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Acquiring Knowledge of Digital Video Manipulation Techniques and its Effect on the Perceived Credibility of Television News

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Acquiring Knowledge of Digital Video Manipulation Techniques and its Effect on the Perceived Credibility of Television News

by

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Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

December 2007

Dedication

Dedicated to

My parents, Ruth & Salomon Stavchansky,

My siblings, Liza Stavchansky–Lewis & Marcus Stavchansky,

My beloved Rachael Miller Stavchansky,

and to every soul who supported me on the journey to complete this dissertation.

Acknowledgements

This dissertation exists because of the support, time, and dedication of several exceptional individuals. My dissertation co-supervisors and mentors, Dr. Sharon Strover and Dr. Karin Wilkins, provided me guidance and advice in the steps towards the completion of this dissertation. Dr. Strover assisted me in converting my passion for image-making into a useful research question that should not be left unanswered. Always generous with her time, she gave insightful and poignant comments and critiques of my writing and provided me with a sense that this study was relevant to a community of researchers. She also provided a room at *The Telecommunications and Information Policy Institute* where I administered the experiment for this research project—for which I am thankful. I also recognize her, as the chair of the Radio–Television–Film department, for giving me the opportunity to design and teach undergraduate digital media courses: a survey course and a visual effects design course. From this activity, I learned that teaching was a necessary component to knowing the depths of a subject.

Dr. Wilkins taught me research methodology with the utmost care and seriousness. One of the most inspiring moments in her methodology courses came when she explained why research is valuable to humanity and that we can never truly *prove* something, but that we can *know* answers to our questions. Her insights into the significance of my research and her constant interest in my field of inquiry allowed me to stay focused and energized throughout the research and writing process. Through her encouragement, Dr. Wilkins acted as a pillar of support during the execution of this research project.

I am indebted to Dr. Thomas Schatz for helping me find a venue for my artistic voice and for his regular interest in my creative and production work. I was made fully aware of his support when he connected me with producers of a PBS television show that broadcasted one of my first visual effects productions. I thank Dr. Schatz for ensuring that I write my thoughts in a clear yet sophisticated manner. He helped me mature in my academic writing and critical thinking skills—which I am still sharpening!

I thank Dr. Turnbull for helping me consider how my findings may relate to web video, and for teaching me how good information architecture assists computer users in learning a navigable space. Don Howard taught me the art of motion picture editing in his graduate editing course, and his advice was invaluable in helping me understand the mindset of professional editors and their day-to-day tasks.

Finally, I thank Dr. Sandy Stone for introducing me to the field of simulation, and for giving me the freedom to experiment with digital tools so that I eventually found my passion in researching and developing digital image-making techniques. Dr. Stone's support and critique of my creative work give me reason to continue making art. For statistical tutoring I thank Sonia Frias for educating me on how to use the SPSS statistical analysis software.

I would not have been educated by any of the previously mentioned people without the resources generously given to me by my parents, Salomon and Ruth Stavchansky. My entire family helped me navigate the journey of graduate school with care and support. Lastly, I acknowledge my wife, Rachael Miller Stavchansky, for her love, support, and faith in my abilities as scholar, educator, and artist. She was by my side throughout the whole process. Thank you, Rachael, for everything.

Acquiring Knowledge of Digital Video Manipulation Techniques and its Effect on the Perceived Credibility of Television News

Publication No._____

Arie L.Stavchansky, Ph.D.

The University of Texas at Austin, 2007

Co-Supervisor: Sharon L. Strover

Co-Supervisor: Karin G. Wilkins

The present research study investigated the perceived credibility of television news in relationship to the acquisition of knowledge of digital video compositing techniques. An experiment was carried out to verify if acquiring knowledge of digital video post-production techniques affected the perceived credibility of television news. Instrumentation for the experiment included a video stimulus produced with a readily available digital video compositing software package as well as an online post-test questionnaire. A scale for perceived credibility of television news was constructed based on a frequently used operationalization of the concept of credibility. Findings showed that after subjects acquired knowledge of digital video post production techniques, their perception of television news credibility was less than subjects who did not acquire knowledge of digital video post production techniques. Also, the amount of education a subject possessed played a significant role in how he or she perceived the credibility of

television news. Frequency of television news consumption, familiarity with digital imaging software tools, and academic background were also examined in relationship to perceived credibility of television news. Implications are explained for improving media literacy education, protecting television news credibility, and designing media effects experiments.

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Chapter 1: Introduction

BACKGROUND & PROBLEM STATEMENT

This research project investigates the effects of acquiring knowledge of technique on perception. By "technique" I mean the body of knowledge and methods that are used in order to achieve a desired result. All human activity employs technique, but, in the context of this project, "technique" refers to the methods and knowledge—"know-how"—by which humans make artifacts out of raw material found in their environment. This study focuses on image-making techniques and the individual's shift in perception—if any—when he or she learns about a *new* image-making technique. The particular objects exmained in this study have to do with visual representations of news events. A broader concern, and one well developed in literature on journalism, is how individuals assign credibility to certain visual representations. By considering the origins of technique in general, one can clarify the origins of image-making techniques and the process by which new ones are created.

In *The Technological Society* (1964), Jacques Ellul examined the origin of technical activity. He was interested in the origin of techniques for making weapons, clothing, and for hunting, fishing, and building, classifying these as "material techniques." He determined that at the core of the research and development of such techniques there was a closed area of activity—that of *invention*. For Ellul, this was the "root" from which all techniques sprang. He considered the first use of a method born from invention to be magical when he theorized that "magic is the first expression of technique." (25) He claimed that with magic, there is little or no diffusion, but that there is no progress, either. That is to say, "in magic, we see only endless new beginnings," while in material technique "we observe an increase and later a multiplication of

discoveries, each based on the other" (27). According to Ellul, magic technique is never handed down to others and only lives in the mind of its initiator. When the initiator dies, so does the magical technique. This is exemplified in the common adage, "a magician never explains his tricks." However, in my point of view, magical technique is carried on by others when they "reverse engineer" it. In essence, it remains alive over time as others practice their rediscovery of it. As more individuals become literate with a magical technique, it becomes transferable in the same way as a material technique; it loses its magic but gains in use and applicability. Essentially, a magical technique is the genesis of a material technique.

In producing moving imagery that operates as a message, there are three phases of technique: pre-production, production, and post-production. Pre-production involves techniques for planning the tasks that will be accomplished during the production phase. Techniques during the production phase are utilized to execute the plan, while in the post-production phase techniques are exploited in the deliberate construction of a meaningful message out of the raw material gathered during the production phase.

Examined in the context of Ellul's theories, the discovery of post-production techniques can be thought of as magic. Practitioners work creatively to develop ever more sophisticated post-production techniques so that producers' visions can be met. During the development process of a technique, practitioners themselves are in awe of what can be accomplished with their tools. It is at this moment when technique is magic. Ellul explained that "our modern worship of technique derives from man's ancestral worship of the mysterious and marvelous character of his own handiwork" (24). To audiences these techniques emerge from "out of nowhere," leaving them asking, "How did they do that?" Succeeding in capturing audience attention in this manner can be very powerful when there is a need to persuade. The use of post-production techniques at their

earliest stage of development can engage audiences with a message more effectively than the use of commonly employed techniques. It is when techniques are no longer magical to audiences that their usefulness as agents of persuasion evaporates.

Since image-making techniques at their earliest stage of development can be powerful agents of persuasion, the intent with which they are used makes them more or less harmful to audiences. For example, in popular culture these image-making techniques are used in the production of Hollywood blockbusters, advertisements, video games, educational materials, and the news media. While these types of cultural products can be used to promote interests, they can also be used to mislead society purposefully. The journalistic image is particularly vulnerable to the misuse of image-making techniques, as we will see in a host of examples below. Consider, if you will, that a news producer of our time may be thought of employing magical technique when he or she makes the choice to use a new image-making method for reporting events. Yet, the technique can be considered magic only until society develops a literacy for that particular image-making technique.

This project is concerned with post-production techniques used to produce digital video content and how learning about such techniques affects the perceived credibility of television news. As image-making techniques evolve alongside the rapid adoption of digital media production tools and new media distribution channels, understanding the parameters of image manipulation is more important than ever. Additionally, these evolving techniques are widely unknown, and they may be underemphasized in current media literacy education.

It is apparent that digital still imagery is vulnerable to manipulation by virtue of some famous visual alterations that sparked critical debate in the press and in public discourse. There are a host of classic examples. For example, in 1983, editors of

National Geographic Magazine altered the positions of the pyramids at Giza in order to fit the vertical framing of the magazine cover. National Geographic is considered a reputable documentor of cultures and natural phenomena the world over. This example was controversial in so far as it was one of the first incidents where a trusted media source publicly acknowledged the use of *digital tools* to manipulate imagery. In essence, it was a harbinger of future ethical controversies surrounding digital image manipulation.

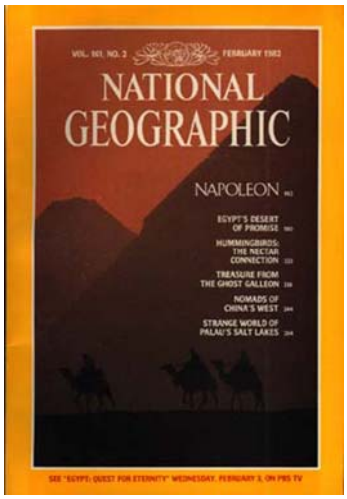


Illustration 1.1: National Geographic Cover, February 1983 (Farid 2006)

Another famous example occurred when, during the O.J. Simpson trial in 1994, *Time Magazine* altered Simpson's mug shot to make the defendant appear more sinister when compared to the same mug shot published on the cover of *Newsweek.* By making Simpson appear more menacing, *Time Magazine* editors may have wanted to increase readership and therefore advertising sales. Even so, this digital alteration was criticized for attempting to evoke a sense of judgment towards Simpson among *Time Magazine* readership (Barron 1994). This incident also raised questions about racism as a result of the media's portrayal of of an African American male accused of a crime. Reaves's (1995) discussion of this incident points out that "critics charged *Time* with racism," and

the editors of the magazine "apologized one week later for what the managing editor called 'their photo-illustration' of an image they had 'originally viewed' as an 'icon of American tragedy'" (707).

Illustration 1.2: Unaltered mug shot (left), altered mug shot (right) (source: wikipedia.com)

Recent examples include a Reuters news service photograph of a city skyline in Lebanon during the Israeli–Lebanese conflict in July 2006. Hany Farid, a digital image analysis researcher at Dartmouth College who creates software algorithms that detect digital image manipulation, characterized the public reaction to the Reuters photo as "one of outrage and anger," and concluded that the "manipulation was simply inexcusable" (Farid 2006, 8). Looking closely at Illustration 1.3, the manipulated image on the right depicts the cityscape to be more damaged than the original on the left. For example, the pillars of smoke are thicker, taller, and more pronounced. The buildings also appear to have more damage due to the manipulation of contrast in that particular area of the image.

Illustration 1.3: Original Photo of Skyline in Lebanon (left) Published Doctored Photo of Skyline in Lebanon (right) (Farid 2006)

In 2003 a freelance photographer was accused of doctoring a photograph of an American soldier interacting with Iraqi citizens in the current Iraq war. The published image is a composite of two digital images taken at the same scene at different points in time. It appeared on the cover of the *Los Angeles Times* that very year, and "after discovering the fake, the outraged editors of the *LA Times* fired [the photographer]" (Farid 2006, 1). Examining the published photo on the right, note the seemingly direct interaction between the U.S. soldier and the Iraqi man carrying a child. This direct interaction may have more of an emotional impact on viewers than the original images on the left and in the middle. This emotionally evocative image could function to sell newspapers as well as to shape public opinion about the Iraq war.

Illustration 1.4: Original A (left), Original B (center), Published composite (right) (Farid 2006)

An internet firm in Chattanooga, Tennessee recently doctored a photograph of Karl Rove after his visit to Porker's restaurant in Chattanooga during U.S. President Bush's visit to Chattanooga in February 2007. The photograph was published on web logs and "fuel[ed] speculation in the blogosphere that the president's top advisor is running White House correspondence through a non-government email system" (Davis 2007, 8). Such a misleading message could lead the public to conclude that members of the executive branch of the United States government had sought out email communication channels that could not be traced for investigational purposes.

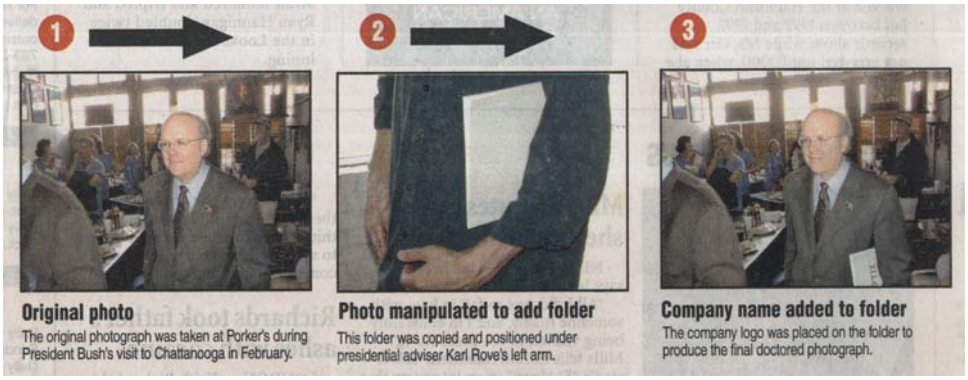


Illustration 1.5: Sources and published photograph of Karl Rove (Davis 2007)

One example that touches upon how manipulated images can affect audiences' self perception appears on the cover of the July 2007 issue of *Redbook* magazine. In the cover photograph shown on the left in Illustration 1.6, celebrity Faith Hill appears skinnier than in the original, non-manipulated photograph shown on the right. Note especially the contours of Hill's body on her arm and back. After being criticized that the manipulation contributes to unattainable body image standards, "Redbook's editor in chief Stacy Morrison said, 'The retouching we did on Faith Hill's photo for the July cover of *Redbook* is completely in line with industry standards'" (Farid 2007). While the

editor may have found this manipulation acceptable, viewers of the magazine cover see a false reality that may impact their self image negatively.

Illustration 1.6: Published photograph on cover of *Redbook* (left), Original photograph (right)

These varying examples and others with different degrees of ethical transgression show the vulnerability of the digital photograph today and in the past.

Audience reaction to manipulated imagery differs depending on the context and circulation of the image. Between friends image manipulation can be humorous, and society accepts the incredulous behavior of photo editors who contribute to celebrity gossip tabloids. In contrast, when an image is circulated to a mass audience, and the subject matter is serious in nature, manipulation is hardly taken lightly. Yet there is no classic example in broadcast television news that has caused as much public disturbance as found in the preceding examples of digital still imagery manipulation occurring in the "digital dark room".

Some critics and researchers have noted recent trends in graphical overlays, screen layout, and packaging techniques for television news, but have left out issues concerning video image manipulation. Morse (1998) noted the evocative opening

sequences in television news broadcasts for their effectiveness in immersing the viewer "in a world to be explored beyond the screen in weightless flight" (73). Fox, Lang, et al. (2004) investigated viewer comprehension of television news information as related to the superimposition of graphics over video. In addition, some research mapped and codified photographic and visual design conventions used in the packaging of television news in order to understand their effect on viewer activity (Grabe, Zhou et al. 2001; Cooke 2003; Cooke 2005). Other critics have briefly addressed real-time chroma-key matting techniques used to composite imagery behind reporters and interviewees (Ernst 2002; Tobias 2004; Baym 2005). One issue commonly noted amongst researchers is that the chroma-key technique allows the news room to extend artificially its geographical presence, thereby enhancing the validity of a news story or interview.

Several motion pictures in different genres of fiction have explored instances of video image manipulation used in television broadcasts. Examples include Paul Michael Glaser's *The Running Man* (1987), Barry Levinson's *Wag The Dog* (1997), and Jonathan Demme's *The Manchurian Candidate* (2004). While these films show audiences the results of unethical practices in post-production video suites, they do not demonstrate the actual procedure or range of methods for altering video imagery. Furthermore, audiences may conclude that techniques used in such narratives are somehow "fictional" because of the films' genres. This is problematic because, as we will see, the actual techniques for manipulating the digital moving image are similar, if not more powerful, than those used for manipulating digital still imagery.

As such, a primary objective of this research is to explain the impact that knowledge or awareness of image-making techniques has on the perceived credibility of visual media content. Reaching this objective means answering the central research

question: does acquiring knowledge of digital video post-production techniques affect the perceived credibility of television news?

SIGNIFICANCE OF RESEARCH

Even with the rising popularity of online news media, television is still considered a significant source of news. In the United States, television has been reported as the most frequently used source of news, as is the case in the U.K. (Nguyen 2003; Morris 2005). This consumption trend may have developed simply because television transmits both visual and aural signals, thereby stimulating more than one sense and making television an appealing form of media (Ryan 1975). Further, it is cognitively and mechanically easier for a person to consume television news as opposed to print, radio, or online news. Even though some media scholars have cautioned against labeling television consumption as merely passive (Connell 1979; Hall 1980; Barker 1988; Mittell 2000; Livingstone 2003; Newcomb 2005), it requires the least amount of physical or cognitive activity when compared to consuming content from print, radio, and especially online sources (Livingstone 2003). In the context of new media communication channels, television consumption is like going on holiday. This metaphor will likely change as new technologies converge with television, but now television viewers do not have to decide which hyperlink to click or if they want to "favorite" the content with which they are engaged. Neither does a television viewer type at length or navigate through complex information spaces. Furthermore, television viewing, unlike reading print, does not require a person to focus on the consistent decoding of abstract imagery such as the letterform. Essentially, work for television viewing is performed only to the extent that a viewer produces meaning, or decodes messages, from what they see and

hear while watching television. People learn to decode television messages faster and developmentally earlier as compared to other media (Barker 1988). This means television viewing demands the least amount of literacy to decode messages when compared to other media. In addition, the total volume of television news from different networks gives journalistic programming a significant presence and accessibility to audiences when compared to other media. Television also is simply an accessible source of news to the general population. This may explain why television continues to be a leading source of news.

