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VIEWER RESPONSES TO INTERACTIVE NARRATIVE: A COMPARISON OF INTERACTIVE VERSUS LINEAR VIEWERSHIP IN ALONE AND GROUP SETTING

presented by

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has been accepted towards fulfillment
of the requirements for the

M.A. degree in Telecommunication, Information Studies and Media

Major Professor's Signature

August 4, 2004

Date

VIEWER RESPONSES TO INTERACTIVE NARRATIVE: A COMPARISION OF INTERACTIVE VERSUS LINEAR VIEWERSHIP IN ALONE AND GROUP SETTING

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A THESIS

Submitted to
Michigan State University
In partial fulfillment of the requirements
For the degree of

MASTER OF ARTS

Department of Telecommunication, Information Studies and Media

2004

ABSTRACT

VIEWER RESPONSES TO INTEACTIVE NARRATIVE: A COMPARISION OF INTERACTIVE VERSUS LINEAR VIEWERSHIP IN ALINE AND GROUP SETTING

By

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Based on researches about viewers' emotional responses to media, the emotional responses to interactive video were studied. Because of the nature of interactive television, the involvement of people during watching the video was expected to be increased. This paper presents results from various emotional factors, which were used to measure viewers' responses to other media forms. Also emotional factors of subjects who watched interactive video were compared to those who watched linear version.

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INTRODUCTION

Since the 1970's, futurists, journalists, entrepreneurs, and artists have imagined possibilities for interactive television. Technological options for delivering interactive television to the living room continue to evolve, from the early QUBE experiments using two way cable, to the vastly more powerful broadband internet of today and enhanced television over HDTV of tomorrow. Entrepreneurs try out different business models, looking for interactive television services to market. The menu of services sometimes included as interactive television includes: pay per view, video on demand, personal television (such as Replay TV and TiVO), integrated shopping and/or chat, viewer control over choice of camera angle of a particular live event, audience participation shows, polling, online learning, and interactive drama (Fuller, 1999; Rusch, 2004; Whitney, 2004; Albiniak, 2004; Reilly, 2003; Lee, 2003; Buell, 2001).

Futurists- scholars Brenda Laurel (Computers as Theater) and Janet Murray (Hamlet on the Holodeck) theorize about the role of the viewer/participant in an interactive narrative. Murray explained the concept of interactive narrative as "Mobile Viewer Movies". "Viewers would watch a 'mobile viewer' cyberdrama with their remote control device in hand, ready to click and branch through the story as it unfolds. (p259). She described the cyberdrama like this: "The dramatic action would look like any ordinary television show, but whenever one character in a group of two or more exits to another room of a house or goes to another place in the fictional world, the viewer would have the option of choosing whom to follow" (1997, p239).

Laurel, proposes the concept of "first-personness," to describe the experience of viewing a narrative (Laurel, 1986). By this she means that we feel for and with the characters, and include ourselves as a character (p. 113). The representational nature of dramas allows us to enjoy the experience with "no threat of pain or harm in the real world." She describes a playfulness viewer/participants engage in while watching a representation, a "what if imagining" contemplating possible outcomes and resolutions which may occur in the drama. Interactive narrative may encourage even more engagement and what if imagining, than a linear narrative because the viewer/participant actively makes choices, which influence the outcomes.

Interactivity scholars trying to define the nature of the construct almost always include a dimension, which applies to audience-driven interactive narrative. Mark Meadows compared a structure of interactive narrative with musical notation; "An author may write the basic structure, it's the participation and interpretation of that structure that makes it come alive" (Meadows, 2002).

Writers, producers, game designers, and multimedia developers have been experimenting with the art of interactive narrative, based on a premise that the viewer/user interacts with, controls, selects, or otherwise influences the experience and outcomes of a story. Michael Joyce was an early pioneer of interactive fiction. Game designer Chris Crawford has written and spoken extensively about interactive narrative and games. Mark Meadows recently wrote Pause and Effect, the Art of Interactive Narrative.

Meadow's book, quotes Laurel's definition of interactive narrative: "An interactive narrative is a time-based representation of character and action in which a

reader can affect, choose, or change the plot. The first-, second-, or third- person characters may actually be the reader. Opinion and perspective are inherent. Image is not necessary, but likely." (p. 62) The core attribute of interactive narrative is that the "reader/viewer/participant" makes choice, which can change the plot or perspective of the story.

The least-studied aspect of interactive narrative is home viewer responses. Presumably some day, whether through enhanced TV available over HDTV, or over the internet, home television viewers will have the option not just of watching movies at home, but of participating, making choices while watching interactive narratives. Watching television in the home today tends to be a passive experience, with viewers (often more than one), gathered in a relaxed setting such as a living room, passively watching a television program. Some radio and television broadcast programs actively involve viewers through call in or online voting (e.g., American Idol), comments, or questions (e.g., Larry King, Talk Radio) but audience participation has rarely been used to interactive with a fictional narrative. The introduction of remote control channel changing devices combined with vastly increased channel alternatives gives the option of yet another form of interactive viewing. Sampling small chunks of different programs is known as "grazing" and viewers can also watch more than one show at a time by switching back and forth at strategic times (Eastman and Newton, 1995). Although the viewer is active in this scenario both cognitively (making choices) and physically (pressing buttons), the viewer is only interacting with a fictional narrative story in the most marginal way, by either watching or not watching at any given moment.

Computer games compel a totally different experience, typically one person alone with a computer, sitting close to the screen, hand on the mouse or keyboard, watching intently and interacting constantly. Different genres of computer games vary widely as far as the nature of the narrative with which a player interacts. The most rudimentary forms of twitch games including first person shooters involve a barrage of kill or be killed interactions usually combined with navigation. A different extreme, multiplayer online role play games, involve interaction with thousands of other real human players and complex storylines extending over months or years. According to Warren Spector, in the context of game design "isn't just about giving players choices; it pretty completely defines the game medium." (Salen and Zimmerman, 2004). What these extreme (yet common) examples share is a nearly continuous series of player interactions, which impact what happens next and how the narrative unfolds.

