever was going on in the dialogue. Umm what I think would be a big part on what would be lost on if it was closed captioned or anything a big part of what would be lost on a deaf viewer is when her mother is reading her that book and there is no sound you can't ... her lips are just moving umm I feel like I assume that that's when she was passing on her death at that time and I think that subtlety would be lost on a deaf viewer. .. I guess I would say no its not equivalent but it's a similar experience.

2)   *How easy was it for you to follow the events occurring throughout the video?*

Participant 1
How easy was what? It was easy.

Participant 2
It was real easy ..to follow the events

Participant 3
Fairly easy

Participant 4
Too easy, I've lost a number of family members to cancer and I've lived that experience I've gone through the original diagnosis through the treatment and that's a form a death. The advance medical interventions we have are as damaging to the body as the cancer itself. And I was at the bed side of relative who have died from this. So for me it just reopened memories to me on a very powerful a very difficult but are very important to me so I watched that and it's a big part of who I am having experienced that with people that I grew up with and that I loved. It's a very difficult thing for me as well.

Participant 5
It was pretty easy. When I watched it the second time I realized when the mother was there it appears to me that that's when she died because she kinda her eyes .they were blinking very quickly and it looked not like she was falling asleep but rather she was dying. so I caught that the second time. But I think the first time I was able to catch most of it. I guess I didn't really understand until the asshole Posner was in there when she died and the nurse was trying to get them to stop but he wanted them to revive her b/c she was umm a test patient and he wanted that data to survive he didn't want his experiment to end early.

Participant 6
Umm pretty easy. I understood the beginning that she was going through all of these examinations and then in the middle was kind of like her trials. I wasn't sure...it was the part with the book. Where she's sitting there reading to her. I wasn't entirely sure about the relationship between the two. So that was a little unclear. Other than that everything seemed to make sense.

Participant 7
It was pretty easy

Participant 8
It was easy

Participant 9
Umm it was pretty easy …pretty easy.. it started with the diagnosis then she was going for all these tests and treatments and obviously chemo and then the coding scene.

3)   Imagine you're an HBO subscriber and you see this trailer on HBO. The head of HBO would like to know how to improve the accessibility of their trailers for D/deaf and HOH individuals. What would you recommend? Why?
Participant 1

I don't know what you would do. First of all I would put in captions on the trailer but also I wouldn't necessarily know how to handle the tone and the mood that is set by music. I wouldn't necessarily know how to have them handle it. With tone and music. The editing was good maybe the editing t…editing so that the sense of curiosity and suspicion .. the rapid stuff that just sort of grabs your attention um… but in the end I don't get the umm .. I'm not really sure about much else how you can circumvent the music thing b/c the music thing is what is gonna grab an affective. At the same time the problem is it goes beyond HBO at that point. It goes back to film makers and how there are so many umm well you know critics of film are very umm suspicious of movie scores that bully you into feeling a certain way. So I don't know how to approach that. A sort of sentimental violin kind of thing that happened I don't know how to extricate that from the American movie narrative but HBO could've done a better job of mediating that norm of the American movie narrative with more information especially .. the off screen speaking that's not captioned. I think that could really make everything different. At least when the music is playing you could even have a {music playing} like describing what kind of music is playing. You could do that, you know, you could describe the tone of the music playing during the part where there's nothing happening.. it's just music. You could do that.

Participant 2
Just the closed captioning

Participant 3
I don't feel I have any frame of reference to make any recommendations.

Participant 4
I would have to better understand the communication patters and the norms that develop within the culture of sign language users and those who face hearing impediment to

understand what resonates what are the nonverbal communication cues that have the type of emotional power that sweeping beautiful overture does or best approximation and how to design from that. I think for the sake of expediency closed captioning is most used because it is accessible to producers but I think just reading text on the screen I don't know again the communication norms if that's gonna do the same thing.

Participant 5
I don't know if I could offer any suggestions for that I mean it seems like they covered a lot of it there were ..the important things were there. I mean if you have the closed captioning tell you that she has terminal cancer and then the part where they're talking about do you want to be on the dnr list or do you want to be code blue …umm I think deaf or hard of hearing people would generally get the important parts of the information that there's a lot of very expressive shots of her face so I don't think they're be too much more they could do I mean there's no way really to allow the deaf or hard of hearing ppl to hear the music.. So I guess my answer the they question would be no to best of my knowledge … but I'm not an expert.

Participant 6
Its kinda what I mentioned earlier about just using the captions saying what kind of music is going on in the background. Which I think it helps …it kinda sets the tone for things. If it was silent it would be a lot different. Yeah just try to put the music in there.. You kinda have to play around with that to see what works and what doesn't.

Participant 7
I'm not sure because I think ..sometimes I do watch tv with the closed captions bc there's an assent that I can't figure out or something .. but I have the background music up so I do hear it but I do know that I get distracted from the picture . It's difficult for me because I'm missing some of what's on the screen. And so its hard to think about how to improve that . I mean you could put the closed captions before the scene but then it kinda takes away .. I don't really know it would be hard to figure that out.

Participant 8
When you don't have the audio and you just have the video there needs to be some kind of bright focus drawing your attention at the beginning probably Because I know sometimes when something is written you get distracted and you go do something else. So if there was some kind of bright…something that draws the eye to make the person go "what was that?" Might be a way to start the trailer. When normally someone might just ignore it.

Participant 9
Ummm, I don't know if closed captioning is a feature of HBO or if that has to do with type of tv you how. I don't know . But I think that that would be important . There were no subtitles of anything I couldn't .. I didn't know the name of the movie except from the

questionnaire. Umm so I think closed captioning maybe some sort of title heading you know starring …. Um I don't know I mean closed captioning is honestly the only thing I know of that would make any sort of equivalent so you could follow the dialogue umm or yeah I don't know.