Within mass communication studies, *the agenda-setting function* of television and other forms of mass media was first proposed as a hypothesis in an influential study by McCombs and Shaw (McCombs and Shaw 1972). To explain the agenda-setting hypothesis succinctly, the researchers cited Cohen (1963):

> Perhaps this hypothesized agenda-setting function of the mass media is most succinctly stated by Cohen, who noted that the press 'may not be successful much of the time in telling people what to think, but it is stunningly successful in telling its readers what to think *about*.'

In their study, McCombs and Shaw found that what their subjects said were key issues in a presidential election campaign matched the actual content of the mass media used during the campaign. If this is the case, the agenda-setting function may have some influence on social interactions. Salient issues discussed by the mass media fill public forums with debate and magnetize interpersonal conversations eventually leading people to form an opinion on the topic in question. Once opinions are developed, a stance is taken which leads to action, in the classic decision-making model.

Since the introduction of the study by McCombs and Shaw, communication researchers have developed an area of inquiry examining contingent conditions that affect the agenda-setting function of the mass media (Wanta and Hu 1994). For example,

Young investigated how fearful television news content related to its level of importance as perceived by audiences (Young 2003). Other researchers examined whether news media credibility plays a critical role in the agenda-setting process—and thus social interactions as well (Wanta and Hu 1994; Hantz and Diefenbach 2002). Wanta and Hu (1994) found that "a credibility index—dealing with community affiliation—also had a direct effect on media agenda-setting" (90). Meanwhile, Hantz and Diefenbach (2002) took note that "no study of agenda-setting to date attempts to include the concept of manipulation, or perceived manipulation of images or of information" (20).

News media influence choices people make in their lives. If news media producers choose to manipulate journalistic images that maintain some type of role in the agenda-setting process, this may encourage the gradual erosion of public trust in a number of settings. Hantz and Diefenbach summarize this logic eloquently:

> Yet, perhaps as a result of increased media literacy and the skepticism of the postmodern attitude, audiences are also both sensitive to and suspicious of all incoming visual data. As a result, our definitions of trust have grown more tentative, leading to a general decline in public trust at several levels: in government, in society, in media institutions and in interpersonal relations. (1)

This "tentative distrust" has the capability to increase social tension as noted in the criticism evoked by the examples of digital image manipulation above. If still image manipulation results in such criticism, how much more will be evoked if critics begin to find manipulation in moving images used for television news?

As we will see in the literature review, several factors that contribute to audiences' perceived credibility of television news have been investigated. However, this study is particularly concerned with the relationship between the creation of the broadcast moving image and its interpretation by television news audiences. The production technique of television news' visual dimension is important to study because it acts as an apparatus that attempts to deliver the highest degree of verisimilitude to the

natural environment (Barker 1988). Furthermore, the visual dimension of television is an additional persuasive component in message delivery—not only does one hear an expert or journalist speaking, but they can make judgments about the experts' words based on their visual appearance (Ibelema and Powell 2001). Additionally, visual stimulation is typically what gives evidence to aural stimulation in documentary or journalistic communication, while the opposite is true of narrative fiction: aural gives evidence to visual. This may explain why in television news broadcasts, when reporting from a geographically remote place, a unique visual is created to support the broadcast audio. Until another of the five senses is simultaneously stimulated with sight and sound, television news' visual dimension will maintain its role as a superior representation of reality.

Understanding the role of video post-production techniques as related to television news credibility is useful for producers. For example, television news producers may be better suited to select post-production techniques that ensure their content is perceived as credible. Some television industry professionals already choose post-production equipment based on "how [they] are trying to define the station" (Anderson 1999, 52). The equipment a television station chooses has some influence on the choice of post-production techniques. In fact, many national news broadcast networks in the United States including FOX, NBC, and CNN utilize the same software and hardware tools owned by Hollywood visual effects studios (Suydam 1999; Autodesk 2005; Autodesk 2006). These networks adopt this technology, in part, because of the policies requiring higher resolution to broadcasts, but also in order to rapidly create moving imagery that gives them a unique voice in the marketplace. If the technology to affect imagery in fictional narratives is the same as that used in television newsrooms,

then it is most likely the choice of technique—or the way an operator uses that technology—that can maintain the station's credibility.

Findings stemming from this investigation may be also useful for audiences as they may be used to further develop media literacy education. While the "digital divide"— a term conventionally referring to the division between those who have access to digital media technologies and those who do not—continues to narrow, it should be noted that those who *do* have access still face a barrier to the acquisition of new techniques. This barrier is ever present in the world of digital video post-production. For example, there is a barrier between those who have access to video manipulation software and those who *know how to use* video manipulation software to meet particular needs. Furthermore, another barrier exists between those who know how to use video manipulation software, and those who *invent methods for video manipulation* that eventually become part of a specific literacy. The following diagram attempts to explicate these divisions further:

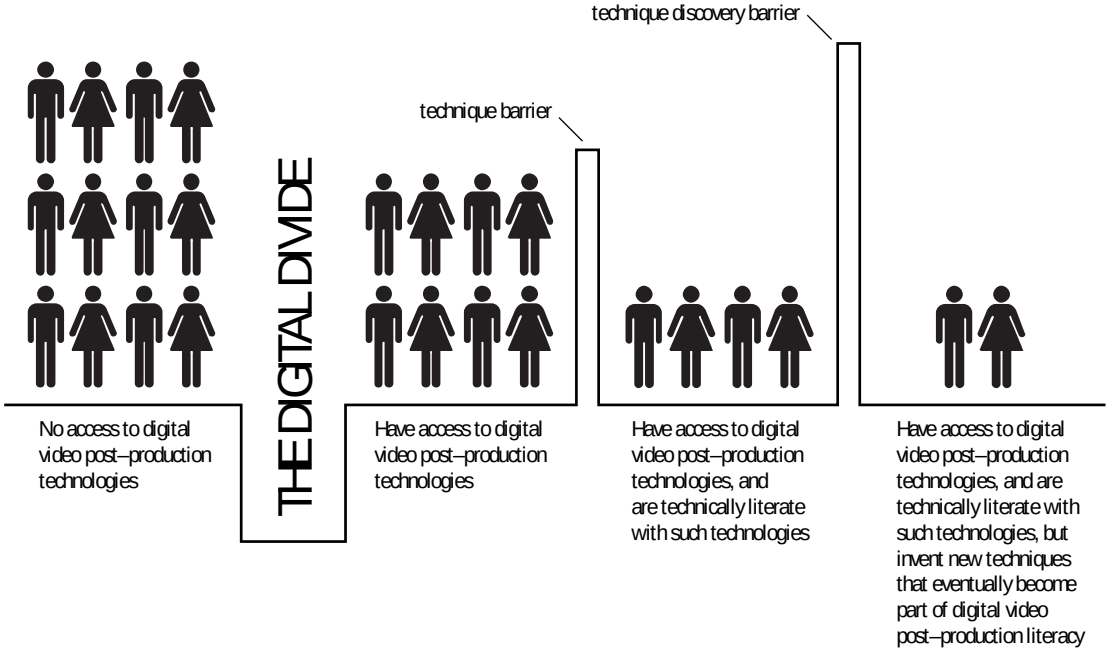


Figure 1.1: Barriers between Access to Technology and Techniques

With this notion, media literacy education may be able to emphasize the critical analysis of moving imagery from a technical standpoint. Therefore, not only should literal video image manipulation techniques be taught within media literacy curricula, but technique development and choice should be emphasized. Gladney and Ehrlich (1996) were concerned that manipulation of television news imagery had not been examined within the community of researchers because "the ability to manipulate television images in something other than a rudimentary fashion is a relatively new phenomenon" (498). At the time of their publication, manipulation of the video image, as opposed to the editorial framing of the news, was not usually included in media production literacy curricula. Today, video image manipulation is no longer a phenomenon, as the costs to acquire the tools for video manipulation have been lowered and the interfaces to those tools have become more intuitive so that users learn techniques rapidly. According to Gladney and Ehrlich (1996), "there is little survey data and practically none related to digital manipulation of moving images" (498). Further, the next chapter assessing the body of research concerning the manipulation of visual media, finds that all articles relate to digital *still images*. Researching the manipulation of digital still imagery may have plateaued.

The structure of the dissertation begins with outlining the extent of research surrounding digital still image manipulation, the literature review discusses the concept of credibility and how others researchers have operationalized it. Chapter 3 reviews the methodological approach to the current research project by detailing hypotheses, the

experimental design and its execution. Within the same chapter are demographics of the samples used in the experiment and a discussion about the various scales constructed in order to analyze data. Chapter 4 contains the analysis of data that assist in the evaluation of the proposed hypotheses. Finally, Chapter 5 is comprised of a discussion of findings from the analysis and concludes by discussing opportunities for future research.

Chapter 2: Literature review

CONTEXT & TECHNIQUE

In recent years, a significant amount of scientific and technical research has gone into optimizing image-making techniques without regard to its social impact (Li, Sun et al. 2004; Rother, Kolmogorov et al. 2004; Jia, Sun et al. 2006). For example, some computer science researchers developed "intuitive user interface tools designed and implemented to provide flexible control and editing" for artists who work with digital still images (Li, Sun et al. 2004, 303). They created an intuitive graphical user interface whereby an artist can select areas of a digital image with the help of computer vision algorithms. Another group of researchers designed an algorithm that "is used to simplify substantially the user interaction needed for a given quality of result" for compositing digital images (Rother, Kolmogorov et al. 2004, 309). The field of computer vision has also contributed to image-making in its ability to assist users in finding and tracking contours of moving foreground subjects against backgrounds (Agarwala, Hertzmann et al. 2004). In contrast to these algorithms applied in image-making software, other technical research has presented algorithms designed to detect tampering of digital still imagery and the duplication of compressed video (Farid 2006; Wang and Farid 2006). In addition to large post-production studios and news rooms using hardware and software that draw upon of this type of research, individuals now have a lower barrier of entry to acquiring such digital wares. Technical research for image-making is moving forward and will continue to move forward as demands for digital content creation become more prevalent. What is missing is an understanding of the sociological consequences of technological applications derived from this type of image-making research within specific contexts of media production.

In the field of communication, a number of media studies from the last few decades have been largely concerned with *perceived credibility* as related to either the source of media content, media use, or characteristics of the medium itself (Rimmer and Weaver 1987; Gladney and Ehrlich 1996; Akehurst, Kohnken et al. 2001; Kiousis 2001; Greer and Gosen 2002; Kensicki 2003). Studies that examine credibility as related to the source of a message "involve examining how different communicator characteristics can influence the processing of messages" (Kiousis 2001, 382). In this case a researcher may investigate how audiences perceive the credibility of a message coming from one television network as opposed to another network (Morris 2005), or investigate credibility as related to audience consumption and preference of media channels. A researcher here may want to understand the way individuals perceive credibility depending on how frequently they engage with or are exposed to a particular medium (Wanta and Hu 1994). Another set of research concerns itself with the way audiences perceive credibility as related to properties found in the media channel. For example, a researcher may measure perceived credibility of messages delivered online as opposed to print, radio, or television (Gladney and Ehrlich 1996; Flanagin and Metzger 2000).

While researchers have briefly mentioned the role of new digital production technologies in relationship to credibility (Reaves 1995; Baym 2005), few studies have investigated production technique itself and its role within the context of past findings (Fahmy and Wanta 2005). Past studies have pointed to research opportunities for dissecting and analyzing techniques used to create and render digital images, but they employed only static imagery in their methodology (Reaves 1995; Greer and Gosen 2002). For example, researchers have referred to the increasing ease of interfacing with photo retouching tools as a result of digital imaging software development (Reaves 1995; Hantz and Diefenbach 2002; Baym 2005). In a recent study, Fahmy and Wanta (2005)

conducted an experiment where subjects were primed with a video that demonstrated manipulation techniques for digital *still images* and were asked to fill out a questionnaire. They found that "among participants pre-exposed to the video that explains the ease of digital alteration," there was a decrease in "believability" of news (8). However, they primed another group of subjects with the same video in addition to a printed explanation of how to manipulate digital still images and found that "the data show an increase in believability among participants pre-exposed to information on digital imaging using both video and print" (8). The video stimulus in the researchers' experiment showing the manipulation of digital still images with *Adobe Photoshop* had a voice over (Fahmy 2007). They also found that when comparing the effectiveness of print and video stimuli, which demonstrated the techniques for manipulating digital still imagery, the video stimulus, with the audio track, proved more effective than the print stimulus alone. Famhy and Wanta's stimulus is similar to the present research study's stimulus—the difference being that in the present investigation the stimulus contained no audio, did not show an operator using digital compositing software, and showed *moving images* being manipulated.

Since the moving image is a series of still images, it follows that any technique employed in the manipulation of one still image can be re-employed on an entire series of images. More succinctly, in the domain of the digital medium, anything that can be done to the still image can be done to the moving image. It is important to study digital video compositing because digital still images are vulnerable to manipulation, and therefore digital video is equally vulnerable to manipulation. As this is the case, it may now be appropriate to introduce a study of the technical manipulation of moving images to the field of media credibility.

Some media credibility studies that have used moving imagery in their methodologies have focused primarily on the effect of producers' editorial and framing decisions on credibility. These studies were concerned with the careful juxtaposition of moving images and sound bites or the episodic and packaged nature of the moving image (Gladney and Ehrlich 1996; Morse 1998; Liebes 2000). While this project recognizes digital video editing techniques as a major component in determining how television news may be judged by an audience, it is not concerned with the technique of editing alone. Instead, this study focuses on the technique of digital video compositing as related to media credibility.

Today, digital video compositors color correct, fix blemishes, create special effects and titles, superimpose graphics, and ultimately package messages for the world to receive. To be sure, compositing is a distinctly different discipline from editing, but is becoming more blurred with time and certainly within the walls of news rooms (Brinkmann 1999). Before digital compositing existed, optical compositing was the only way in which disparate moving imagery could be integrated into a whole. The machinery to accomplish optical compositing tasks was quite cumbersome and separate from editing machinery. Operators of these machines worked with tools that had strikingly different interfaces. Now, however, editors' digital toolsets include many new compositing functions that were previously available only to separate digital compositing programs. Even the most basic of video editors may encounter compositing tasks in routine jobs. This means that entry level news post-production professionals may have access to and, very likely, the skills to use compositing techniques in their work. Such access should signify why studying digital compositing is significant in the context of news media credibility.

CONCEPTUALIZATION & OPERATIONALIZATION OF PERCEIVED CREDIBILITY

Credibility research has frequently been studied by assessing audience perceptions. Quantitative data summarize researchers' operationalization of credibility based on items in surveys, questions and interviews, and experiments. This section assesses how past researchers conceived of credibility and how they operationalized their conceptions so that they could be examined through empirical research. In the past couple of decades, a majority of credibility research has focused on a distinct set of variables for examination.

Conceptualization of perceived credibility

A widely agreed upon definition for credibility remains absent in the community of credibility researchers (Gaziano and McGrath 1986; Meyer 1988). This occurs because the term itself is a superset of characteristics that may or may not be associated with a subject or content under scrutiny. For example, a news story may be accurate but not trustworthy, while a public speaker may be plausible but biased in his or her philosophies. As far as credibility research is concerned, it is virtually impossible to test how a subject fares with regard to every characteristic related to the notion of credibility. Several researchers in the last couple of decades have defined credibility as part of the human ability to consciously perceive. However, the dictionary definition of credibility generally refers to a person or object possessing a capacity for belief or demonstrating reasonable grounds for being believed.

The language past researchers have used in conceptualizing credibility includes "community affiliation," the act of "believing," and the concept of "truth." Meyer (1988) notes that credibility for a newspaper includes "maintaining harmony in and leadership status with the newspaper's community" (567). In other words, a newspaper story can

garner belief from readers but be considered inconsequential if the publisher holds opinions in opposition to the majority of the community that it serves. Alternatively, credibility is a catalyst to broader outcomes such as newspaper status within a community. This suggests some metrics for credibility are taken from outside the actual content of a news story and are based on the level of interest a news media organization arouses in the community. For example, individuals may claim affiliation to news organizations, which they perceive to deliver stories that align with their own opinions. For example, Morris (2005) found that "Fox News watchers enjoy news that shares their personal views, while CNN and network news audiences prefer news that has more in-depth interviews with public officials" (56).

West (1994) conceptualizes credibility as an information source that possesses qualities "which cause what it says to be believable beyond any proof of its contentions" (159). In addition, credibility can also rest on the mere act of "seeing" media content as it results in "believing"—as the adage of "seeing is believing" is well known (Gaziano and McGrath 1986; Slattery and Tiedge 1992; West 1994). The most significant thread in the body of credibility literature suggests that the act of *believing* is a key tenet to conceptualizing the definition of credibility.

More specifically, however, one could ask what factors are needed for a person to believe in something. One would have to break apart the notion of believing into smaller components. For example, faith amounts to trusting in something that cannot be proven and is therefore easy to characterize, but belief involves a complex definition of truth. For most statements to be deemed true, a proof must be sought and made available. In mathematics, a statement becomes a theorem because a person can derive a proof for it based on abstract logic. After a mathematical statement becomes a theorem, it is "believed," and considered credible, from that point forward. Where abstracted logic is

not used, deriving proof for a statement is more difficult to produce because it relies on physical evidence or substantive data. In this case, a proof is multi-faceted as it may contain an examination of data points, witness accounts, comprehensive reviews of significant literature, and other hard evidence to support a statement. If all facets of the proof align to support a statement, it is likely that the statement will be regarded as truthful and thus credible.