Interactive narrative is a cross between passively watching television on the couch with one's family and continuously interacting with a game alone on the computer (sometimes playing against others who are also physically alone on their computers). Key questions, often raised but never answered, include: Will today's passive TV viewers want to be more active participants, or will they prefer to just sit back and watch; Are the same gratifications met by passive TV viewing also met by watching interactive narratives; Will viewing interactive narratives with a group cause conflict or increase enjoyment? Since interactive narratives are not commonly available today, these questions are hard to answer. An interactive narrative student project, Modern Cinderella, provides researchers with content that can be used to compare viewer reactions to the experience of watching interactive narrative.

BACKGROUND

TECHNOLOGY

Since cable television systems were developed, there have been numerous attempts to introduce some interactivity to the cable viewing experience. As a result, there are various cable television services such as Internet service on cable television systems, VOD (Video on Demand), Home shopping channels and interactive program guides in addition to the ability to change channels, which pervades TV and radio. Even though computer and communication technology have brought an interest in interactive television or two-way television, there has been much confusion, hype and controversy about the possibilities of interactive television. There is no uniform solid explanation or concept of interactive television, in terms of technology, although some people try to explain what the interactive television is like. It is still hard to clear consensus on what interactive television is. One of the primary reasons for this is that television began as and still primarily exists as a one-way transmission model. Traditional mass media formats are one-way communication forms. Most traditional mass communication systems don't have " a timely and functional feedback circuit" (Newhagen et al.,1995).

Since the invention of telephone, television has been considered as the most standard and popular media form. Television may be defined as: "... an electronic system for transmitting still or moving images and sound to receivers that project a view of the images on a picture tube or screen and re-create the sound" (Encyclopedia Britannica 1999-2000, http://search.britannica.com); "Television is a communication medium that transmits and receives sounds and images, including moving images, by means of

electromagnetic waves or electrical signals transmitted by cable" (Encyclopedia of communications Technology, Gardner & Shortelle, 1997). There are two competing points of view about which one is going to be a future interactive multimedia in terms of a media platform.

One point of view is a perspective of having the computer as a platform due to its powerful application. The other is a perspective that has traditional television as a platform for interactive media based on its ease of use and ubiquity Television has some merits compared to the computer as a platform. "Television is a familiar and successful economic model and social control mechanism. Furthermore, it needs minimal additional investment since it is already ubiquitous" (Kim, 2002). The two media imply different amounts of participant interaction. Computers display dynamic content, computer-generated worlds, which are highly malleable and thus amenable to far reaching and frequent participant interactions impacting all aspects of a narrative. Prerecorded video and audio by nature is far more limited. Each different permutation must be produced, and therefore only a small number of choice points are practical. The technology differences impact what is possible and what is practical. Whichever dominates will influence the course of how interactive narrative develops.

SERVICES

There have been attempts to establish two-way communication in a past cable system history. On December 1, 1977, Warner Communication launched a two-way interactive communication cable system, QUBE. It delivered 30 channels of television programs: 10 broadcast TV channels, 10 premium or pay-per-view channels and 10 channels with original interactive programs. One unique aspect of QUBE is its' five response buttons to press when answering questions posed to home viewers on QUBE programs. These five buttons were used for feedback purposes, which could include polling of certain research or confirming a delivery of book rentals from their library (Bolton, 1981).

QUEBE had a very in similar program in comparison to today's education or distance learning programs. QUEBE viewers could register for community education programs such as guitar lessons using PPV function key. For kids, a program named "Pinwheel" attracted many young viewers' attention. "Sight on Sound" invited teen-age viewers and let them choose one rock-and-roll artist and/or singer.

However, there were a few obvious limitations on interactive polling. First, not all home viewers made use of QUBE's interactive technology. Second, only one viewer in a multiple-person household could respond. Third, it can be logically assumed that certain kinds of people will and did interact more often than others. QUBE is a computer network hooked to a cable television system, and subscribers can do anything from banking to shopping transactions. Despite technical success and subscriber popularity, QUBE couldn't continue to provide service because of economical reasons.

There was another trial to bring interactive television system to homes by Time Warner named Stargazer. It was Video-on-Demand service provided by telephone company. Even though Stargazer brought many charms to viewers, it ended up with failure. One of the reasons was that viewers had to make a phone call and enter several codes to pause the video they were watching. Also there were other issues such as markets and government's role (Farber, 1994).

There have been some controversial issues about whether the emerging media format is going to be a combined form of interactivity or not. However, few can doubt someday our computer and television will be the same machine. Under this consideration, new media formats will appear.

MAVSI-SDM is a media format, which is used for DVD – video and satellite television video streaming. MAVSI-SDM means Menued & Audio Video Sub-picture Interleaved – Streaming Digital Media. MAVSI-SDM is a general explanation of the architecture of future presentational media and their delivery.

The full use of MAVSI-SDM is a little far away, but it offers a good picture of how this format could be used. Even though there are some limitations, DVDs foreshadow many uses of a complex MAVSI-SDM system.

FUTURE VISIONS

During the last 10 years, there has been a convergence among media forms based on communication technology as well as a need for new media form. Among those mediums, television has gone through many changes becoming more interactive, digital and multi-purpose, such as web TV, ITV and DTV.

James suggested one possible scenario showing what future media looks like. "...The year 2014, a watchful world joins together gain to see the best of the best compete for Winter Olympic gold.... Our viewer selects a live feed of the 4 man bobsled races. He can select the network's own video feed or choose individual camera angles. In addition, he can view athlete statistics and biographies from a side menu..." (2003, p37). Some of the features James suggested are already out there in the market by some companies such as Microsoft and British interactive TV.

Microsoft's Bill Gates also mentioned about the future of interactive television: "You're watching Seinfeld on TV, and you like the jacket he's wearing. You click on it with your remote control. The show pauses and a Windows style drop-down menu appears at the top of the screen, asking if you want to buy it. You click on 'yes'. The next menu offers you a choice of colors; you click on black. Another menu lists your credit cards asking which one you'll use for this purchase. Click on MasterCard or whatever. Which address should the jacket go to, your office or your home or your cabin? Click on one address and you're done-the menus disappear and Seinfeld picks up where it left off. Just as you'll already have taught the computer about your credit cards and addresses, you will have had your body measured by a 3-D version of supermarket scanners, so the

system will know your exact sizes. And it will send the data electronically to a factory, where robots will custom-tailor the jacket to your measurements. An over night courier service will deliver it to your door the next morning" (Sherman, 1994).