Beyond the semantics of truth, believing in a statement is ultimately a subjective choice individuals make informed by several different factors. Such factors may include a person's political orientation, his or her trust in a statement's source, age, gender, race, class, and a host of other characteristics that are unique for each individual. These attributes can influence which messages emanating from the mass media a person deems as truthful and credible.

Operationalization of perceived credibility

Journalism ethics anchors credibility research. This is probably due to the fact that it is the task of the journalist to tell stories about events occurring in physical reality—the public wants to *believe* the news stories that they are told. However, measuring credibility with regard to journalistic products is not as simple as asking subjects whether or not they believe what they see or read; it should be noted that credibility is typically construed as multi-dimensional, but the actual dimensions invoked by researchers vary from study to study (Burgoon, Burgoon et al. 1981; Gaziano and McGrath 1986; West 1994; Johnson and Kaye 1998).

For example, the American Society of Newspaper Editors (ASNE) conducted a survey that "used a variety of operational definitions of credibility, including broad and narrow measures" such as newspapers' respect for people's privacy, separation of fact

from fiction, employment of well-trained reporters, factual reliability, and whether their stories were perceived as trustworthy (Gaziano and McGrath 1986, 453). Burgoon, Burgoon, and Wilkinson (1981) noted "a study on the credibility of mass media sources [by] McCroskey, Jensen and Valencia [who] found that the number and nature of separate judgments made differed somewhat across the diverse populations [they] surveyed, but that typically five distinct dimensions emerged: competence, composure, character, sociability and extroversion" (412).

The origins of the field include Charnley (1936), who published an article on newspaper reporting accuracy, and Hovland and Weiss (1951) who, together, published an article on how the source of a message influences the credibility and effectiveness of communication. Between 1959 and 1961 the Roper polling organization surveyed which medium people "believed" the most between radio, television, magazines, and newspapers (Roper 1985). By 1961, results from the poll indicated that there was an "increased public trust in television, compared with newspapers" (Gaziano and McGrath 1986, 451). Gaziano and McGrath (1986) found that between 1961 and 1985, the "Roper question [had] been the most frequently used operational definition of credibility in published research" (451). The assessment of Gaziano and McGrath called for an updated operationalization of credibility in order that future academic research in the field become standardized and cumulative (Meyer 1988).

In their widely cited study, Gaziano and McGrath (1986) sought to provide a more robust operationalization of credibility in order to provide a consistent set of variables that other media credibility researchers could use. Their approach in developing a credibility scale included a factor analysis of items used in survey questionnaires for the previously mentioned ASNE study ($N = 875$) that focused on people's perception of news credibility. In performing factor analysis, a researcher can

detect the impact a variable has upon another variable based on a model created by the researcher. The model for a factor analysis uses variables that make rational sense for their inclusion. As an example, age, gender, income, and education level could act as a model for a person's rating of a product that he or she uses everyday. Here a factor analysis could show that education level may have no influence over how a person rates a product, and that income is the most substantial demographic in the model for influencing the rating. In the case of the Gaziano-McGrath study, the researchers determined that the following twelve variables comprised some explanatory power for the concept of credibility.

1. *Fairness*: Is fair or unfair
2. *Bias*: Is biased or unbiased
3. *Story completeness*: Tells the whole story or doesn't tell the whole story
4. *Accuracy*: Is accurate or inaccurate
5. *Privacy*: Invades or respects people's privacy
6. *Audience interests*: Does or does not watch after readers' / viewers' interests
7. *Community affiliation*: Is or is not concerned about the community's well-being
8. *Clarity*: Does or does not separate fact and opinion
9. *Trust*: Can or cannot be trusted
10. *Profit interests*: Is concerned about the public interest or is concerned about making profits
11. *Reporting method*: Is factual or opinionated
12. *Personnel quality*: Has well-trained or poorly trained reporters

While this twelve item index may prove useful for specific situations, social science researchers could easily imagine a great deal of variability coming from a scale with this many items, depending on a study's sample size. Two years after the publication of the Gaziano-McGrath scale, Meyer (1988) examined their factor analysis and noted:

> [a problem] with these indices is not only their lack of face validity, but the absence of any prior theory to inform their interpretation. Gaziano justifies this approach by noting that it 'allowed respondents themselves to define 'credibility' rather than imposing an academic definition on them.' Fair enough, perhaps, for ASNE's purposes, but for research knowledge to be cumulative, we badly need an academic definition linked to a prior construct. (570)

Meyer's goal was to then find a "measure of credibility that will allow comparisons across different populations and different times" (573). By conducting reliability tests on groups of items across the Gaziano-McGrath variables against his own data collection, Meyer found that five items make for what he termed a "believability" index.

> Each deals straightforwardly with believability. 'Fair,' 'unbiased,' 'tells the whole story,' 'accurate,' and 'can be trusted' each measures a close approximation of the same thing. This redundancy provides a far more accurate measurement than could be made by one of these items alone. And when the items are added or averaged, the result could be a continuous measurement which opens up more possibilities for analysis than a single nominal or ordinal variable.

In essence, the Meyer modification to the Gaziano-McGrath credibility index amounts to the following five-item semantic differential scale:

- Fair — Unfair
- Unbiased — Biased
- Tells The Whole Story — Doesn't Tell The Whole Story
- Accurate — Inaccurate
- Can Be Trusted — Can't Be Trusted

This set of items proved efficient in its use as Meyer tested it on data sets from previous studies to ensure its reliability. For this reason, credibility researchers used this version for some time after Meyer's publication.

West (1994) examined several previous studies "to cross-validate a widely used set of standard credibility scales in an attempt to further understand reliability and validity of credibility research" (159). The problem West noticed was that despite Meyer's analysis work on the Gaziano-McGrath scales—and his development of an efficient index—the scales in the Gaziano-McGrath study were "the only set of scales for the measurement of media credibility to have undergone validation" (160). West also noted that even after several decades of media credibility research, "there is still no consensus concerning the proper use and evaluation of these credibility scales" (160).

West's analysis of Meyer's credibility scale had an acceptable goodness-of-fit "indicating that the measurement model [was] acceptable," but that the Gaziano-McGrath model "had insufficient goodness-of-fit" (163, 164). More specifically, West discusses the basis of this acceptability of the Meyer scale for use in media credibility studies:

> The empirical validity of the [Meyer] model, at .84, is marginal but acceptable, and the overall reliability, at .92, is high. Individual item reliability is somewhat lower at .7, indicating that some of the items measure credibility less well than others. Nevertheless, the Meyer scale for measuring credibility appears to perform with acceptable reliability and empirical validity. (West 1994, 163)

Finally, West concluded that "the Meyer modification of the Gaziano-McGrath scales appears to validly and reliably measure credibility per se" (164). Much of the current research surrounding media content credibility uses a variation on the Gaziano-McGrath scales or the Meyer scales (Rimmer and Weaver 1987; Slattery and Tiedge 1992; Johnson and Kaye 1998; Greer and Gosen 2002).

While researchers within the field of journalism have made efforts to formulate and validate measurement scales for media credibility, others researchers with related interests have operationalized credibility with their own scales of measurement. For example, one study compared the credibility of live and video presentations using "Criteria-Based Content Analysis (CBCA) [that] focuses on specific content characteristics which, if present in a statement, support the hypothesis that an account is based on personal experience (i.e. that it is truthful)" (Akehurst, Kohnken et al. 2001, 66). Another study examined credibility of witnesses for judicial purposes and asked participants to complete sentences based on a seven point scale. Specifically, one sentence on the questionnaire read, "Her testimony appeared . . .," followed by items that appeared in a semantic differential scale—for example, from "plausible" to "implausible" (Kaufmann, Drevland et al. 2003, 24). These two examples are significant to the extent that credibility researchers still do not feel the need to use a standardized measurement of credibility. An institution that specializes in the standardization of research practices and tools for media credibility researchers could yield more reliable credibility research and cross-validation of research results.

Another mode of observation for media credibility studies comes in the form of survey research. Two studies demonstrate designs incorporating an online survey, while another is a re-analysis of collected data from a survey conducted in the past. Johnson and Kaye (1998) wanted to understand the differences of credibility between internet and traditional media sources. It is important to note that this study took place in 1998—a relatively nascent stage of Internet and web adoption as a source of media. In their methods section they described methodological techniques for attracting respondents to their online survey. Posted links on different websites, Usenet groups, and listserves acted as "marketing" methods for their research. They claimed that the "intent was not to

generate a random sample, but to attract politically-interested Web users—those who would be more likely to use online media sources," but they went on to suggest that "the sample may be representative of the Internet population" (Johnson and Kaye 1998, 328). What does the "Internet population" mean today? In a matter of seven years, the adoption of the Web as a source for news has increased dramatically. Their findings point out that "among the sample of politically-interested Web users that online newspapers and online candidate literature are viewed as more credible than their traditionally-delivered counterparts" (334). While this finding *describes* the sample and generalizes to its population, their findings cannot attempt to find a *cause* for what they describe. This is a limitation of this design in survey research.

Another study by Rimmer and Weaver (1987) asked if frequency of media use is correlated with TV or newspaper credibility. After analyzing data collected from a survey conducted three years prior to the publication of this study, they suggested that "the sheer frequency of newspaper and television use is *not* generally correlated with how credible (trustworthy, unbiased, complete, accurate) newspapers and television are perceived to be" (36). Again, while this is an excellent description of a sampled population, it is limited in describing what causes a media source to be credible. However, their study does get at understanding attitudes and orientation regarding media choice, a correlation best found through survey research rather than experimental research.

To be sure, all operationalizations of credibility attempt to reconcile a representation of an event to its actual physical occurrence by means of a distinct unit of measurement. In other words, if a person finds a story credible and believable, his or her mind maps its representation to its occurrence in physical reality. The map's connection path is more or less weak, but its strength may certainly be measured by asking the

individual a combination of questions based on the credibility scales as previously discussed. In the event that a person deems a story incredible or unbelievable, measuring the strength of the cognitive map should come out to be extremely weak, or it may reveal the absence of a map altogether. The operationalization for the present study attempts to measure the strength of this map after a person watches techniques for manipulating video imagery used in television news. As we will see in the following methodology chapter, this research study's operationalization of credibility is derived from the Meyer (1988) scale that was validated by West (1994).

This literature review noted a considerable amount of research on the conceptualization and operationalization of perceived credibility of the media. However, there is a lack of research on media production technique as related to perceived credibility as well as research on digital *moving images*. Findings from the reviewed studies as well as an examination of population samples influenced the formulation of four hypotheses used in the present investigation. The following chapter presents these hypotheses and discusses their relevance.

Chapter 3: Methodology

This section details the research questions and the methods used to investigate them. Hypotheses are stated first, and an explanation of the experiment design follows. Next, details regarding the production of the video stimulus are given and are followed by justification for specific items found on the experiment's questionnaire. Finally, the section ends with a chapter that describes the demographics of the population sample.

RESEARCH QUESTIONS & HYPOTHESES

The central question for this research study asks: does acquiring knowledge of digital video manipulation technique affect the perceived credibility of television news? If so, in what manner does the perception differ? Second, what aspect in knowledge of digital video manipulation techniques has the most influence on perceived credibility of television news? These hypotheses were tested in an experiment that yielded statistical data discussed in a later section. The following are the research hypotheses.

Hypothesis 1

> *Acquiring knowledge of digital video post-production techniques influences audiences to perceive television news as less credible.*

To understand the reasoning behind this first hypothesis consider the trade secrets of a professional magician. If an onlooker learns how a magician's trick is accomplished, it is possible for the onlooker to stop believing in the magic of the trick itself. Moreover, the onlooker can use the knowledge of that single trick to extrapolate methods the

magician employs in other tricks, thereby discrediting all magic demonstrated. In the context of this research project, techniques for compositing moving images are the magic tricks, and the knowledge acquisition of post-production techniques is the unveiling of the trick.

When a subject was exposed to the video that demonstrated a series of tasks for a digital compositing operation, this study assumed that he or she "acquired knowledge *of* digital video post-production techniques." Though this assumption was made, a distinction between "acquiring knowledge *of* " technique and "acquiring knowledge *about*" technique should be clarified. "Acquiring knowledge *of*" a technique implies that a person has been made aware of the technique's existence while "acquiring knowledge *about"* technique would imply a person obtained a particular depth and breadth of details regarding the technique. This hypothesis refers to a person becoming "aware" of a technique as opposed to developing a comprehensive understanding of a technique.

As discussed in the literature review, the concept of credibility can be operationalized such that it rests on a spectrum from "low" to "high". This means subjects perceive television news as having more or less credibility in its portrayal of actual events. A subject who perceives television news as "less credible" than another subject is perhaps more skeptical of television news' representations of actual events.

Hypothesis 2

Subjects who are familiar with digital compositing software and techniques perceive television news as less credible than those who are less familiar.

While the first hypothesis focuses on acquiring knowledge of techniques for altering digital video content, this hypothesis considers the relationship between knowledge of the specific tools that manipulate digital imagery and perceived credibility. This hypothesis assumes a difference between the knowledge of a particular technique and the more general knowledge of what a tool used for performing that technique *is capable of*. A person who has already interacted with programs like Adobe Photoshop or Adobe AfterEffects may realize the extent to which the tool may be used for manipulating digital imagery. Equipped with that realization, this person could be aware of the software's use in creating imagery for the news, and come to the conclusion that visual material in the news is manipulated in some regard—whether it be with textual and graphical overlays or the composition of disparate video clips to make a new clip. With such a perspective, the individual could be more skeptical of imagery that appeared in the news media than if they had never used digital image compositing software. Not only would a sense of skepticism emerge, but the person could become more tolerant of manipulated imagery appearing in the news.

This logic is substantiated by Greer and Gosen (2002) who concluded that, after administering their media effects experiment, "subjects with experience using imaging software were more tolerant of digital manipulations than those with no experience" (8). In other words, people in their sample with experience using imaging software were more accepting of the fact that manipulation of imagery occurs from time to time. These subjects did not feel that any harm would be done to the public if a manipulated image were to be published. However, while people may be tolerant of manipulating journalistic imagery, they still may not find the news credible. Testing this hypothesis will help disclose the connection between *familiarity* with imaging software and perceived credibility of media content.

Hypothesis 3

Subjects with academic preparation in the discipline of communication perceive television news as less credible than subjects with other academic preparations.

This hypothesis posits that curriculum and instruction may have an influence on the perception of television news. For example, a communications department at a large research university may provide curriculum to students covering media literacy. Such a curriculum could include units of study on digital video production and critical analysis of media content that influences a student's perception of television news. Alternatively, departments outside communications may not offer students courses on media literacy since they do not have an immediate need for that. Testing this hypothesis can further the understanding of education's influence on perception of television news. It may reveal that formal instruction has a relationship to credibility assumptions or assessments. Worth noting here is that none of the credibility research studies reviewed for this research project considered curriculum and instruction in their analysis.

Hypothesis 4

Subjects who consume a low amount of television news perceive television news as less credible than those who consume a high amount of television news.

Researchers have found that frequency of watching television news is related to how a viewer perceives the credibility of television news. As Rimmer and Weaver (1987) wrote, "there is no significant association between frequency of newspaper reading and

newspaper credibility, but there is for frequency of TV viewing and TV news credibility" (36). Their findings showed that subjects who "watch television two or more hours a day are somewhat more likely to rate the credibility of TV news high than those who watch less than two hours a day" (32). This result may be because television news is repetitive in its reporting and programming. On one hand, high consumption viewers may tend to believe reports more as they see and hear the same audio and video clips repeatedly in the course of a single day. On the other hand, they may watch more television from the outset because they think it is more credible than other forms of media. Testing this hypothesis may clarify the relationship between consumption and credibility. Furthermore, an interaction between the first hypothesis and this hypothesis may be possible. For example, exposure to digital video post-production techniques may be related to the amount television consumption.

THE EXPERIMENT DESIGN

Experiments are typically carried out to investigate causal relationships. They maximize the researcher's control over a very limited set of variables. The main research question for the current project asks if the knowledge a person acquires about video manipulation techniques is related to perceiving television news as less credible. While the experiment's design is classic, the method of execution was novel in its use of new communication technologies for both the recruitment of subjects and data acquisition. This section describes the experiment's design and the selection of the samples and the construction of the experiment's stimulus. Several limitations on the design and execution of the research project will be addressed. Finally, I will discuss necessary university requirements for conducting ethical research on human subjects.

Design and implementation of experimental model

The experiment followed a classic, post-test only, control group design. This means a minimum of two groups of subjects were required to administer the experiment. Groups were created by random assignment of subjects to either the control or experimental group. As a result, the two groups could be compared without initially testing them for specific factors or attributes because the randomization ensures both groups are as equal as possible in their demographic composition. (Campbell and Stanley 1963; Babbie 2004) Subjects in an experimental group were exposed to a stimulus produced by the author of this dissertation, while subjects in the control group were not. The stimulus was the crux of the experiment as it was a short video that demonstrated post-production techniques for manipulating digital video content. Subjects who watched the entire video stimulus were assumed to have acquired knowledge about digital video manipulation techniques. Details as to what exactly appeared on the video are discussed later in this chapter.

Treatment, or its absence, upon the experimental and control group occurs in a parallel, rather than a serial, progression. Figure 3.1 abstracts the experimental design setup into a simple diagram.