INTERACTIVITY

What is interactivity? As a most basic level explanation, Pearce said, "interactivity is at least as old as human communication" (Pearce, 1997). With the development of media technologies, defining what is interactivity became more complicated. Even for communication scientists and interactive television professionals, it is difficult to tell the clear meaning of interactivity. It resembles "the hunt of medieval knights for the Holy Grail, a cup or platter supposed to be used by Christ at the Last Supper" (Vos, 1999).

According to Kim, there are two different approaches to understanding interactivity in terms of new media technology (2002): the communication approach (Bretz, 1983; Rafaeli, 1988; Williams et al, 1988) and the media environment approach (Steur, 1995). In communication approach, the interactivity can be defined as a relation between communicators and message exchange. In contrast to this approach, mediated environment approach defined the interactivity as a user's experience coming from technology, which provides users a power of changing the form of media as well as the content.

The true interactive television service must be in a form of two-way communication. In two-way communication systems, most services that are considered interactive form will fall into basic characteristics of two-way communication. According to Kim, "interactivity is closely related to the shift of power balance in communication process as electronic media are recognized into two-way communication systems" (Kim, 2002). This means that interactive media gives viewers a power to be a speaker and

producer not mere listener. In the interactive television systems, the interactivity means a mount of freedom of selection. In this respect, interactive television system refers a system, which are more than a mere multi channel programs.

Another approach explains interactivity as being related to the shift of power balance in the communication process in the environment of two-way communication. Rafaeli said, "one of the distinguishing dimensions [of interactivity] is the level of control the consumer has over the information system" (Rafaeli, 1988). In this approach, interactive media is made up of more than one channel, -- the more channel options, the more interactivity...

New media, which embody aspects of interactive television, have some unique and specialized characteristics compared to traditional television such as remote controls, videotext ability and multi channels. Interactive television is ... "the meeting of television with new interactive technology". ITV is domestic television with interactive facilities usually facilitated through a 'back channel' and/or an advanced terminal. Equally important, interactive television is content that users and viewers can communicate with via the technical system. Interactive television is also a way of empowering viewers to use television in new ways"(Von, 2000). This definition focuses on the both users and contents as well as technology. Even for interactive television, traditional television is a good starting point for interactive television research. Also new media (interactive television) is communication technology that makes it easy users and information to respond to each other (Rice, 1984 P.35).

Heeter (2000) proposed a participant-centered definition of interactivity limiting what is considered an interaction to actions the participant can enact, which influence aspects of a designed experience the participant can perceive.

ART OF INTERACTIVE NARRATIVE

Compared to interactive television based on medium interactivity, content-based interactive television presents a real and new interactivity based on its narrative called interactive narrative. Providing an extensive narrative experience could be one of the challenges for future computer games as well as new story telling.

The primary role of interactive narrative is generating a set of multiple perspectives. This means giving ultimate control of the story to viewers. In a traditional storytelling, an author was in a center of the story, and readers or viewers always followed author's thought. In interactive narrative, however, the role of the author is shifted to viewers, and viewers can experience a story with different perspectives. "The most engaging interactive narrative relies upon flow; that is, uninterrupted participation in the unfolding action. Poor interaction design can interrupt flow and degrade the experience"(Laurel, 1990).

In his book, Meadows mentioned that Interactive narrative generally follows these 4 steps: Observe, Explore, Modify and Change (Meadows, 2002). The timing of the events in a plot are as determined by both the author and reader. By the process of observing and exploring, readers also have a power to modify the plot, and this change of plot also causes another change in the plot. Consequently the role of author is presenting all the possible perspectives. The most challenging part is finding the appropriate balance between the two.

USER EXPERIENCE

Lee (1995) offers observations about how and why people watch television which suggest that viewer will still want to watch linear narrative programming, even if they sometimes choose interactive narrative. 1) People enjoy low-involvement as well as high-involvement viewing and many have a need for low engagement use of television. Whether viewing an interactive narrative is a low-involvement or high-involvement viewing experience is not yet known. It does require more overt viewer activity, but does this rise to the level of being high involvement? 2) Routine is an important aspect of existing ways of viewing and may be an obstacle to viewers exploring new types of programs that require interactivity. 3) Relaxation and mood lift are critically important benefits that may be best delivered without demands for interaction with the set. 4) Television also is exceptionally successful as an engrossing storytelling medium. Interaction may have little to offer here, or it may turn out to be even more engrossing. 5) Finally, people enjoy talking about shared TV experiences; highly interactive individualized programming where viewer choices result in very different viewing experiences diverge from the shared experience. Lee's ideas suggest that the availability of interactive narratives will not mean the death of traditional television.

One of the best-known approaches of the cognitive processes is human processor mode, which models the cognitive processes of a user interacting with a computer (Card et al., 1983). This model conceptualizes cognition as a series of processing stages with three different processors: perceptual, cognitive and motor processors. Applying these

stages to interactive narrative, the participant perceives an interactive node, cognitively evaluates the alternatives, and physically acts to implement their choice.

Norman (1993) discusses two different general modes of cognition people may experience while watching television: experiential and reflective cognition. Experiential cognition focuses on the external experience. Reflective cognition compares, contrasts, evaluates and explores associated memories, thoughts, and feelings. He explained that both experiential and reflective cognition are essential for everyday life, but require different kinds of technological support (Norman, 1993). Interactive narrative potentially combines reflective and experiential cognition, requiring more reflection than is needed for traditional passive viewing.

Some of the goals of interactive television or interactive media include giving more control to viewers, providing multiple perspectives to viewers, and producing more personalized media experiences. Many scholars, professionals and futurists have speculated about the benefits of interactive media. However, understanding viewers' feelings about interacting with narratives (do they want to interact or not, and if so how often and in what ways?) have not been studied.

Since interactive narratives are not yet common, to begin to think about viewer emotions research on linear media is a starting point. One domain where extensive emotional and attitude studies on TV have been conducted is in the field of advertisements. Many scholars have developed emotions and attitude factors in advertisements of various media forms. There have been compiled lists of different kinds of emotions, including involvement, enjoyment, affect, pleasure, etc. Holbrook and Batra (1987) described emotional scales to assess the role of emotions in great detail. They

compiled a list of different emotions, synthesizing research and theories developed by many authors.

Zillmann and Bryant have conducted numerous studies of emotion and TV viewing, looking at program viewing rather than commercials. Their research shows that viewers use television to calm down, cheer up, and get ready for a trying day. Knobluck and Zillmann (2002) tested the theory of mood-management, confirming that subjects in an experimentally induced bad mood listened to highly energetic-joyful music for longer periods than did respondents in good moods. By the end of the study the moods of all three experimental groups were not appreciably different – subjects successfully selected media to balance their moods. Our emotions influence our media choices, and our media choices influence our emotions. Interactive narratives offer more opportunities to exercise choice than linear narratives, where the primary choice is to watch or not watch. A therapeutic interactive narrative could conceivably be designed to consistently offer a selection of story branching choices, which suit good, bad, and neutral moods.

In a study about process tracing of emotional responses to TV ads, Abeele and Maclachlan used "Joy" as one of the emotion measures (Abeele and Maclachlan, 1994). Holbrook and Batra developed "Pleasure (joy, affection, pride, gratitude)" as one of three different emotion dimensions (Holbrook and Batra, 1987). Then, Geuens included this Pleasure measurement as a "cheerful" factor in the study of readers' feeling toward advertisements for alcoholic beverages (Geuens, 1998). Moorman, Neijens and Smit introduced a list of emotion measurement in the study on advertisement (Moorman, Neijens and Smit,2002). In their list, they included "Enjoyment" measurement developed

by Norris and Colman as well as by Furnham, Gunter, and Walsh (Norris and Colman, 1994, Furnham, Gunter, and Walsh, 1997). The enjoyment measurement has been one of the important factors to measure people's emotional responses to advertisement. The same enjoyment scale may be applied to interactive media. Will people watching an interactive narrative will feel more enjoyment with the story than will people watching a linear version of the same story?

The arousal measurement appeared in various studies. Holbrook and Batra suggested "Arousal" as one of their three different emotion measurements (Holbrook and Batra, 1987). Later, Geuens used this arousal measurement as an "interested" factor in the study of readers' feeling toward advertisements for alcoholic beverages (Geuens, 1998). Also many other scholars used arousal as one of emotional measurements in their studies including a study by Broach, Page, and Wilson (1995), by Mattees and Cantor (1982), by Pavelchak, Antil, and Munch(1988) and by Singh and Chuchill (1987). Arousal also may be applied to interactive media. Because of the requirement of interacting while watching, people watching an interactive narrative may experience more arousal than will people watching a linear version of the same story. Similarly, because interactive narrative viewers must reflect upon and actively make choices that influence the progression of the story, they may also feel more involvement

Television viewing in the home often occurs in a group. Group viewing may increase enjoyment. Sandbvig, Saphir, and Chaffee (2000) define co-use and co-processing of media. Co-use refers to watching or reading or listening to media together. Co-processing is sharing interpretations or evaluations of media content. The word co-viewing has been used to refer to parents watching television with children and offering

their interpretations and evaluations of the content, to help mitigate negative effects and amplify positive effects of media content on children (Austin, Roberts, and Nass, 1990). Co-viewing was found to add to children's enjoyment of the program (Salomon, 1977). Group viewing of linear television may also involve conflict over what to watch, who holds the remote control, and how often to change channels. Studies show adult females are significantly more likely to report that someone else changes channels when they wish they wouldn't than are adult males (Heeter, 1988). Females are also significantly more likely to watch an entire show from start to finish. Thus, group viewing of linear television already results in male-female conflicts over channel changing. Group viewing of interactive narratives requires someone to make choices at each branching node. One individual may control the remote and make the choice. The group may discuss the choice and arrive at a consensus. Group viewing of interactive narratives is probably more frustrating in terms of satisfaction with the choices made than alone viewing of interactive narratives.

A study about connection and presence is also found a study on advertisements. Papacharissi and Rubin used "Social Presence" to assess the social presence of the Internet (Papacharissi and Rubin, 2000). Cowles and Crosby used bipolar scales such as 'impersonal – personal', 'active – inactive', and 'unsociable – sociable' for measuring "Presence" (Cowles and Crosby, 1990). Keil and Johnson used the same presence bipolar scale with the one, which Cowles and Crosby used in their study (Keil and Johnson, 2002). Moreover, Bradner and Mark developed and used various presence measurements in their studies about social presence with video and application sharing (Bradner and Mark, 2001). Following the results of previous studies, connection and presence may be

used in a study of interactive media. People watching in the group interactive condition may feel more social presence with other people in their group than people watching in the group linear condition.

METHOD

SUBJECTS

Participants in this study were taken from a sophomore level introductory large enrollment digital media course at Michigan State University. A total 90 took part in the study (20 for each of four conditions plus 10 who were included in exploratory analyses but were excluded from experimental comparisons because of scheduling complications, but who did participate in the study and complete questionnaires). Participants were given extra credit in exchange for their participation. 64 of them were female while 23 were male, and there were 3 missing data in this question. Most were in their freshman, sophomore or junior year. Eighty-eight percent of the subjects grew up in the United States, and more than 90 percent have English as their first language.