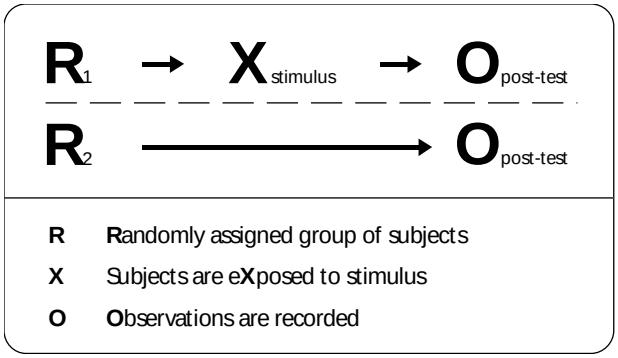


Figure 3.1: Abstracted Experiment Design Illustration

More concretely, the following illustration shows how subjects proceed through a laboratory setting while participating in this study (see Figure 3.2). Laboratory space was kindly donated by the *Technology and Information Policy Institute* at The University of Texas at Austin. The lab space allowed an administrator to guide the subjects through procedures in a secluded area so as to ensure the methodology remained consistent. In addition, the lab space gave subjects a quiet environment in order for them to concentrate fully on the video stimulus. Figure 3.2 shows the layout of the lab space and all utilities employed for the study.

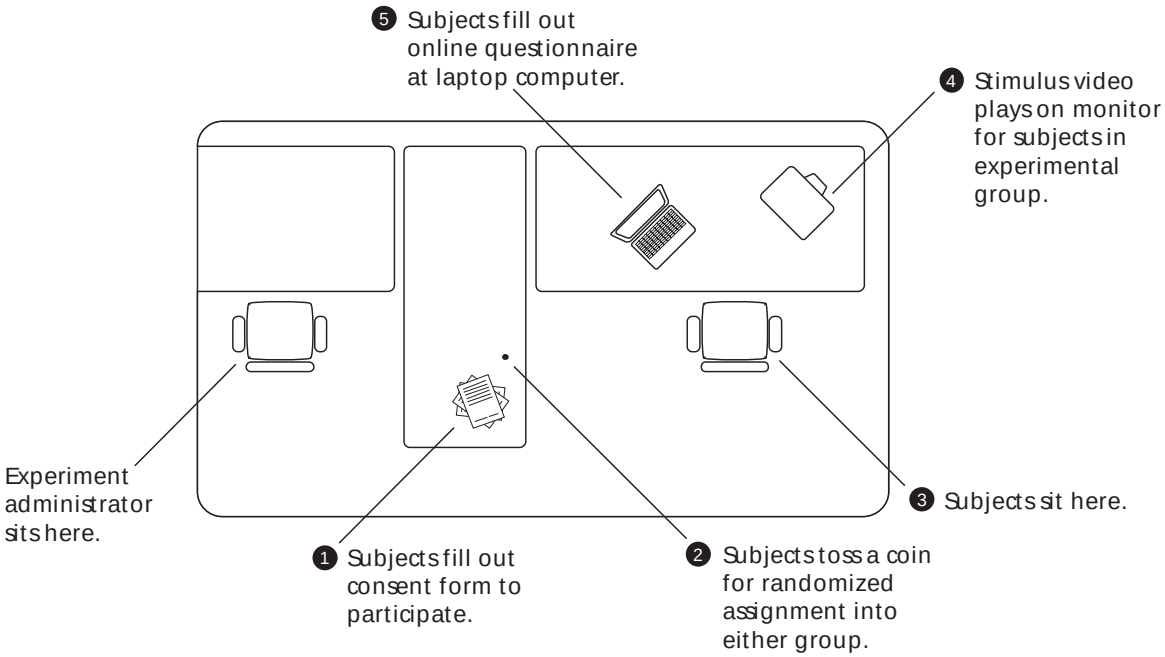


Figure 3.2: Top View of Laboratory Space for Face–to–Face Data Acquisition

A questionnaire on the laptop computer was submitted to an online database that stored all the answers to the questions and the subject's assigned group. This method afforded efficient data acquisition and integrity. Additionally, an interactive, computer mediated, survey eliminates the possibility of errors caused by human data entry. A pilot study to assess this methodology uncovered the potential for internal programming errors and allowed time to improve the online survey.[1]

In addition to this mode of data collection, the author of this dissertation developed and conducted an online version of the experiment. In this scenario, subjects visited a website with programmed navigation algorithms that guided them to appropriate

[1] If the program code for the interactive survey is incorrect it has the potential for creating errors across all data points. While a human may make one or two mistakes in the data entry of one hundred data points, incorrect program code for an interactive survey will make an entire set of data points invalid. Therefore, it is crucial to test the functionality of the online survey and how it records data. This can be done with any amount of individuals participating. This type of survey requires triple checking the program code for inconsistencies. Therefore, the survey used for this study was thoroughly examined for errors.

web pages. The experimental design remained the same as in Figure 3.1 above, but instead of participants visiting a laboratory setting, as in Figure 3.2, they pointed their World Wide Web browser to a website that directed them to a control or experimental group at random. After this, the subject proceeded through the online flow of the experiment as in Figure 3.3.

The random assignment of an online subject is based on a simple computational algorithm that determines if a randomly selected number is odd or even. Figure 3.4 shows the logic of this algorithm and its navigation scheme.[2]

[2] First, the computer randomly selects a number between the inclusive range of one through ten. After the random number is stored in computer memory, the algorithm divides that number in half to determine if it leaves a remainder. This operation is performed by invoking what is known as the modulus operator in a variety of computer programming languages. If a remainder exists after the modulus operation, the number is identified as odd and the visitor is tagged as a subject in the control group. When no remainder exists, the number is even and the subject becomes a member of the experimental group. All this activity occurs in the background once the user lands on the website's homepage.

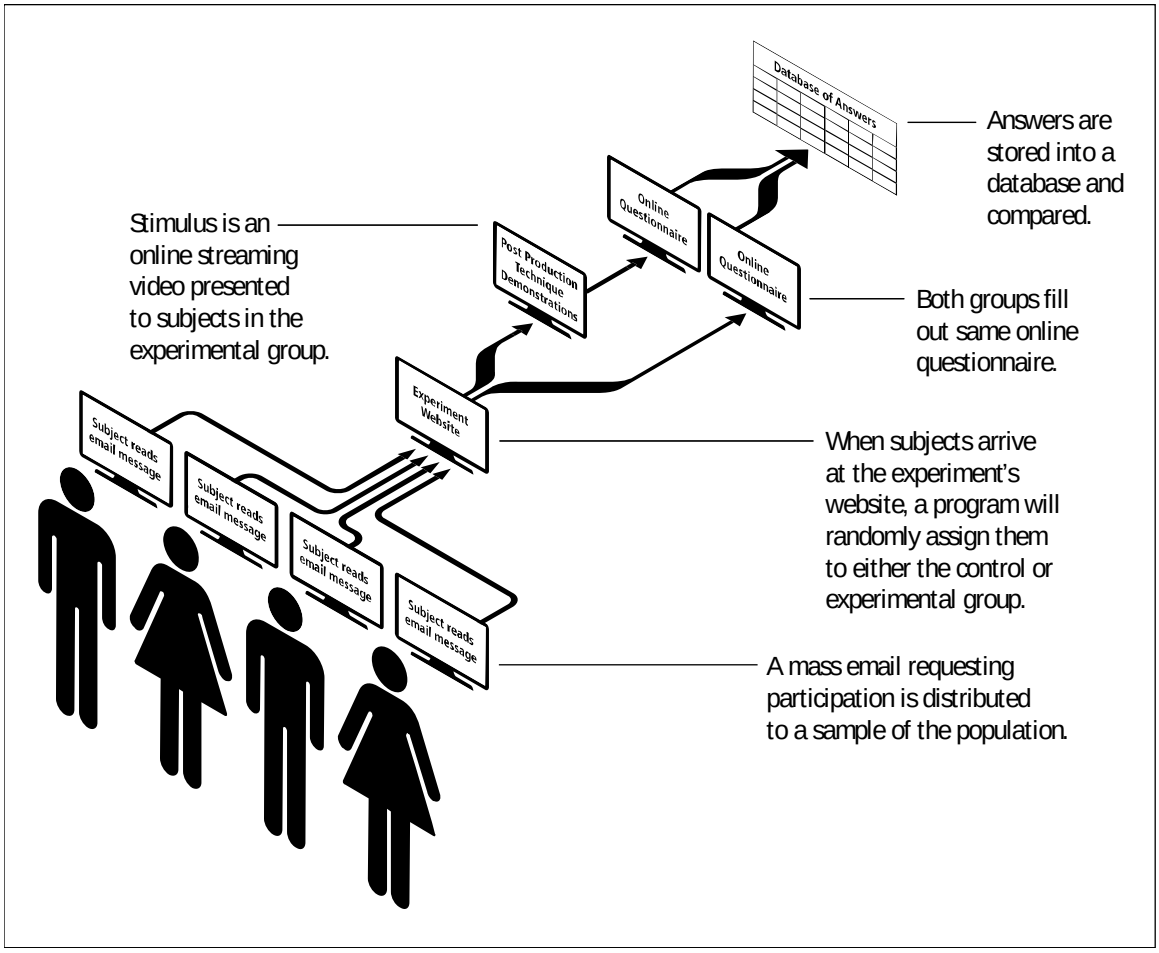


Figure 3.3: Representation of Online Website Flow for Data Acquisition

When a subject arrived at the website, the algorithm executed in the background, but the subject saw on-screen text asking for consent to participate in the study. The language used for this text closely matched the consent form used in the physical laboratory setting provided by the University of Texas at Austin. The main difference between the on-screen text and the printed consent form was that, instead of acquiring a signature from the participant, a button stated "I Grant Consent to Principle Researcher" was positioned below the text. Clicking this button ensured participants gave consent to

the researcher for capturing their answers to the questionnaire. After consenting to participation, control group subjects landed on the questionnaire web page and submitted

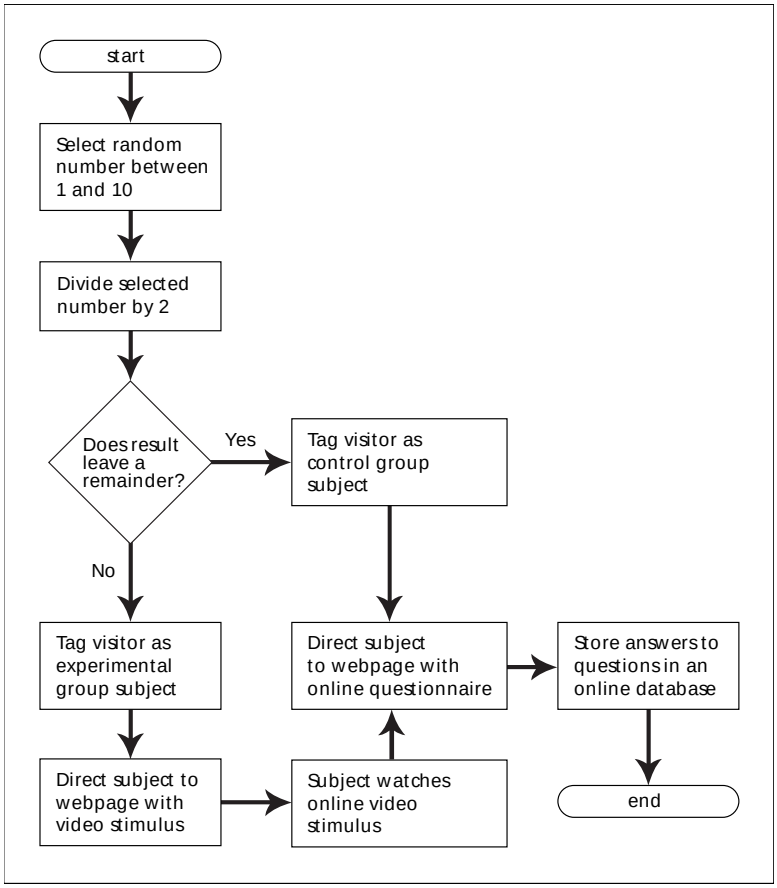


Figure 3.4: Algorithm Logic for Guiding Website Visitor through Experiment

their answers. Experimental group participants proceeded to a web page that displayed only a single streaming video of the same stimulus shown to subjects who entered the laboratory used in the face-to-face implementation of the design. The online video stimulus was encoded with Adobe Systems' Flash technology which allowed the video to send signals to the participant's web browser. This means that once the video had reached the end of playback, the web browser automatically directed the subject to the online questionnaire. No effort to interact with the website was required from any

subject, except for answering the online questionnaire. Figure 3.4 is a flow chart demonstrating the logic used to direct subjects into groups.

A subject who did not wish to sit through the online stimulus video could have exited the study simply by abandoning the site—either by closing the browser window, typing in a new web address, or by ignoring the video and the questionnaire when it displayed on screen. It is probable this behavior occurred for a number of cases since, as noted later, the number of subjects in the online experimental group was much smaller than that in the online control group. What is certain is that only subjects who watched the online video in its entirety could proceed to the questionnaire. A subject in the online experimental group could not otherwise land on the questionnaire web page. This was further ensured by attaching a cryptic code to the universal resource locator (URL) for the questionnaire's web page that was used to verify whether or not a subject had seen the video in its entirety.

While this may seem to hamper the internal validity of the experiment, the response rate for the online methodology was high enough so that it was not a problem. Out of approximately fifty thousand emails sent, 821 individuals submitted their online, self-administered, questionnaires.[3] This amounts to a 1.6% response rate, which is significant given the nature of the email "marketing" of the study and the absence of any incentive for participation.[4]

The most problematic issue with this design is that a subject could perform multiple tasks on their computer while the video played on in their web browser. This introduces internal validity problems related to the experiment's instrumentation. While it is possible to make the web browser maximize to full screen, thereby eliminating other

[3] Even though 821 participants submitted an online questionnaire, 100 of the participants entered "other" for their academic class and were therefore excluded from the sample for study.

[4] The email addresses were acquired from a private marketing company that collects college student email addresses from across the United States.

programs, it does not guarantee that a participant will stop using other programs during playback. To minimize this problem, a short textual message was displayed that showed the duration of the video and that after the video played, they would proceed to a questionnaire.

Population and sampling logic

For the present study, the scope of the population was the entire undergraduate and graduate student population at The University of Texas at Austin (UT Austin). While there are limitations to sampling from this population, UT Austin has one of the largest and most diverse student bodies in the United States. In February 2006, it was estimated that UT Austin had enrolled approximately thirty-five thousand undergraduate and twelve thousand graduate students (Meckel 2006). This figure is particularly significant for the online implementation of the experiment design since a message requesting participation was sent to nearly fifty thousand email addresses in order to recruit participants.

Since this study relied on available subjects within the population, it employed non-probability sampling methods as opposed to probability sampling methods. Non-probability samples are not representative of the overall population as are probability samples. Thus, caution should be taken in generalizing the findings from the studied samples at UT Austin to all college students. While this may seem problematic, the findings from this experiment still point to a relationship between knowledge of post-production techniques and perceived credibility of television news. Social scientific experiments typically recruit a small number of subjects, and as a result, "probability sampling is seldom used in experiments to select subjects from a larger population" because of the administrative efforts and costs that would incur to manage subjects in

control and experimental groups. (Babbie 2004, 226) Indeed, random assignment is the design alternative in the experiment to probability sampling in the survey. Probability sampling methods are usually employed for large-scale research survey studies rather than experiments. (Babbie 2004) Demographics for the groups formed in both implementations of the experiment are discussed in the following sections.

Recruitment of subjects

Several steps were taken to recruit subjects. First, permission to conduct research on human subjects was needed to begin recruiting. UT Austin's Office of Research Support and Compliance (ORSC) granted permission to administer the experiment. Obtaining permission required that participants not be asked for any personal information during data acquisition, and that the names of participants remain confidential. The ORSC required the online database that stored answers to the questionnaire be kept confidential and secure. This means that no other person besides the researcher could access the data without permission from the researcher. Subjects filled out a consent form granting the principal researcher permission to use their data collected from their responses to items in the present study's questionnaire. See the consent form that subjects filled out or agreed to online in Appendix B.

For the face-to-face implementation of the experiment, an announcement about the study was made in a high enrollment university course entitled *Introduction to Media Studies* in the department of Radio–Television–Film at UT Austin. An extra credit incentive of one percent of the students' overall grade was offered to any student who wished to participate. The announcement did not specify the present study's central research question, but did mention requirements for participation and that it was a "Media Effects" study. By ensuring subjects gained little knowledge of what was specifically

being examined, the procedure minimized bias in answering questions during the study, thereby increasing the internal validity of the experiment.

To participate in the face-to-face experiment, a registration website was implemented that displayed available time slots for participation in the laboratory. Having an online registration system provided an efficient mechanism for students to choose a convenient and available time slot to come into the laboratory. Tracking the students from registration to participation was also efficient due to an auto-email sent to both the experiment's administrator and the registered student. In addition, it helped track which students were to gain extra credit for their participation. Most importantly, requiring students to submit their working email address cancelled the possibility of including those students in a mass email sent to UT Austin's student body asking for their participation in the online implementation of the experiment.

Recruiting subjects for the online implementation of the experiment was a much different proposition. The first step was to secure a valid list of email addresses for all students—undergraduate and graduate—enrolled at UT Austin for the Fall 2006 semester. Administrators from UT Austin were hesitant to deliver such a list because of the potential risk to abuse it. Therefore, the email list was acquired from a private entity that collects student email addresses from major universities across the United States each semester used in marketing campaigns.