Cinderella 2003 - Interactive storytelling

Cinderella 2003 was a class project of TC 840, Foundation of Digital media by professor Brian, Winn, in the department of Telecommunication, Information Studies and Media at Michigan State University.(Figure 1, Appendices A) It is content base interactive storytelling in which users have chance to control their own story as Murray described in her book as "cyberdrama" (1997). Cinderella 2003 is a storytelling about modernized Cinderella, who can have a different personality based on viewer decisions. For example, in the first selection point, when Cinderella's step-mother and her step-sisters went to a party, viewers must decide what Cinderella should do. Cinderella can go in one of three directions.(Figure 2, Appendices B) Two of the three directions were devised according to the possible personalities of modern Cinderella; she may be very aggressive in her jobs, or she may be very independent. The third option, crying and waiting for magic, is closer to the traditional Cinderella story. Mark Meadows (Pauses & Effects) explains true interactivity by comparing it with use-case scenarios, which expand the stories in a tree hierarchy structure. According to him, real interactivity comes from characters not from structure. "A character that is present in an environment, someone who cares about something, someone who has some form of opinion, perspective, or passion, is something that gives a narrative a life." In the courses of story, viewers are going to face some situations in which they will have to make decisions based on behalf of Cinderella. Each episode reflects on some virtues from modern-day society and characters, which are quite different from those of the traditional Cinderella story.

PROCEDURE

Each participant was randomly assigned to one of four treatment conditions: *Individual Interactive Video*, *Individual Linear Video*, *Group Interactive Video*, and *Group Linear Video*. The video was a short 5-7 minutes in length and was created by a group of graduate students at MSU. It was created initially as an interactive video, but for the purposes of this experiment, a linear version was constructed by removing the interactive segment where users are required to make a choice and following a single linear progression. The videos were shown to students over a three-week period in a conference room set up to simulate a comfortable home television watching experience including a couch with pillows for the subjects to sit on and a large screen upon which the video was projected. Subjects watched the video either alone or with one other subject depending on the condition they were assigned to (individual or group). When the interactive video was used, the subjects told a researcher in the back of the room their choice each time a decision was required. Immediately following their viewing experience, subjects filled out a questionnaire assessing their emotional reactions to the video.

MEASURES

The survey consisted of three parts. First 40 questionnaires measured viewers' responses to interactive or linear video in terms of 4 emotional concepts, and all of the concepts were measured using 10 questions each. The four concepts were measured in the questionnaire: *'Arousal and Excitement'*, *'Connection and Presence'*, *'Involvement'*, and *'Enjoyment.'* The operations of these concepts were a combination of new measures created exclusively for this study and standard measures used in earlier studies. (cf. Thayer, 1965; Bradner and Mark; Holbrook and Batra, 1987; Keil and Johnson, 2002; de Greef & Ijsselsteijn; Ohanian). Participants were asked to answer their agreement to 40 questions with 5 rated as a degree of strong agreement and 1 rated as a degree of strong disagreement. A 5-point Likert scale was used for 37 of the questions, while a semantic differential scale was used for the final 3. All participants were asked the exact same questions, so that direct comparisons could be made

A second, exploratory part was a series of questions in which the wording was adapted based on the viewing condition. For example, subjects in the alone viewing conditions were asked whether they were glad they watched alone, while subjects in the group viewing conditions were asked whether they wished they could have watched alone. Four different versions of questions were developed, one for each condition. Each version has similar questions measuring similar constructs. The same 5-point Likert scale was used for all of the questions in the second part.

The third part of survey was a series of questions asking personal and demographic information.

EXPERIMENTAL RESULTS

Factor analysis was conducted on the 37 items initially developed to serve as enjoyment, arousal, connection, and involvement scales to look at observed underlying dimensions of the set of 37 items. Principal components analysis with Varimax rotation was used. Five factors emerged accounting for 59% of the variance.

Most of scales were constructed by summing the items which loaded .487 or higher on the factor. Scales were then divided by the number of items so that resulting means could be interpreted as roughly corresponding to the 5 point Likert scale used for the individual items.

The scales extracted from factor analysis were named **Enjoyment, Intrigue, Involvement, Concentration** and **Laughter**. Cronbach's Alpha was calculated to check the reliability of these new scales. All reliabilities were above.6, with enjoyment at .93, Intrigue at .87, involvement .80, concentration .77 and laughter .63.

To examine the research questions, 2-way ANOVA s were calculated comparing means for linear versus interactive viewing conditions and group versus alone viewing. Enjoyment combined feeling joy, delight, amused, peppy, energized, lively, activated, excited, amused, enjoying watching the show, and finding it was an intense experience.

The overall F was not significant for enjoyment of Modern Cinderella.(Table 1, Appendices B) Average responses were close to neutral (3.) on the five-point scale of enjoyment.

Intrigue combined "I was curious about other responses about the show", "I wondered how other people liked the ending of the show", "I was motivated to watch the show more than once", "I would like to watch other shows like this one", "I want to watch the show again" and "I was pleased by the show." A main effect of interactive for intrigue was significant. Those who experienced the interactive version were significantly MORE likely feel intrigued, curious about other endings, wanting to watch again, wanting to see more shows like this (3.59) than were people who experienced the linear version (3.07). Interactive viewers watching alone were the most intrigued (an average of 3.84) while linear viewers watching in a group were the least intrigued (3.07). The main effect for group approached but did not achieve significance.(Table 2, Appendices B)

Involvement combined "I was concerned about the result of the show.," "I thought carefully about the development of the plot.," I feel enlightened by the show, and I felt involved with the characters in the story. No significant difference in involvement was found for either group versus alone viewing or interactive versus linear. Linear viewers reported an in between (roughly 3.0) amount of involvement, while interactive viewers tended to be less involved with the content, characters, and plot if they watched in a group (2.61) than if they watched alone (3.28). This trend does not achieve significance, but is suggestive of an impact of group viewing. (Table 3, Appendices B)

Concentration combined I was surprised by events in the show. I concentrated on the TV during the show, and I paid a lot of attention to the show. The overall F was significant for concentration of Modern Cinderella. A significant main effect was found for group viewing and concentration (viewers watching in a group were significantly less likely to report concentrating on the show than viewers watching alone). The

interaction effect was also significant. Group versus alone viewing of the linear version had essentially identical concentration, while the difference of more concentration watching alone was found only among viewers of the interactive narrative. (Table 4, Appendices B)

Laughter combined laughing out loud and laughing inside during the show. Interactive viewers laughed significantly more at Modern Cinderella than did linear viewers, regardless of whether they watched alone or with another person. (3.86 compared to 3.08). (Table 5, Appendices B)

DISCUSSION OF FACTOR SCALE FINDINGS

The enjoyment factor for Modern Cinderella was not different whether viewers watch the interactive version or the linear version, nor was it different whether they watched alone or with someone else. Other aspects of the viewing experience were different, in consistent ways. The interactive narrative resulted in more viewer intrigue with the program and the format. And it resulted in more laughter than the linear version.

Group viewing seemed to have a larger impact on viewing the interactive narrative than the linear version. Concentration was significantly lower in the group interactive condition than in the individual interactive condition, yet concentration did not differ in the linear condition. Although not significant, this same genera trend was observed for involvement. Group viewing of the interactive version was associated with less involvement with the content, plot, and characters than individual viewing of the interactive version. Involvement was nearly identical for group and alone linear viewing. Even the results for intrigue show a difference not just between linear and interactive, but a significant interaction effect where group viewers of the interactive version were less intrigued than alone viewers. Group viewing appears to dampen some of the impact of an interactive narrative.

EXPLORATORY RESULTS

Two basic research questions guided the exploratory analysis: 1.) How does the experience of viewing an interactive narrative differ from the experience of viewing a similar, linear narrative? And 2.) Is watching an interactive narrative in a group better or worse than viewing it alone?

In the survey, another set of questions was answered by subjects customized to their experimental condition. Four different versions of the questions (group interactive, group linear, alone interactive and alone linear) were developed to measure the responses to a set of constructs. Some of questions that were not applicable to a viewing condition weren't included in those groups' survey questions. For example, the question of "It didn't matter to me what choices were made" wasn't included in the surveys for people who watched linear version. The questions were:

- I talked to/would like to have talked to other people in the group.
- I felt association with the others in my group.
- I was/would be interested in other people's responses to the video.
- I enjoyed being with/wish I could have been with other people to watch.
- I wish I could have/am glad I watched alone.
- I shared/would like to have been able to share my opinions and responses with others.
- I asked/would like to have asked others for their input.
- I thought carefully about the choices I made.

- It didn't matter to me what choices were made.
- I was unhappy about the choices that were made.
- I enjoyed being able to choose/would like to have been able to choose.

To address these questions, 2-way ANOVA s were calculated comparing means for linear versus interactive viewing conditions and group versus alone viewing. Response categories for all if the group-specific items ranged from 1 = very much to 5 = not at all.

A main effect group for "I talked to/would like to have talked to other people in the group" was significant. Those who watched alone were significantly MORE likely to want to talk to other people than people who watched with others were to have actually talked with them. A significant interaction effect was found. People who watched the interactive version in a group were more appreciative of the companionship than those who watched the linear version in a group. On the other hand, those who watched the interactive version alone were less likely than those who watched the linear version alone to wish they were doing so with others rather than alone. The individual and group questions are not directly comparable. It is worth noting that considerably more talking with others occurred in the group interactive version than in the group linear version (3.55 versus 4.85). (Table 6, Appendices B)

A main effect interactive for "I felt association with the others in my group." was significant. Those who watched interactive version with someone else felt more association with their viewing partner than those who watched linear version with

someone else (3.55 versus 4.25) (5 for not at all, 1 for very much). (Table 7, Appendices B)

Both main effects were significant for the question of whether viewers were interested (or if they were alone, whether they *would be* interested) in other people's responses to the video. People who watched alone imagined they would be more interested in others' responses than those who experienced in groups actually were (2.35 versus 3.23). Also people who watched interactive version were MORE interested in others' responses than those who watched linear version. (2.50 versus 3.08). (Table 8, Appendices B)

Viewers who watched alone imagined they would enjoy watching with others more so than viewers who watched with others actually did enjoy watching with others (2.18 versus 2.63). In both cases the means leaned towards the positive side of the scale, more favorable than unfavorable towards watching with others. (Table 9, Appendices B)

Those who watched with someone else did not wish they could have watched alone (4.25) while those who did watch alone were not particularly glad that they watched alone (3.70). The questions are not directly comparable, but group viewers were significantly though slightly less desirous of watching alone than were alone viewers, though both groups showed a preference for watching with others. Overall, considering both this and the previous question, our research subjects liked the idea of watching narratives with other people, whether the narrative is linear or interactive. (Table 10, Appendices B)

The overall F is not quite significant. There is a trend for those who watched the interactive version to share their opinions and responses (or, if alone to have wished they

could have shared them with others) more so than did those who watched the linear version (2.65 versus 3.25). The linear viewers were slightly less than neutral in their practice of or desire to share their opinions, while the interactive viewers were further in the positive direction. Interactive narratives may enhance interpersonal communication among viewers. (Table 11, Appendices B)

Linear group viewers were by far the least interested in asking others for input than any other condition. (Table 12, Appendices B)

Watching alone versus watching with someone did not significantly impact how carefully viewers thought about the choices they made in the interactive narrative. Overall the responses were close to neutral (3.) on the five-point scale of thinking carefully. (Table 13, Appendices B)

A significant difference was found for "It didn't matter to me what choices were made". Those who watched the interactive version alone were significantly MORE likely to care about the choices were made, while those who watched with someone else and thus had to share the decision making process felt less invested in the outcome (3.95 versus 3.10). (5 for not at all, 1 for very much). (Table 14, Appendices B)

One question was only applicable to group interactive viewers. We asked the extent to which they were unhappy about the choices that were made. Group interactive viewers were not unhappy about the choices made in their two person groups. The average response was 4.3 on a scale where 5 was "not at all" unhappy. (Table 15, Appendices B)

Viewers who watched the linear version were, on average, neutral as to whether they would like to have been able to choose different endings. Viewers who watched the

interactive version were more enthusiastic about having been able to choose different endings. This difference (1.95 versus 2.88) is significant. (Table 16, Appendices B)

CONCLUSION

Modern Cinderella was experienced differently depending on whether viewers watched alone or in a group and whether they watched a linear or interactive version of the story. The experimental medium of interactive narrative fared quite well in this experiment. In some important ways the interactive narrative viewing was a more positive experience than the linear version. Finding out the fact the interactive video is more intriguing and results in more laughter than the linear version are valuable findings in this experiment research. Enjoyment itself was not significantly different but these other factors (often associated with enjoyment) did emerge as meaningful differences.