Once the list was secured, the next step involved drafting an email asking for participation. As no incentive was given to participants, the email used "school spirit" as the linchpin for attracting students to the experiment's website. UT Austin's school colors and Longhorn emblem were used in the design of the mass email. Additionally the email stated that the researcher "looks forward to sharing the results to the larger academic community," thereby making potential participants feel as though they would

be adding value to the scholarly world. The final email sent during the late night hours of December 4th, 2006, as approved by the ORSC at UT Austin, is shown in Appendix A.

The recruitment email was sent to approximately fifty thousand student email addresses over the course of two days. Only a portion of all the individuals who were sent the email actually received the message due to various bulk mail filtering programs. Fewer people opened the email after reading the subject line, and even fewer took time to visit the website in order to participate. Even so, with a massive amount of emails sent, the sample was sufficiently large (*N = 721*).[5]

THE VIDEO STIMULUS

This chapter shows and explains—in a non-technical manner—the content appearing on the video stimulus. The stimulus was created by digitizing a video tape recording of a broadcasted news program. Next, manipulations were performed on the various segments of the footage. Finally, the stimulus video was edited into a cohesive package divided into two parts, with a total of five technique demonstrations, and burned to a standard digital video disc for playback. The organization of the technique demonstrations ensured subjects could easily comprehend the material.

[5] While this email was not intended to be "spam," some recipients exhibited distress after having received the email. Within this group, some recipients were outraged after learning their email address was made available to an academic researcher and threatened to report the experiment's administrator to campus authorities. In contrast, other recipients wrote to the experiment's administrator with enthusiasm about the study after they completed the experiment. A different set of problems arose when many of the email addresses on the list were found to be invalid. As a result, several email servers sent an extremely high number of bounce-back messages to the experiment administrator's inbox. This increased network traffic for the internet service provider who hosted the email address for the study. Technicians from the internet service provider contacted the experiment's administrator with a warning that the account through which the email was being sent would cease to exist if there was no justification provided to them for the high network traffic. An important lesson to be learned here is that recruitment of subjects in this manner requires a unique email address for the sole purpose of sending a mass email. Additionally, network activity should be monitored during and after the mass email is distributed.

Source footage options and selection

Source footage for the stimulus was digitized from an analog video tape recording of a 1996 Public Broadcasting Station (PBS) news program, *Frontline*. Focusing on the 1990 Gulf War, this news program showed a range of footage that included interviews with politicians, prisoners of war, protester rallies, and damage to cities in Iraq. The video tape recording was generously provided by the archives at The Instructional Media Center in the College of Communication at UT Austin. Footage from the national, commercial, television networks was not selected for this study for a few reasons. To begin, PBS footage is not tampered with as much as other networks' footage. Relatively few textual and graphical overlays appear on the screen during a PBS news broadcast. While the cleanliness of the imagery may be due to *Frontline* producers' aesthetic choices, PBS has little interest in beating out competition by adding "bells and whistles" to their imagery. This is in part because PBS is funded by its community of viewers and the United States government. Because of its financial backing, audiences may consider PBS not only more critical, but also more credible than commercial network news.

Several options existed for selecting footage, but a news broadcast was appropriate due to its relevance to the present study's central research question regarding perceived credibility of television news. While footage from a different type of broadcast—a documented nature show for example—may have demonstrated a technique more purely, it may not have revealed the power of what is possible in television news post-production suites, thereby rendering the stimulus ineffective for the purpose of this study.

News footage about war was suitable for this study because hard-news, as opposed to soft-news, is generally considered to be more serious, urgent, and credible. Audiences are less likely to consider that hard news' visual dimension undergoes

alteration.[6] Archival footage was selected over recent footage because it included visual noise resulting from videotape wear and tear thereby posing a challenge to simulate the inherent visual noise during the manipulation process. Visual noise is part of analog video's aesthetic, and to make the stimulus perceptually more "real," visual noise was synthesized during the compositing process. Additionally, using archival imagery could signal to the subjects the possibility that false memories can be created as a result of altering moving images that were recorded in the distant past. This would essentially result in a more effective stimulus because television news broadcasts sometimes include archived footage in order to substantiate their claims.

Using originally produced footage could have made the stimulus seem less professional in its broadcast quality aesthetic. In this case, subjects who participated in the experiment may have inferred that techniques to alter video would not be applied to professionally shot imagery for news broadcasts thereby rendering the stimulus ineffective. However, the fifth and final technique demonstration discussed below used originally produced footage that was shot from an airplane on a consumer grade digital video camcorder. This was to demonstrate that amateur video imagery could be altered for specific contexts in national broadcasts. Indeed, the task for deciding what footage to use in the stimulus proved difficult because it had to simultaneously demonstrate a compositing technique in its purest form without letting the content of the footage influence the viewer. After choosing the footage to manipulate, the next task involved converting it to a digitized format.

[6] Reaves (1995) found that, "ethical dilemmas for editors will most often fall into soft-news categories" (707).

Digitization and software tools

Digitization refers to the process of converting an analog medium to a digital medium. Analog media are "analogous" to physical disturbance patterns occurring in nature. For example, the ridges on the surface of a vinyl record album are analogous to continuous sound waves passing through a microphone. Likewise, the arrangement of emulsion molecules on film is an analogous representation of light reflecting off objects in the physical environment. Media that capture analog signals are physically and literally transformed in a real-time, continuous manner. This malleability causes analog media to degrade over time. Performing any operation on or with an analog medium causes the quality of its record to diminish significantly. For example, recording a portion of an analog video tape onto a blank one will cause the source tape to degrade, and the image found in the new tape will be of poorer quality when compared to the original source. However, digitization makes it possible to manipulate video without degrading its quality because it is a process that converts analogous representations to abstract symbols—specifically RGB vectors.

While analog media abide by the laws of nature, digital media are bounded by the laws of logic and mathematics. Still, it can be argued that all media are physically malleable, including digital media. To be sure, optical discs, magnetic tape, and solid state memory chips undergo some type of physical transformation as signals are recorded. Even so, the method by which digital media is transformed is dictated by a strict set of rules and is therefore very structured and precise. For example, light that passes through the lens of a digital video camera is converted into RGB vectors by algorithms embedded into circuits within the camera itself. After the conversion, another algorithm signals a hardware device which then forms rigid patterns on an optical disk. These patterns will later be decoded by a playback device. For visual reference, Figure

3.6 shows a microscopic view of the underside of a compact disc; notice the precision of the arrangement of divots formed by a laser beam (IN-VSEE 1999). These digitization algorithms, arbitrarily coded by humans, are what make an image a symbolic representation instead of an analogous one. The image, in effect, is converted to code rather than an analogous representation. The process of encoding a communication signal into a symbolic and syntactic language, only to decode it later, is not unlike processes used by telegraph operators to create and interpret Morse code. The main difference is that a computer, as opposed to a human, performs the encoding and decoding with a level of precision and density that a human cannot achieve.

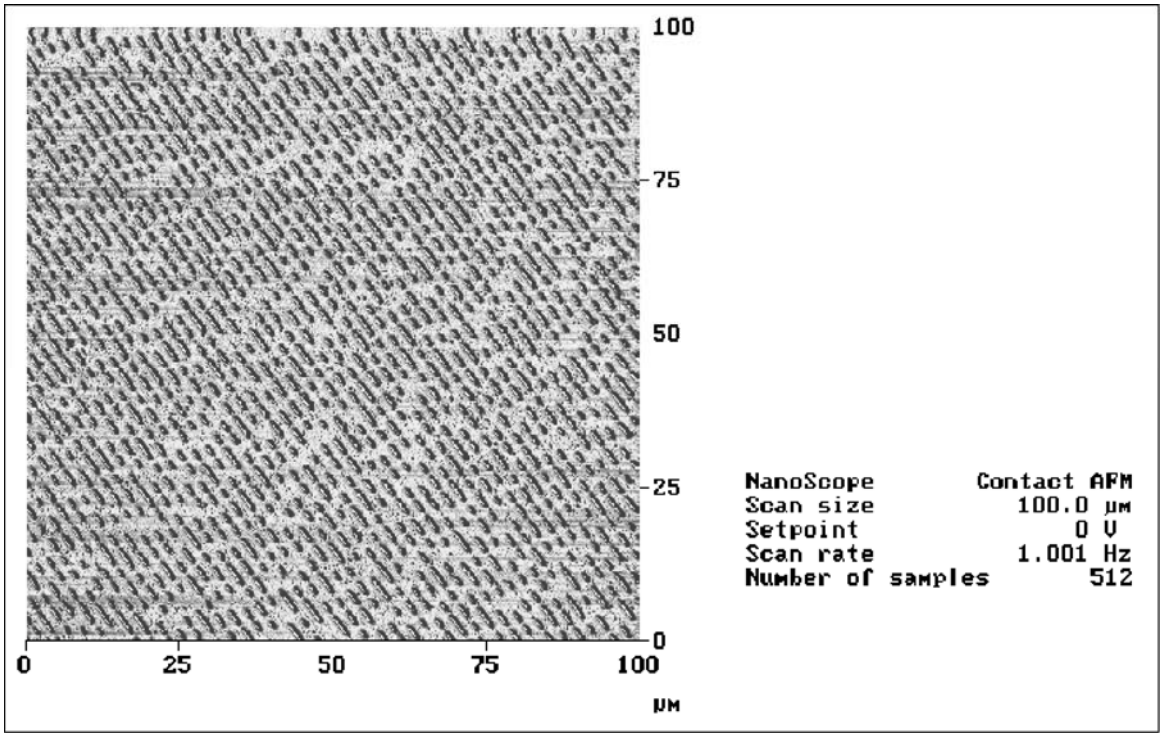


Figure 3.5: Microscopic View of the Underside of a Compact Disc
Source: The IN-VSEE Project; Arizona State University, 1999.

When replaced by symbols, an analogous representation becomes an "operand." As an operand, an image is manipulated by altering abstract symbols (i.e. RBG vectors)

in an abstract manner (i.e. interacting with compositing software). Digital images exist in a "numerical vacuum" and may only be affected by tools that are "native to" this same numerical space. McCullough (1996) writes about this notion:

> In processed symbols we have a basis for formal reasoning. This power comes from the fact that, when replaced by a symbol, an object becomes a mere operand. As an operand, it may be manipulated in an abstract manner, such that the syntax of forming consistent expressions, rather than any representational significance of the symbols, governs the formation of new expressions. And as shown in the example, an operand used in such a formal system may be transformed to suggest a new meaning for which there is no object—no previous external significance. (87)

With digital imagery, abstraction is the means to representation. This means that, at its core, digital video compositing is a practice that includes tasks for rearranging and modifying abstract symbols—or, more precisely, numbers. This makes the digital image less immune to physical degradation from haptic compositing operations upon analog media.

McCullough's argument is significant for two reasons in the context of manipulating digital imagery. First, it suggests that residue from operations performed on analog media is different from residue left after operations performed on digital media. For example, when compositing with an optical printer, a filmstrip may get slightly scratched, burned, faded, or marked. This is not a problem when compositing imagery with a digital processor that never "touches" the actual image. Compositing digital imagery is less risky than compositing film because the digital exists in a space that is forgiving of mistakes and immune to physicality. Thus, the digital medium is the first to allow people to "undo" actions without leaving traces. The possibility of damaging film or distorting analog video with compositing operations is a non-issue for digital video. Therefore, it is best to composite images in digital form because residue left over from operations is more effectively hidden. Several researchers have noted that

digital alteration of still imagery is difficult to detect and is a seamless process within a photo editor's workflow. (Reaves 1995; Greer and Gosen 2002; Hantz and Diefenbach 2002; Farid 2006) For the reasons explained above, the 1996 analog VHS tape recording of *Frontline* used to produce the video stimulus in this experiment was digitized so that any alteration performed on the video footage would not further degrade the image quality.

Adobe Systems' non-linear editing software, *PremierePro 2.0*, running on the *Microsoft WindowsXP Professional* operating system was used to convert the VHS tape of *Frontline* to digital video files stored on a computer workstation's internal hard disk. After digitization, Adobe Systems' digital video compositing software, *AfterEffects 7.0*, was used to perform the video manipulation techniques. *AfterEffects* and *PremierePro* are mature software applications that are compatible with standard consumer desktop computers. These applications were used for this study because of their low barrier to entry for the average consumer who wants to learn digital video editing and compositing. Techniques demonstrated in the stimulus may be recreated by individuals with a nominal amount of knowledge about standard digital video compositing software. Altering digital video imagery with these particular software applications is simple and relatively inexpensive, and this makes the demonstrated techniques all the more significant to this study. Employing esoteric, or high-end, compositing software in the production of the stimulus would render it difficult for other researchers to reproduce a similar stimulus for further examination of the present study's research question.

Organization of stimulus and demonstrated technique overview

The stimulus was divided into two parts. Techniques used to alter moving images in the first part of the stimulus are based on methods used for manipulating digital *still*

imagery that emerged alongside the early development of digital imaging software. The second part of the stimulus included techniques that are unique to altering *moving imagery* and are relatively new. Organizing the stimulus in this way provided a point of departure from previous research that focused solely on studying the manipulation of digital still imagery. In addition, the techniques presented were progressively more difficult from the perspective of a practitioner. Each technique showed operations from previously demonstrated techniques. With this organization of techniques, a person may have more clearly understood the final technique once they had already viewed the previous five.

Techniques used in the stimulus were selected for their potential likelihood of abuse in a television news post-production room. As television news stations require fast turn around times for developing packaged news information, very little time remains for an operator to work with video imagery after it passes through an editorial session. Some video manipulation techniques, while extremely powerful, take a great deal of time to master and require teams of people to perform. Imagery resulting from such advanced techniques requires producers to schedule additional time to "fix" the imagery's flaws that may clue viewers into the imagery's artifice. It is improbable that such advanced techniques would be in use at television news studios, much less developed by professionals working there. Techniques in this superior class are typically researched and developed at academic institutions or visual effects studios and are commonly utilized in Hollywood blockbuster spectacles. In contrast, the simple techniques used in the stimulus could easily integrate into a television news studio's production workflow.

The following list enumerates the general category of techniques used in the video stimulus. Following the list, a discussion of each technique is presented.

1. **Masking**: The deliberate hiding of visual material within the image's frame.
2. **Keying**: A mechanized masking process that hides material within a series of frames.
3. **Rotoscoping**: A manual masking process over a series of frames.
4. **Artifacting**: The process of synthesizing video by invoking computational algorithms that alter captured video footage.
5. **Motion Tracking**: The invocation of a computer vision algorithm that follows and records a moving feature within digital video footage.
6. **Matchmoving**: The utilization of motion tracking information to seamlessly integrate computer generated imagery into captured video footage.

The first part of the stimulus demonstrated techniques involving simple masking and keying operations. Masking removes existing areas of the digital video frame and effectively renders those parts as black pixels. In general, video inside a mask becomes black, while the video outside the mask remain the same. The process of "keying" an image is essentially a mechanized masking technique. With keying, an algorithm generates a shape shifting mask for every frame of video based on several parameters defined by an operator. The most popular parameter is color choice. Green or blue is typically entered as a color to "key" out because many productions film objects or actors in front of luminescent blue or green screens. However, other parameters may be used to create keyed imagery, not just color. Bright pixels, in contrast to dark pixels, may be used as a parameter in the keying process. Masking and keying operations are used in conjunction because a keying algorithm can waste time analyzing part of an image that

could easily be masked out by an operator. For this reason, keying operators will initially create a "garbage mask" around objects that are non-essential for the keying operation.

A digital video mask is the same as any other type of digital video, but it is utilized within a compositing operation rather than simply being displayed. This means that a digital video mask is may be considered a *tool* rather than something to be perceived by audiences. Digital compositing applications regard pixel data in digital video masks as instructional information rather than display information. In this sense, digital video masks control which pixels are hidden and which are revealed within the masked video footage. The controlling mechanism of a digital video mask is explained in technical detail in the Appendix under A.2.

One should not necessarily conceive of digital video masks as static control images. Rather, it is best to conceive of composite digital video as a refined animation of visual elements in a moving collage. Digital video masks used to composite video elements are not typically static because the visual elements being masked are usually moving within the frame. Masks are animated by a compositor to follow a visual element's motion over the duration of video footage. In the visual effects industry, this process is known as "rotoscoping"—a term borrowed from the name of an old technique whereby cel animators traced visual elements on celluloid film frames. The fact that masks can be animated over time is the essential difference between compositing still imagery and moving imagery. Problems associated with masking a still image are multiplied when the image begins to move, but computers solve these problems quickly. The mechanization of the masks' animation by a computational algorithm is what makes digital video compositing powerful.

After the demonstration of masking in the stimulus, techniques using motion tracking and artifacting operations were shown. Artifacting is defined here as the

combination of computer generated imagery with digital video captured by a camera. While compositing, an operator can invoke a single algorithm that alters each frame of video in the same fashion. Such an algorithm creates an effect in the video footage, thereby leaving a "digital artifact." Blurring a digital video image sequence is an example of this artifacting technique. Combining computer generated graphics with digital video through the use of simple matrix algebra calculations—known as "transfer modes"—is another way to artifact digital video imagery. A compositor can also apply masks in order to affect isolated areas of an image. For example, an edge mask isolates the edges of a matted foreground image onto a separate background image so that a compositor can concentrate on finessing the integration of the foreground element with its new background. Artifacting techniques can make computer generated imagery composited with digital video appear as if they were captured by a camera at the same place and time.

Motion tracking, a technique in which a computer program follows and records a feature within the digital video frame, was originally developed through support by the U.S. Defense Department for use in missile guidance systems. (Brinkmann 1999) This technique is founded on computer vision algorithms that seek and track contours and color variations within a digital video frame. Matchmoving is a related technique that utilizes motion tracking information to calculate the three-dimensional position of a two-dimensional visual element within a video frame. When the movement of a visual element is tracked over time, a compositor can seamlessly integrate computer generated imagery into the three-dimensional space represented in the video frame. Compositors typically use matchmoving when replacing signage or labels on objects within a moving video image. The technique is often used during post-production of television commercials for everyday household products and alcoholic beverages. This is because

brand labels of products often change between the time they are actually photographed on set to a commercial's post-production phase. Matchmoving is a relatively new technique for lower end compositing software applications, but due to simplified interface and interaction design, the technique is relatively easy to learn and execute.