Viewing alone or in a group interacts in interesting ways with the experience of viewing an interactive narrative in ways that do not appear when viewing the linear version. Group viewing of the interactive version dampens concentration and involvement. This may be necessary to keep from being upset about not being in control. Watching the interactive narrative alone evokes more concentration and involvement than viewing it in a group.

The exploratory part of the study sheds some additional light on the experimental results. Four of the seven comparisons of interactive versus linear responses showed significant main effects, as well as one interaction effect. Five of nine possible main effects for group versus alone viewing were significant.

Viewers who watched the interactive version were more likely to feel an association with their co-viewers. They were more interested in hearing other people's responses to the video. They were more likely to share their own opinions and responses with others.

They enjoyed being able to choose different endings. Considerably more talking with others occurred in groups watching the interactive version than the linear version.

These findings imply that watching an interactive narrative influences the experience of group viewing. Group versus alone significant effects confirm this relationship. People who watched the linear version with others were least likely to talk, while those who watched the interactive version were most likely to talk. Making choices in a group requires interaction and sparks conversation, apparently also leading to more laughter and more enjoyment than watching alone or watching linear television.

We wondered whether watching in a group would be frustrating, since ones own preferences of what ending to choose had to be negotiated. Viewers were not upset about the outcomes, nor were they did it matter to them very much what choices were made. Having to make choices in the interactive narrative did not appear to produce conflict or dissonance, at least based on the answers to the survey questions. We observed tendencies for viewers who watched alone to wish they had watched with others, and for those who watched with others to be happy to have done so.

Our findings suggest that interactive narratives on television may be quite strongly affected by whether viewers watch alone or in a group. There are advantages to both conditions. Interactive narrative experience is more strongly impacted by alone versus group viewing than the linear narrative experience.

DISCUSSION

The recent communication technology makes it possible to predict a new type of interactive media in a market as a successful business model. For this purpose, the general research about characteristics, as well as advertisement in these future media, should be undertaken because just adaptation of general principle of traditional media will not apply to new interactive media.

This study tried to present the general characteristics of interactive media and extract viewer's overall emotional responses to the interactive media. Our findings are based on a single experiment using a short 5 to 7 minute student-produced interactive narrative. Responses to the program were positive. Production values were quite high and the script was entertaining. However, it does not compare to broadcast television dramas or Hollywood movies. How would a higher quality, half hour, hour or movie length production impact the results?

One of the suggestions for the same kind of experiments in the future is to use 7-point scales in the survey instead of 5-point. With 5-point scales, it is really hard to see real differences in people's responses.

Also developing new scale is important for further study of interactive television because most of emotional scales used in this study were borrowed from those of advertisement. Some of them worked well while some of them didn't. For example, laughing seemed to be a good scale for measuring people's emotional responses to

interactive video. However, the nature and characteristic of interactive video make interactive video enjoyable, not making people laughing.

One aspect of this study includes the gender differences between male subjects and female subjects. In this experiment, subjects were required to make a decision of directions of stories, providing different perspectives in the middle of story. Responses to this selection of both male subjects and female subjects were quite different. When a group consisted of male and female, there was a kind of conflict in their decision-making processes; one of them seemed unhappy about the group decisions. In the story, for example, most of male subjects wanted to leave prince in the point of selection when prince went bankrupt while most of female subjects still wanted to marry prince even though prince went bankrupt. These kinds decision-making conflicts were found mostly in the groups that consisted of different genders. This could be an interesting topic of future study. The conflicts did not appear in the statistical analysis outcomes, although they were informally observed by researchers during the experiment. Our observations suggest there are underlying gender differences in the decision process which should be examined more carefully.

Another limitation of the study inherent in the experimental design is that people watching in a group were randomly assigned a co-viewer. This is very different from a home viewing environment watching with family and friends. We might assume that watching with family and friends would be even more enjoyable and less conflicted. Or, would there be more conflict? A study in more natural viewing circumstances could be interesting.

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APPENDICES A

Figure 1 – The Screenshot of Cinderella 2003

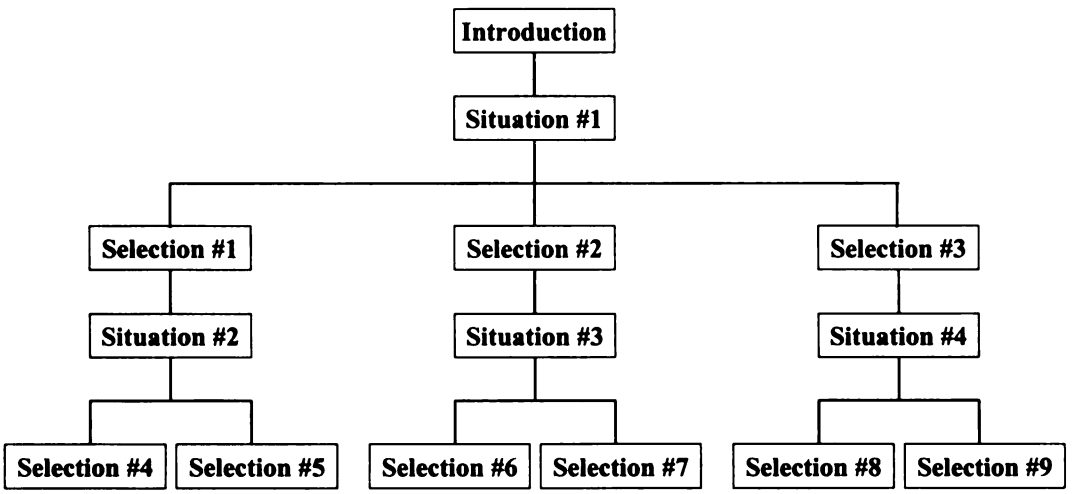

Figure 2 – The Path Diagram of Cinderella 2003

APPENDICES B

	Interactive	Linear	Total	N
Group Watching	3.03	2.91	2.97	40
Individual Watching	3.12	2.99	3.06	40
Total	3.08	2.95		
N	40	40		80
Scale Reliability	0.9293			
	F	P		
Overall F	0.323	0.890		
Main effect group	0.314	0.577		
Main effect interactive	0.652	0.422		
Interaction effect	0.003	0.960		