Explanation of digital video manipulation demonstrations

In this section, we will consider the imagery that appeared on the video stimulus and the steps of each technique.[7] It is important to examine the stimulus and techniques used to create it because previous media credibility research has failed to provide detailed descriptions of video stimuli. By including explanation of the stimulus, I provide scholars and researchers with a full description of the subjects' experience in the study. Recording and explaining the techniques used in this stimulus may encourage researchers to demonstrate different techniques in future studies or to improve upon the quality of the stimulus used in this study.

Technique Demonstration 1: Changing Colors on a Necktie

This technique demonstrates the process of altering colors within digital video footage by employing a simple mask. Industry professionals know this technique as "color correction" because the process involves the deliberate correction, or alteration, of color values within digital video footage. The source footage used in this demonstration shows a man wearing a red necktie ("plate A"). The objective for this demonstration was to change the color of the necktie to blue. To achieve this, plate A is multiplied by a mask (plate "M"). Then, the revealed pixels undergo a hue shift by suppressing their red

[7] The video stimulus produced by the author of this dissertation is available for viewing online by visiting the following web address: http://www.credibilityresearch.net/video.php.

color values while increasing their blue color values. Finally, the Over operation was performed using the original plate A and the color corrected version of plate A.

Illustration 3.1.1 Input plate “A”

Illustration 3.1.2 Masked plate “A”

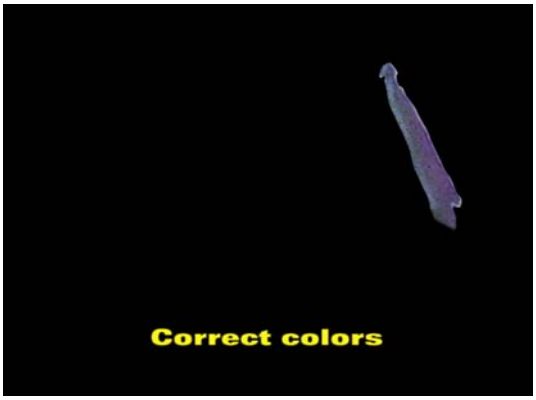


Illustration 3.1.3 Color correction on plate “A”

Illustration 3.1.4 Corrected plate “A” over “A”

Illustration 3.1.5 Before and after comparison

Technique Demonstration 2: Altering a Skyline

This technique shows how a visually chaotic element, such as smoke, may be extracted from digital video footage and composited onto different video footage. Two source footage clips are used in this demonstration. The first clip shows a skyline with demolished buildings ("plate A"), while the second clip shows a thick trail of smoke emanating from behind a distant skyscraper ("plate B"). The objective for this demonstration was to present the buildings in plate A as recently demolished rather than having occurred in the distant past. To achieve this, the trail of smoke in plate B was composited with plate A. The technique used to achieve this first involved generating a mask around the trail of smoke in plate B. Once masked, the revealed pixels were keyed out for luminance so that only the darker pixels that comprised the smoke were revealed. Next, invoking the Over operation allowed the isolated trail of smoke to be composited atop the skyline in plate A. The smoke trail was duplicated, translated, and scaled so that it would integrate more realistically with the skyline. Finally a small area of plate A was composited atop the smoke trails for more apparent depth in the final output video.

Illustration 3.2.1 Input plate “A”

Illustration 3.2.2 Input plate “B”

Illustration 3.2.3 Masked plate “B”

Illustration 3.2.4 Keying “B” for luminance

Illustration 3.2.5 “B” transformed over “A”

Illustration 3.2.6 Masked plate “A”

Illustration 3.2.7 "A" over "B" over "A"

Illustration 3.2.8 Before and after comparison

Technique Demonstration 3: Changing a Background

This technique demonstrates the replacement of imagery that appears behind a main foreground element. Two source footage clips were used in this demonstration. The first clip shows a prisoner of war in front of a solid white wall ("plate A"). The second clip shows demolished buildings ("plate B"). The objective for this demonstration was to replace the wall behind the prisoner of war with the imagery of demolished buildings. Achieving this will make the prisoner appear as if he was in a different location than where he was originally photographed. To perform this technique, a basic mask is generated around the contour of the prisoner of war in plate A. Next, plate A is composited over plate B and is subsequently keyed for the white color. Keying out the white wall effectively isolates the prisoner of war figure. To clean the edges around the prisoner's contour, a "Find Edges" operation was invoked on plate "A" which essentially generates a mask around the edges of an input plate. The edges were smoothed out by invoking a blur operation on the edge pixels. To account for different

lighting in the plates, plate A was color corrected so that the prisoner of war's colors matched the background. Color correction was achieved with a simple "Levels" operation which allows a compositor to adjust the intensity of the individual color components in each pixel on plate A.

Illustration 3.3.1 Input plate "A"

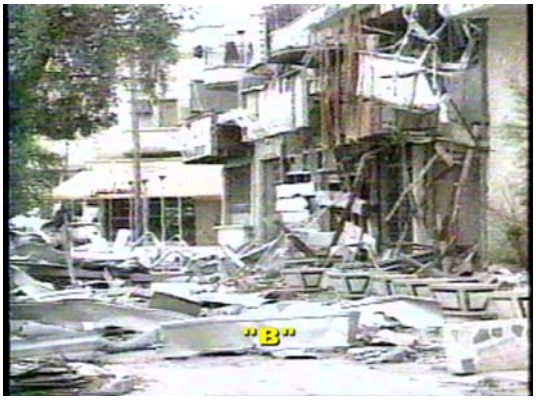


Illustration 3.3.2 Input plate "B"

Illustration 3.3.3 Masked plate “A”

Illustration 3.3.4 Plate “A” over plate “B”

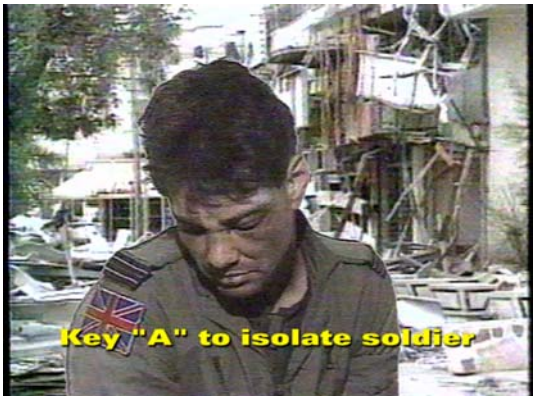


Illustration 3.3.5 Key “A” for luminance

Illustration 3.3.6 Edge mask for “A”

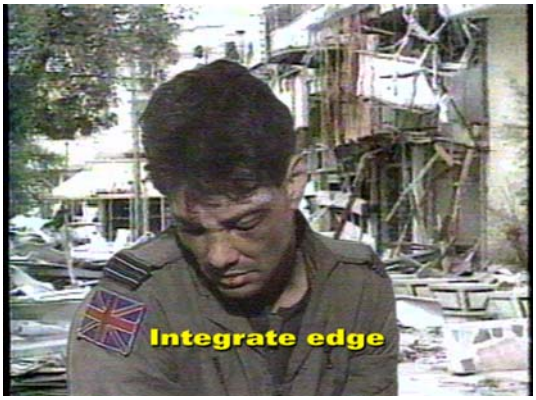


Illustration 3.3.7 Integrated edge

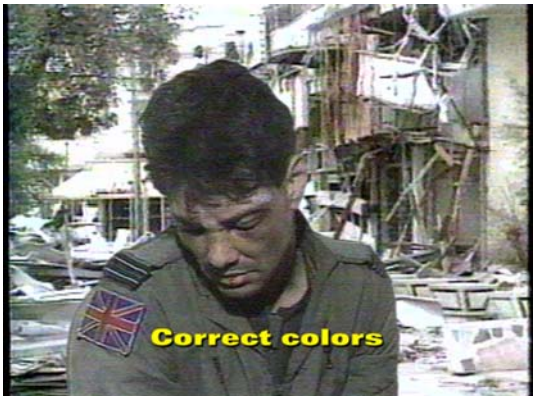


Illustration 3.3.8 Corrected colors

Illustration 3.3.9 Before and after comparison

Technique Demonstration 4: Changing Text on a Poster

This technique demonstrated matchmoving in the context of a protest. A single video clip and an original digital illustration were used in this technique. The video clip showed a group of people carrying posters that had various slogans protesting war ("plate A"). The digital illustration was a black and white still image of a written slogan ("plate B"). The objective for this demonstration was to replace the slogan appearing on a poster in the video clip with the slogan appearing on the digital illustration. To accomplish this, the four corners of the poster in plate A were tracked over time. This recorded the poster's position, scale, and rotation in three dimensional space to the computer's memory. Based on this tracking data, a mask was generated around the contour of the poster and matched to the poster's position, scale, and rotation for every frame of the video clip. This digital mask was multiplied by plate A which isolated the poster element. Next, the digital illustration's scale, position, and rotation were animated so that it matched to the movement of the mask. The animated digital illustration was composited over plate A so that it appeared over the photographed poster. Visual noise

was applied to the digital illustration to match the quality of the plate A. To integrate the poster more realistically, a duplicate of plate A was masked so that the pixels making up a person's head—who appeared in front of the poster—were isolated. The masked duplicate of plate A was composited over the matchmoved digital illustration to further integrate with the scene.

Illustration 3.4.1 Input plate A

Illustration 3.4.2 Tracking poster corners

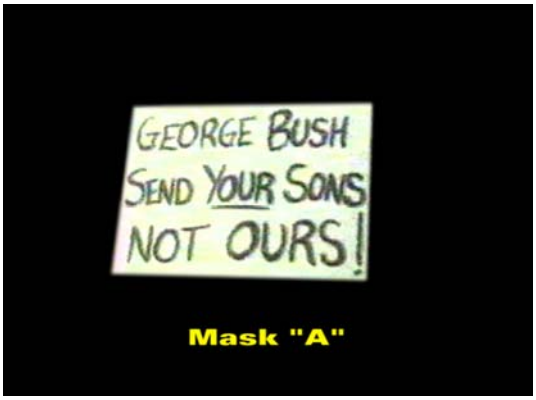


Illustration 3.4.3 Masked A with tracking data

Illustration 3.4.4 Matchmoved illustration "B"

Illustration 3.4.5 Input plate “B” over “A”

Illustration 3.4.6 Masked “A” for overlap

Illustration 3.4.7 Head element over composite

Illustration 3.4.8 Before and after comparison

Technique Demonstration 5: Creating Signal Transmission

This technique demonstrated image stabilization and the process of combining effecting techniques to create a visual style. This demonstration made use of a video clip and a black and white digital illustration. The video clip was an aerial view of a construction site and was captured with a standard consumer grade camcorder (“plate A”). The digital illustration was an arrangement of lines, letters and numbers so that it appeared to be a reticle found in the scope of an optical instrument (“plate B”). The

objective of this demonstration was to make plate A appear to be transmitted from a missile guidance system. Achieving this meant that any jitter in the aerial footage would need to be eliminated. Stabilizing the image involved tracking two features in the footage so that position and rotation of the camera was recorded to the computer's memory. The center point of plate A was animated to match the camera's position information. This eliminated jitter, but introduced artifacts on all sides of the frame because the image was offset from its original position after the stabilization. Fixing this led to increasing the scale of the image, but doing so resulted in stair-stepped edges in various parts of the image. This was fixed by applying a simple blur and contrast operation. Colors in plate A were inverted and shifted to give the appearance of night vision binoculars. The digital illustration was multiplied by plate A so that the reticle appeared atop of the video. Finally, visual noise with distortion was applied to the composition.

Illustration 3.5.1 Input plate "A"

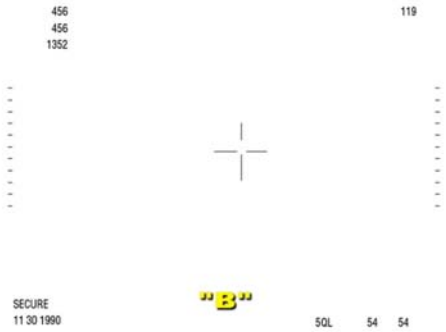


Illustration 3.5.2 Input plate "B"

Illustration 3.5.3 Motion tracking plate “A”

Illustration 3.5.4 Plate “A” stabilized

Illustration 3.5.5 Plate “A” scale increase

Illustration 3.5.6 Blurring plate “A”

Illustration 3.5.7 Altering contrast in plate “A”

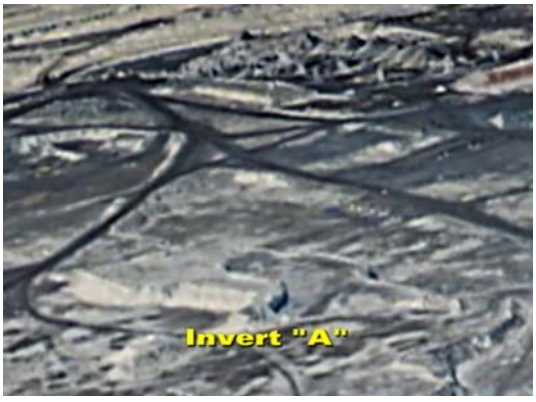


Illustration 3.5.8 Inverting colors in plate “A”

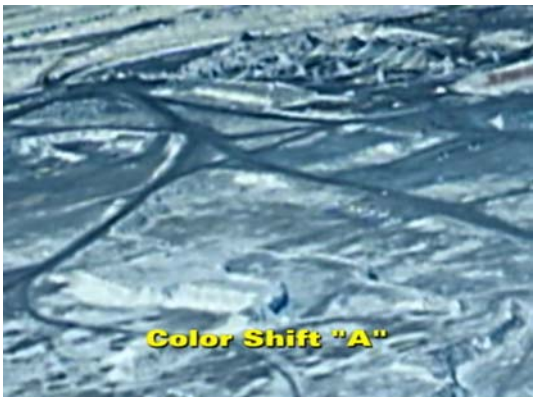


Illustration 3.5.9 Color shifting plate “A”

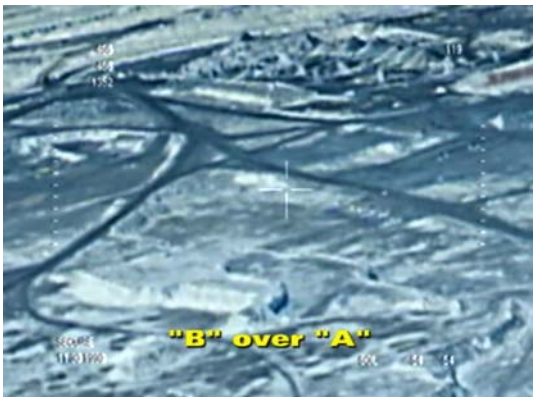


Illustration 3.5.10 Plate “B” over plate “A”

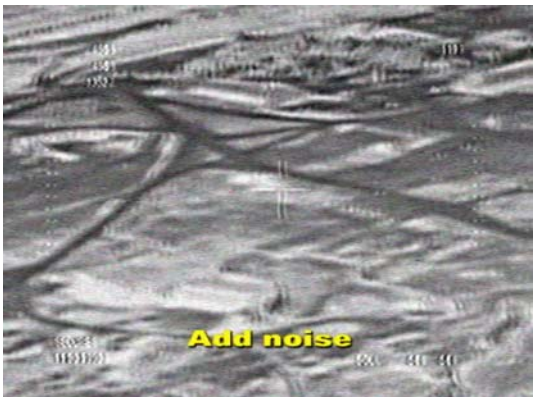


Illustration 3.5.11 Noise applied to composite

Illustration 3.5.12 Before and after comparison

THE QUESTIONNAIRE

The questionnaire was designed to evaluate the specific research questions and hypotheses. It consisted of ten questions designed to assess subjects’ perceived credibility of television news, questions on media use, and demographic items. As a foundation, the design of the questionnaire looked to previous research methodologies

from studies conducted within the field of media credibility. In this context, the questions were aimed at understanding the knowledge, attitudes, and practices of participating subjects. With regards to practices, the survey had questions on how subjects interacted with the news media. Attitudinal questions were essential to directly assess perceived credibility since, as mentioned earlier, attitude strongly influences perception. Questions assessing knowledge uncovered whether or not a subject had either comprehended, or became familiar with, techniques demonstrated in the video. See Appendix B for the complete questionnaire.

Subject input was recorded to a MySQL database hosted on www.credibilityresearch.net. This was achieved using a PHP application interface to the database. After the study was conducted, the database was exported as a Microsoft Excel spreadsheet to a personal computer. Some subjects within the online sample identified themselves as neither graduate nor undergraduate students. These respondents' records were deleted from the spreadsheet because they were not part of the target population for the study. The Excel spreadsheet was then imported into SPSS for data analysis.