Table 1 – Result of Enjoyment Scale

	Interactive	Linear	Total	N
Group Watching	3.33	3.00	3.17	40
Individual Watching	3.84	3.14	3.49	40
Total	3.59	3.07		
N	40	40		80
Scale Reliability	0.8726			
	F	P		
Overall F	4.302	0.007		
Main effect group	3.34	0.072		
Main effect interactive	8.49	0.005		
Interaction effect	1.08	0.303		

Table 2 – Result of Intrigue Scale

	Interactive	Linear	Total	N
Group Watching	2.61	3.03	2.82	40
Individual Watching	3.28	3.05	3.16	40
Total	2.94	3.04		
N	40	40		80
Scale Reliability	0.7976			
	F	P		
Overall F	2.266	0.088		
Main effect group	3.514	0.065		
Main effect interactive	0.261	0.611		
Interaction effect	3.022	0.086		

Table 3 – Result of Involvement Scale

	Interactive	Linear	Total	N
Group Watching	3.55	3.93	3.74	40
Individual Watching	4.22	3.97	4.09	40
Total	3.88	3.95		
N	40	40		80
Scale Reliability	0.7714			
	F	P		
Overall F	3.572	0.018		
Main effect group	5.777	0.019		
Main effect interactive	0.21	0.648		
Interaction effect	4.729	0.033		

Table 4 – Result of Concentration Scale

	Interactive	Linear	Total	N
Group Watching	3.93	3.10	3.51	40
Individual Watching	3.80	3.05	3.43	40
Total	3.86	3.08		
N	40	40		80
Scale Reliability	0.6322			
	F	P		
Overall F	4.788	0.004		
Main effect group	0.175	0.677		
Main effect interactive	14.156	0		
Interaction effect	0.032	0.856		

Table 5 – Result of Laughter Scale

	Interactive	Linear	Total
Group Watching	3.55	4.85	4.20
Individual Watching	3.65	3.10	3.38
Total	3.60	3.98	
	F	P	
Overall F	11.201	0.000	
Main effect group	11.201	0.000	
Main effect interactive	2.818	0.097	
Interaction effect	17.146	0.000	

Table 6 – Result of the Scale of "I talked to/would like to have talked to other people in the group."

	Interactive	Linear	Total
Group Watching	3.55	4.25	3.9
	F	P	
Overall F	5.694	0.022	
Main effect interactive	5.694	0.022	

Table 7 – Result of the Scale of "I felt association with the others in my group."

	Interactive	Linear	Total
Group Watching	3.00	3.45	3.23
Individual Watching	2.00	2.70	2.35
Total	2.50	3.08	
	F	P	
Overall F	6.319	0.001	
Main effect group	13.054	0.001	
Main effect interactive	5.637	0.020	
Interaction effect	0.266	0.607	

Table 8 – Result of the Scale of "I was/would be interested in other people's responses to the video."

	Interactive	Linear	Total
Group Watching	2.65	2.60	2.63
Individual Watching	2.05	2.30	2.18
Total	2.35	2.45	
	F	P	
Overall F	1.556	0.207	
Main effect group	4.024	0.048	
Main effect interactive	0.199	0.657	
Interaction effect	0.447	0.506	

Table 9 – Result of the Scale of "I enjoyed being with/wish I could have been with other people to watch."

	Interactive	Linear	Total
Group Watching	4.10	4.40	4.25
Individual Watching	3.70	3.70	3.70
Total	3.90	4.05	
	F	P	
Overall F	1.893	0.138	
Main effect group	4.944	0.029	
Main effect interactive	0.368	0.546	
Interaction effect	0.368	0.546	

Table 10 – Result of the Scale of "I wish I could have/am glad I did watch alone."

	Interactive	Linear	Total
Group Watching	2.75	3.60	3.18
Individual Watching	2.55	2.90	2.73
Total	2.65	3.25	
	F	P	
Overall F	2.611	0.057	
Main effect group	2.538	0.115	
Main effect interactive	4.511	0.037	
Interaction effect	0.783	0.379	

Table 11 – Result of the Scale of "I shared/would like to have been able to share my opinions and responses with others."

	Interactive	Linear	Total
Group Watching	2.90	4.05	2.98
Individual Watching	3.05	2.85	3.45
Total	2.98	3.45	
	F	P	
Overall F	3.902	0.012	
Main effect group	3.372	0.070	
Main effect interactive	2.760	0.101	
Interaction effect	5.574	0.021	

Table 12 – Result of the Scale of "I asked/would like to have asked others for their input."

	Interactive	
Group Watching	3.60	
Individual Watching	3.05	
Total	3.33	
	F	P
Overall F	1.924	0.174
Main effect group	1.924	0.174

Table 13 – Result of the Scale of "I thought carefully about the choices I made."

	Interactive	
Group Watching	3.10	
Individual Watching	3.95	
Total	3.53	
	F	P
Overall F	7.085	0.011
Main effect group	7.085	0.011

Table 14 – Result of the Scale of "It didn't matter to me what choices were made."

	Interactive	Total
Group Watching	4.3	

Table 15 – Result of the Scale of "I was unhappy about the choices that were made."

	Interactive	Linear	Total
Group Watching	2.20	3.00	2.60
Individual Watching	1.70	2.75	2.23
Total	1.95	2.88	
	F	P	
Overall F	4.376	0.007	
Main effect group	1.825	0.181	
Main effect interactive	11.102	0.001	
Interaction effect	0.203	0.654	

Table 16 – Result of the Scale of "I enjoyed being able to choose/would like to have been able to choose."