Organization of the questionnaire

As mentioned in the conceptualization section of this chapter, previous research has conceived of credibility as a multi-dimensional construct. On one hand, an individual gauges credibility with regard to the actual media content, but the same individual may also consider factors outside the actual content such as the value system of the source of the media content. For this reason, a few questions assess the subject's level of skepticism regarding media. These questions helped distinguish subjects who may be more or less susceptible to the effects of the video stimulus. If a subject in the experimental group entered the study already being critical of the media, the video

stimulus may have affected his or her perception only nominally; the opposite may be true for a subject less skeptical of the media. These questions were especially appropriate given that that the experiment was conducted in a time when still photo manipulation was a prominent subject in the mass media.[8]

The ordering of questions was also carefully considered to enhance the internal validity of the experiment. For example, if the attitudinal questions regarding media credibility were ordered first, experimental subjects could have figured out what the questionnaire sought to evaluate after having immediately watched the video stimulus. Overlooking this issue could have reduced the internal validity of the experiment's data simply due to the instrument design. Therefore, the attitudinal statements were placed in the middle of the questionnaire. To make the questionnaire more engaging, duller questions requesting demographic data were placed toward the end of the questionnaire.

Ensuring subjects entered valid data was accomplished by implementing error checking algorithms into the online questionnaire. When the subject clicked the "submit" button on the questionnaire page an error message was displayed next to a question that might have been skipped, or by one that contained an invalid character typed into an input box. However, an online, interactive, self-administered questionnaire should not be too restrictive in its error checking lest a user abandon the questionnaire altogether—in which case no data would be recorded. This brings up another point with regard to the questionnaire's implementation—concern as to the information flow and user experience.

The questionnaire was contained within a single webpage which led the subject to scroll with the browser's controls. However, the questionnaire could have been divided into several different web pages whereby a user could click next and back buttons. The

[8] Some of the photo manipulation examples in the Introduction were revealed to mass audiences during the same year as when this experiment took place. As noted earlier, criticism of the manipulation appeared in a variety of mass media including print, television, and online sources.

interaction design for an online questionnaire has implications for data acquisition and the maintenance of an experiment's internal validity. In a multi-page questionnaire, when a subject clicks a "next" button to continue to a new set of questions, all data from the current page gets saved. In the event that a subject quits taking the self-administered questionnaire before it is completed, the answers can be saved up to the point of quitting. However, in a one-page questionnaire, this possibility does not exist. One limitation in this study was that there was no code to measuring how many users abandoned the questionnaire before pressing the "submit" button. In general, it should be noted that one-page questionnaires must be short enough such that a subject could swiftly repeat submitting answers. Multi-page questionnaires also make subjects less inclined to revisit past questions. Revisiting past questions can influence an answer a subject may put down for any given question. This study used a single web page for its online form because it contained very few questions to begin with. This reduced the amount of time a subject dedicated to the study itself, and gave the subject an opportunity to evaluate the length of the questionnaire before submitting answers.

Operationalization

Individual items appearing on the questionnaire are explained in this section. In addition, screenshots of how the questionnaire appeared on the web browser for subjects in the face-to-face setting are shown. Figure 3.7 shows the first set of items that assess the subjects' group—experimental or control—and media practices. The first item is coded to record whether or not the subject viewed the stimulus video. In the face-to-face setting, subjects tossed a coin to determine which group they would enter. Subjects selected either heads or tails on the first questionnaire item. Those who saw the heads side entered the experimental group while those who saw the tails side entered the control

group. This item did not appear on the online version of the questionnaire since algorithms handled the random assignment of subjects. Items one through three measured the level of engagement a subject has with the news media and how he or she prefers to acquire the news.

The fourth item listed several statements on a five-point Likert scale (see Figure 3.8). The coded values in all Likert scales used in this study ranged from with which the subject was instructed to agree or disagree 1 to 5, with 1 representing strongly agree and 5 representing strongly disagree. The statements in item four assessed attitudes and knowledge, with the exception of one statement regarding behavior with media. The statements were written in the first person singular, which enabled the subject to answer the questions effectively and efficiently. The first statement in item four gauged the subject's level of skepticism by assessing media consumption patterns. If people are likely to seek out additional news sources after initially learning about a news story from one source, this study assumed that they are skeptical. Similarly, the following two items address whether or not the subjects trust local and federal government officials. This study assumed that people who trust government officials are less skeptical than people who do not trust government officials. The next group of statements in item four was derived from Meyer's perceived credibility index as explained previously in the operationalization discussion in Chapter 4 (Meyer 1988).

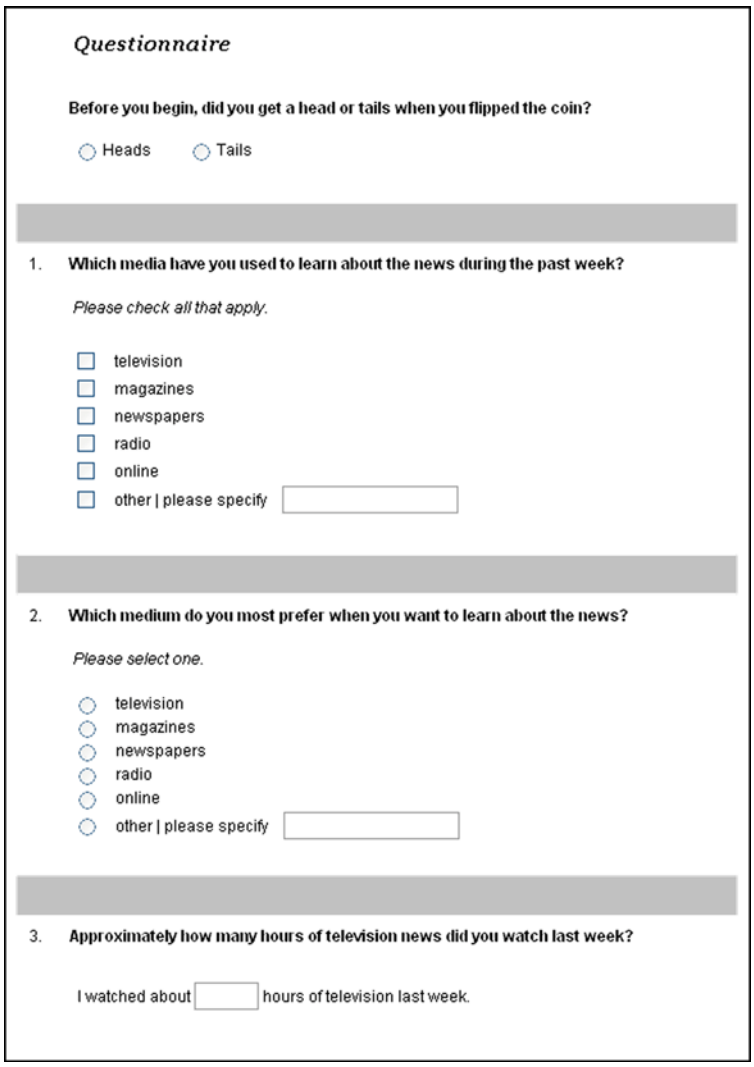
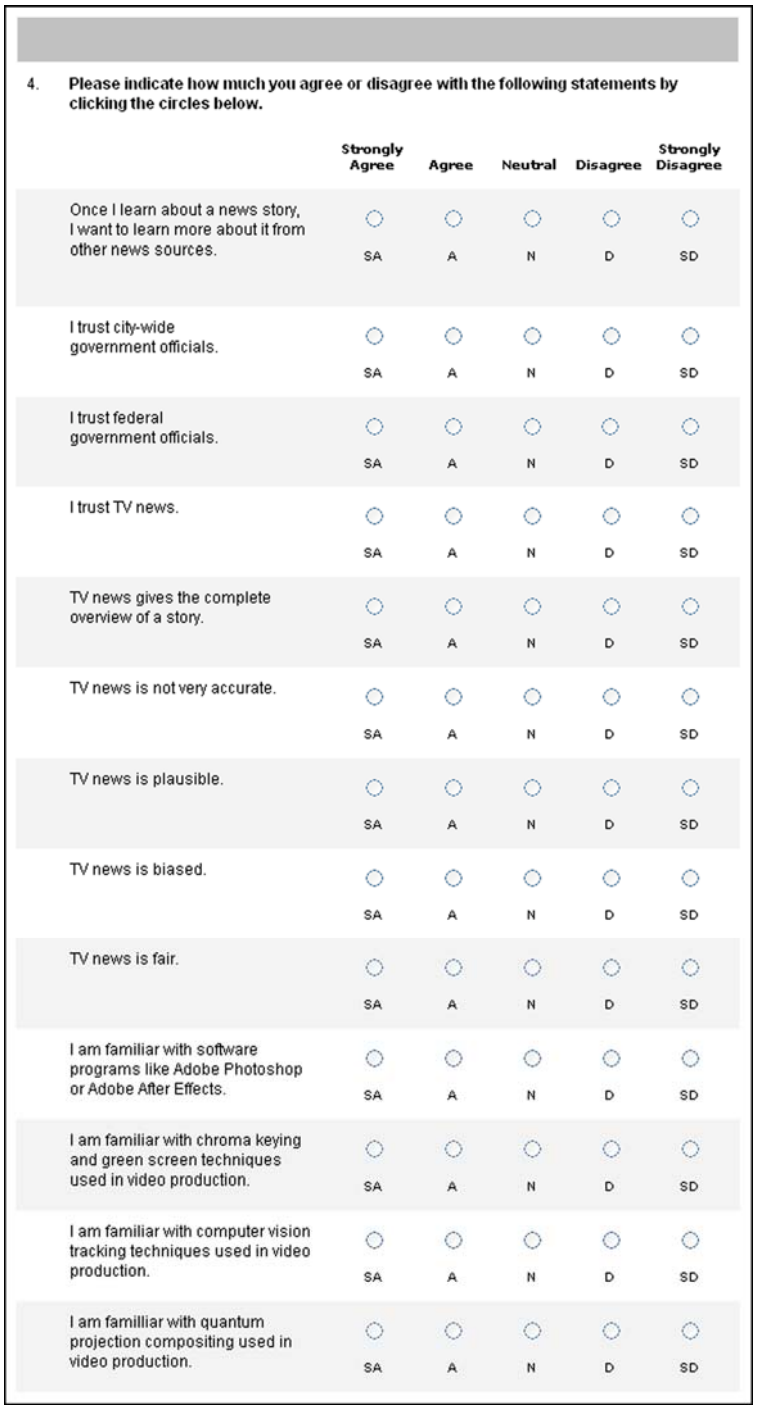


Figure 3.6 Questions Assessing Behavior and Practices with News Media

The final statements in item four addressed familiarity with compositing software and techniques. These statements measured subjects' comprehension of the video stimulus as well as previously gained knowledge of compositing software and techniques. These captured data were used to compare the effect of the video stimulus on people who lacked previous knowledge of compositing software with the effect on people who

previously possessed this knowledge. In addition, the final statement refers to a phony technique in order to filter out subjects who misrepresented their familiarity in their responses to the previous three statements. Figure 3.8 shows all the statements under item four of the questionnaire.



4. **Please indicate how much you agree or disagree with the following statements by clicking the circles below.**

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Once I learn about a news story, I want to learn more about it from other news sources.	○ SA	○ A	○ N	○ D	○ SD
I trust city-wide government officials.	○ SA	○ A	○ N	○ D	○ SD
I trust federal government officials.	○ SA	○ A	○ N	○ D	○ SD
I trust TV news.	○ SA	○ A	○ N	○ D	○ SD
TV news gives the complete overview of a story.	○ SA	○ A	○ N	○ D	○ SD
TV news is not very accurate.	○ SA	○ A	○ N	○ D	○ SD
TV news is plausible.	○ SA	○ A	○ N	○ D	○ SD
TV news is biased.	○ SA	○ A	○ N	○ D	○ SD
TV news is fair.	○ SA	○ A	○ N	○ D	○ SD
I am familiar with software programs like Adobe Photoshop or Adobe After Effects.	○ SA	○ A	○ N	○ D	○ SD
I am familiar with chroma keying and green screen techniques used in video production.	○ SA	○ A	○ N	○ D	○ SD
I am familiar with computer vision tracking techniques used in video production.	○ SA	○ A	○ N	○ D	○ SD
I am familliar with quantum projection compositing used in video production.	○ SA	○ A	○ N	○ D	○ SD

Figure 3.7: Statements Assessing Skepticism, Perceived Credibility and Familiarity

Item five on the questionnaire addressed a subject's network preference. Researchers have found that network affiliation reveals a person's media consumption habits. For example, Morris (2005) found that "Fox news watchers are less likely to follow stories that are critical of the Bush administration but more likely to follow entertainment-based news stories," and that "CNN and network news audiences prefer news that has more in-depth interviews with public officials" (56). Item five was included in order to compare subjects' network preferences with measurements of perceived credibility.

Item six addressed subjects' film genre preferences. The assumption was that specific genres may attract audiences who are more or less knowledgeable about video manipulation techniques. For example, fans of science fiction films might know more about compositing techniques than fans of documentary films. Items 5 and 6 appear in Figure 3.9.

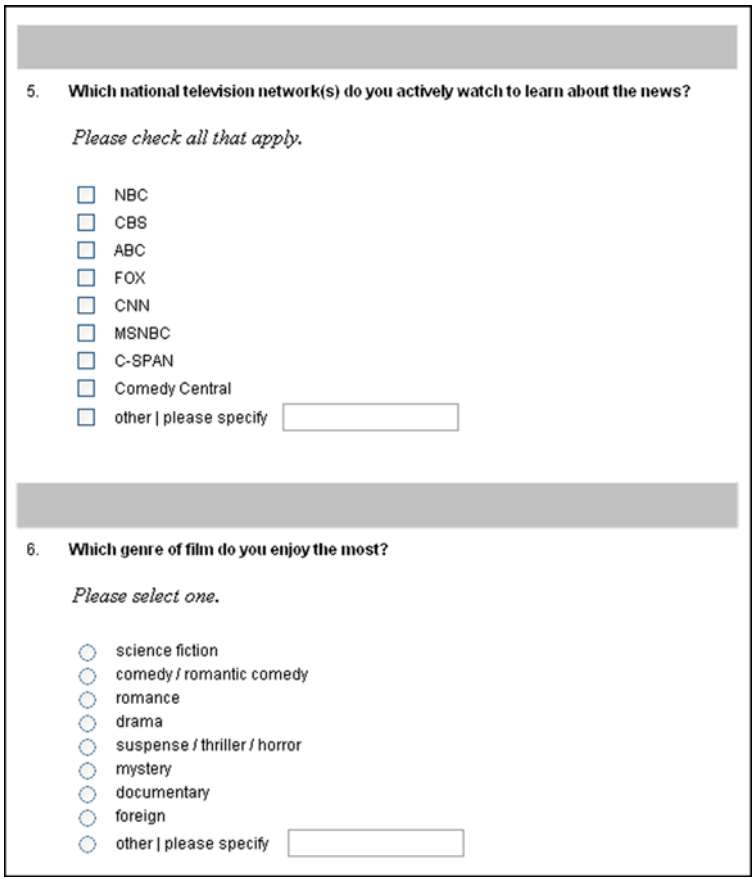


Figure 3.8: Questions about Network Affiliation and Genre Preference

Lastly, demographic information gathered in items seven through ten included subjects' college affiliation, academic classification, gender, and age. These items allowed for comprehensive analysis of data across demographic groups. Figure 3.10 shows items seven through ten.

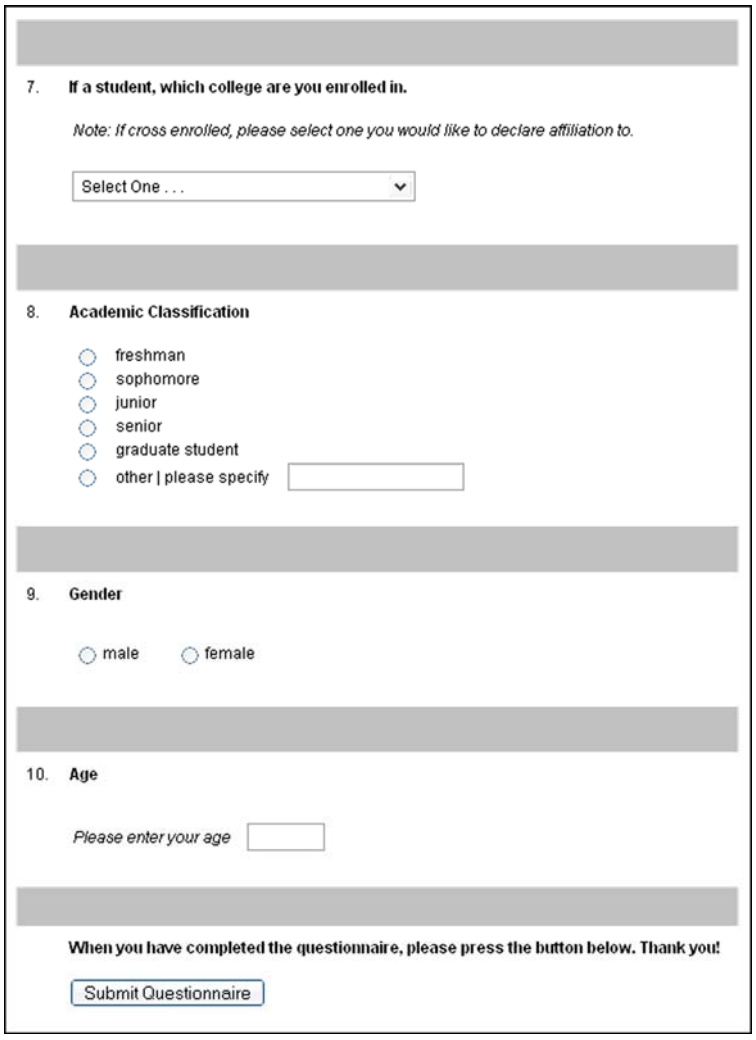


Figure 3.9: Questionnaire Items that Captured Demographics of Subjects

SCALE CONSTRUCTION AND RELIABILITIES

The six statements on the questionnaire that are derived from previous research to measure the perceived credibility of television news are examined in this section for their reliability. This section will also include a short discussion on the reliability of a constructed index for measuring subjects' skepticism. Finally, this section will note the

reliability of an index of the subjects' familiarity with computer imaging software and its capabilities. As previously explained in the Questionnaire chapter, all Likert scales used in constructing these indices assign "Strongly Agree" to 1 and "Strongly Disagree" to 5.

Perceived Credibility Index ("PCI")

The following statements from the questionnaire were used to create the perceived credibility index:

1. "I trust TV news."
2. "TV news gives the complete overview of a story."
3. "TV news is not very accurate."
4. "TV news is plausible."
5. "TV news is biased."
6. "TV news is fair."

This list includes both positive and negative statements about television news. A positive statement means that if a person agrees with it, then he or she likely perceives television news positively. For example, a subject who selected "agree" for "I trust TV news" may have a positive outlook on television news in general. A negative statement therefore means that if a person agrees with it, then he or she likely perceives television news negatively. For example, a subject who selected "agree" for "TV news is biased" may have a negative outlook on television news in general. In order to test for reliability of the index, all the answers of the Likert scale must produce data in the same "direction." That is to say, it is necessary to ensure that all statements from the Likert scale are coded as positive. The data for the two negative statements were therefore recoded, or translated, so that the answers subjects gave matched the directions of those for the positive statements. To achieve this technically, the values corresponding to the negative

statements were subtracted from the number six. In plain language, if a subject had a high value for his or her perceived credibility index, he or she would be more skeptical of television news. Likewise, a lower value on the index means that he or she deems television news as a credible source of information.

In order to measure the reliability of the perceived credibility index, the Cronbach's Alpha statistical test was used on the data collected from all six statements listed above. The Cronbach's Alpha for the F2F setting PCI scale was 0.728, and the Cronbach's Alpha for the WEB version PCI scale was 0.795 (see Tables 3.1 through 9.6). According to Garson, these results correspond to "good" and "adequate" scales respectively (Garson). This means that a reliable PCI value was calculated by averaging the data from the six statements listed above for each individual subject. In other words, a person's perception of credibility was associated with a scale value that was then compared across subjects and samples.

F2F: Item Statistics for PCI

	Mean	Std. Deviation	N
I trust TV news.	2.97	.897	68
TV news give the complete overview of a story.	3.94	.944	68
TV news is plausible.	2.59	.629	68
TV news is fair.	3.46	.800	68
TV news is accurate	3.12	.890	68
TV news is not biased	4.06	.808	68

Table 3.1: F2F: Item Statistics for PCI

F2F: Inter-Item Correlation Matrix for PCI

	I trust TV news.	TV news give the complete overview of a story.	TV news is plausible.	TV news is fair.	TV news is accurate	TV news is not biased
I trust TV news.	1.000	.473	.269	.476	.472	.311
TV news give the complete overview of a story.	.473	1.000	.059	.392	.310	.239
TV news is plausible.	.269	.059	1.000	.201	.275	.019
TV news is fair.	.476	.392	.201	1.000	.364	.258
TV news is accurate	.472	.310	.275	.364	1.000	.364
TV news is not biased	.311	.239	.019	.258	.364	1.000

Table 3.2: F2F: Inter-Item Correlation Matrix for PCI

F2F: Reliability Statistics for PCI

Cronbach's Alpha	N of Items
.728	6

Table 3.3: F2F: Reliability Statistics for PCI

WEB: Item Statistics for PCI

	Mean	Std. Deviation	N
I trust TV news.	3.23	.995	721
TV news give the complete overview of a story.	4.01	.850	721
TV news is plausible.	2.44	.693	721
TV news is fair.	3.49	.840	721
TV news is accurate	3.24	.918	721
tvUnbiased	4.08	.738	721

Table 3.4: WEB: Item Statistics for PCI

WEB: Inter-Item Correlation Matrix for PCI

	I trust TV news.	TV news give the complete overview of a story.	TV news is plausible.	TV news is fair.	TV news is accurate	tvUnbiased
I trust TV news.	1.000	.561	.318	.509	.571	.400
TV news give the complete overview of a story.	.561	1.000	.228	.463	.443	.337
TV news is plausible.	.318	.228	1.000	.276	.287	.144
TV news is fair.	.509	.463	.276	1.000	.400	.491
TV news is accurate	.571	.443	.287	.400	1.000	.327
tvUnbiased	.400	.337	.144	.491	.327	1.000

Table 3.5: WEB: Inter-Item Correlation Matrix for PCI

WEB: Reliability of PCI

Cronbach's Alpha	N of Items
.795	6

Table 3.6: WEB: Reliability of PCI

Skepticism Index ("SI")

The following statements from the questionnaire were used to construct the skepticism index:

1. "Once I learn about a news story, I want to learn about it from other news sources."
2. "I trust city-wide government officials."
3. "I trust federal government officials."

The Cronbach's Alpha statistical test was used on the data collected from the above statements to measure the reliability of the skepticism index. The Cronbach's Alpha for the F2F setting when all three statements were included was 0.118, and the Cronbach's Alpha for the web setting when all three statements were included was 0.373 (see Tables 3.7 through 3.12).

F2F: Item Statistics for SI (Three Item)

	Mean	Std. Deviation	N
Once I learn about a news story, I want to learn more about it from other news sources.	2.32	1.099	68
I trust city-wide government officials.	3.06	.790	68
I trust federal government officials.	3.07	.951	68

Table 3.7: F2F:Item Statistics for SI (Three Item)

F2F: Inter-Item Correlation Matrix for SI (Three Item)

	Once I learn about a news story, I want to learn more about it from other news sources.	I trust city-wide government officials.	I trust federal government officials.
Once I learn about a news story, I want to learn more about it from other news sources.	1.000	-.091	-.352
I trust city-wide government officials.	-.091	1.000	.749
I trust federal government officials.	-.352	.749	1.000

Table 3.8: F2F: Inter-Item Correlation Matrix for SI (Three Item)

Reliability Statistics for SI (Three Item)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.118	.255	3

Table 3.9: F2F: Reliability Statistics for SI (Three Item)

WEB: Item Statistics for SI (Three Item)

	Mean	Std. Deviation	N
Once I learn about a news story, I want to learn more about it from other news sources.	2.53	1.262	721
I trust city-wide government officials.	3.06	.869	721
I trust federal government officials.	3.38	.972	721

Table 3.10: WEB: Item Statistics for SI (Three Item)

WEB: Inter-Item Correlation Matrix for SI (Three Item)

	Once I learn about a news story, I want to learn more about it from other news sources.	I trust city-wide government officials.	I trust federal government officials.
Once I learn about a news story, I want to learn more about it from other news sources.	1.000	.031	-.024
I trust city-wide government officials.	.031	1.000	.639
I trust federal government officials.	-.024	.639	1.000

Table 3.11: WEB: Inter-Item Correlation Matrix for SI (Three Item)

WEB: Reliability Statistics for SI (Three Item)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.373	.452	3

Table 3.12: WEB: Reliability Statistics for SI (Three Item)

This signaled that the scales were not reliable; therefore the first statement, "Once I learn about a news story, I want to learn more about it from other news sources," was removed for further reliability testing. A subject who seeks out further news information about a story may be strongly interested in the story and not inherently skeptical. The Cronbach's Alpha for only the latter two statements in the F2F setting was 0.848, while the Cronbach's Alpha for only the latter two statements in the web version was 0.777 (see Tables 3.13 through 9.18). These corresponded to "good" and "adequate" scales respectively (Garson). This follows logically because both of the latter statements used in the scale are very similar. Reliable skepticism indices were constructed by averaging the data from the two latter statements above for each individual subject.

F2F: Item Statistics for SI (Two Item)

	Mean	Std. Deviation	N
I trust city-wide government officials.	3.06	.790	68
I trust federal government officials.	3.07	.951	68

Table 3.13: F2F: Item Statistics for SI (Two Item)

F2F: Inter-Item Correlation Matrix for SI (Two Item)

	I trust city-wide government officials.	I trust federal government officials.
I trust city-wide government officials.	1.000	.749
I trust federal government officials.	.749	1.000

Table 3.14: F2F: Inter-Item Correlation Matrix for SI (Two Item)

F2F: Reliability Statistics for SI (Two Item)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.848	.857	2

Table 3.15: F2F: Reliability Statistics for SI (Two Item)

WEB: Item Statistics for SI (Two Item)

	Mean	Std. Deviation	N
I trust city-wide government officials.	3.06	.869	721
I trust federal government officials.	3.38	.972	721

Table 3.16: WEB: Item Statistics for SI (Two Item)

WEB: Inter-Item Correlation Matrix for SI (Two Item)

	I trust city-wide government officials.	I trust federal government officials.
I trust city-wide government officials.	1.000	.639
I trust federal government officials.	.639	1.000

Table 3.17: WEB: Inter-Item Correlation Matrix for SI (Two Item)

WEB: Reliability Statistics for SI (Two Item)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.777	.780	2

Table 3.18: WEB: Reliability Statistics for SI (Two Item)

Technology Familiarity Index ("TFI")

The following statements from the questionnaire were used to create an index that gauged subjects' familiarity with computer imaging software and its capabilities:

1. "I am familiar with software programs like *Adobe Photoshop* or *Adobe AfterEffects*."
2. "I am familiar with chroma keying and green screen techniques used in video production."

3. “I am familiar with computer vision tracking techniques used in video production.”
4. “I am familiar with quantum projection compositing used in video production.”

As explained previously, these statements were used to differentiate between subjects who possessed previous knowledge and those who lacked previous knowledge of computer imaging software and its capabilities. The fourth statement that contains a reference to “quantum projection compositing,” a phony technique, was used gauge whether subjects responded to the previous three statements truthfully. The values for this “quantum projection compositing” statement were recoded so that a person who answered “strongly agree” translated to “strongly disagree” for the analysis. By doing this, the orientation of the statements are effectively the same.

The Cronbach’s Alpha statistical test that used data from all four statements resulted in 0.120 for the F2F setting and 0.266 for the web setting (see Tables 3.19 through 3.24). These values correspond neither to “good” nor “adequate” scales. The data resulting from the statements above could not be used to create indices that demonstrate subjects’ familiarity levels with digital compositing software and its capabilities. These results were not expected since the statements were crafted so that they would measure the broad concept of familiarity with compositing technology. As such, a test was conducted to see what would happen to the Cronbach’s Alpha value if a statement was deleted from the scale. When the fourth item was removed, the Cronbach’s Alpha for the TFI scale in the F2F setting was .747, and the Cronbach’s Alpha for the web setting was .721. Results indicated that the scale would be considered “adequate” if the statement regarding quantum projection compositing was not included (see Tables 3.25 and 3.26). This meant that if the statement about quantum projection

compositing was deleted, then the other three statements could be used to create indices that demonstrate subjects' familiarity levels with digital compositing software and its capabilities.

In essence, people who were familiar with the non-phony techniques may have simply looked at the set of technique familiarity statements without thinking about each one individually. Rather, they may have answered all of them similarly. Another possibility is that many of the subjects were overestimating their competence. Therefore, the statement was removed in order to create indices that reliably gauged subjects' familiarity with compositing technology. Tables 3.27 and 3.28 show that the alpha values for the TFI without the phony technique statement for the F2F sample was .747 and the web version was .721.

F2F: Item Statistics for TFI

	Mean	Std. Deviation	N
I am familiar with software programs like Adobe Photoshop or Adobe After Effects.	1.94	1.035	68
I am familiar with chroma keying and green screen techniques used in video production.	2.71	1.294	68
I am familiar with computer vision tracking techniques used in video production.	3.51	1.252	68
I am unfamiliar with Quantum Projection Compositing	2.13	1.021	68

Table 3.19: F2F: Item Statistics for TFI

F2F: Inter-Item Correlation Matrix for TFI

	I am familiar with software programs like Adobe Photoshop or Adobe After Effects.	I am familiar with chroma keying and green screen techniques used in video production.	I am familiar with computer vision tracking techniques used in video production.	I am unfamiliar with Quantum Projection Compositing
I am familiar with software programs like Adobe Photoshop or Adobe After Effects.	1.000	.433	.415	-.289
I am familiar with chroma keying and green screen techniques used in video production.	.433	1.000	.629	-.535
I am familiar with computer vision tracking techniques used in video production.	.415	.629	1.000	-.673
I am unfamiliar with Quantum Projection Compositing	-.289	-.535	-.673	1.000

Table 3.20: F2F: Inter-Item Correlation Matrix for TFI

F2F: Reliability Statistics for TFI

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items[a]	N of Items
.120	-.013	4

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

Table 3.21: F2F: Reliability Statistics for TFI

WEB: Item Statistics for TFI

	Mean	Std. Deviation	N
I am familiar with software programs like Adobe Photoshop or Adobe After Effects.	2.05	1.070	721
I am familiar with chroma keying and green screen techniques used in video production.	3.08	1.420	721
I am familiar with computer vision tracking techniques used in video production.	3.78	1.197	721
I am unfamiliar with Quantum Projection Compositing	1.77	.880	721

Table 3.22: WEB: Item Statistics for TFI

WEB: Inter-Item Correlation Matrix for TFI

	I am familiar with software programs like Adobe Photoshop or Adobe After Effects.	I am familiar with chroma keying and green screen techniques used in video production.	I am familiar with computer vision tracking techniques used in video production.	I am unfamiliar with Quantum Projection Compositing
I am familiar with software programs like Adobe Photoshop or Adobe After Effects.	1.000	.416	.344	-.204
I am familiar with chroma keying and green screen techniques used in video production.	.416	1.000	.618	-.462
I am familiar with computer vision tracking techniques used in video production.	.344	.618	1.000	-.653
I am unfamiliar with Quantum Projection Compositing	-.204	-.462	-.653	1.000

Table 3.23: WEB: Inter-Item Correlation Matrix for TFI

WEB: Reliability Statistics for TFI

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.266	.039	4

Table 3.24: WEB: Reliability Statistics for TFI

F2F: Item-Deleted Statistics for TFI

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I am familiar with software programs like Adobe Photoshop or Adobe After Effects.	8.35	3.187	.440	.222	-.515[a]
I am familiar with chroma keying and green screen techniques used in video production.	7.59	2.425	.443	.454	-.776[a]
I am familiar with computer vision tracking techniques used in video production.	6.78	2.921	.326	.571	-.445[a]
I am unfamiliar with Quantum Projection Compositing	8.16	8.585	-.626	.474	.747

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

Table 3.25: F2F: Item-Deleted Statistics for TFI

WEB: Item-Deleted Statistics for TFI

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I am familiar with software programs like Adobe Photoshop or Adobe After Effects.	8.63	3.798	.422	.188	-.169[a]
I am familiar with chroma keying and green screen techniques used in video production.	7.60	2.475	.495	.436	-.532[a]
I am familiar with computer vision tracking techniques used in video production.	6.90	3.664	.351	.562	-.112[a]
I am unfamiliar with Quantum Projection Compositing	8.91	8.846	-.557	.434	.721

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

Table 3.26: WEB: Item-Deleted Statistics for TFI

F2F: Reliability Statistics for TFI (Three Item)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.747	.744	3

Table 3.27: F2F: Reliability Statistics for TFI (Three Item)

WEB: Reliability Statistics for TFI (Three Item)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.721	.718	3

Table 3.28: WEB: Reliability Statistics for TFI (Three Item)

All the above reliability tests for each scale (i.e. PCI, SI, and TFI) mean that the index values of the scale can be used across treatment groups and to help answer the research questions. In the following section, PCI, SI, and TFI will be used in data analysis.

DEMOGRAPHIC AND DESCRIPTIVE DATA FOR EXPERIMENT SAMPLES

This section presents the demographic composition and additional descriptive data for the samples in the face-to-face setting ("the F2F setting") of the experiment as well as the online version ("the WEB version").

Demographics, Behavior, and Preferences for the Face-To-Face Sample

This sample had a total of 68 subjects (N=68). The control and experimental group had equal numbers of subjects—N=34 subjects for each group. A majority of the subjects (90%) were freshman and sophomores, and all of the subjects were undergraduate students. The mean age of the sample was 19. Approximately 65% of the subjects were female participants while the remaining 35% of the subjects were male. About 87% of the subjects were affiliated with the Communication or Liberal Arts

academic units, while the remaining 13% were enrolled in other academic units within the university. In terms of demographic markers of age, gender, and academic unit affiliation, the control and experimental groups were found to be homogeneous and were therefore acceptable to compare.

With regard to behavior, 86% of all subjects reported having used online sources in the last week to learn about the news, while 72% of all subjects reported having used television sources. These media were followed by newspapers, then magazines, radio, and others. Almost half of the sample, or 49%, preferred using online sources to learn about the news, and a bit over a third of the sample, or 34%, preferred watching television to learn the news. The rest of the subjects preferred to use newspapers, magazines or other sources to learn the news. About 65% of the sample watched between 0 to 5 hours of television news the previous week, while 27% watched between 6 and 15 hours. The remaining 8% were classified as heavy television news consumers watching over 16 hours of television news. The top five watched television news stations reported by subjects, from most-watched to least-watched, were CNN, ABC, NBC, Comedy Central, and FOX. The least-watched television news station was C–SPAN. Most subjects reported that comedies (42%), drama (24%), and suspense films (17%) were preferred over other genres. See Appendix C for demographic and behavior statistics in the F2F setting.

Demographics, Behavior, and Preferences for the Web Sample

This sample had a total of 721 subjects (N=721). The control group (N=430) had more subjects than the experimental group (N=291)—due to the online implementation of the experiment as discussed earlier. This difference amounted to 139 fewer subjects in the experimental group. The majority of the subjects were graduate students and seniors,

while the junior, sophomore and freshman classes were represented almost equally within the sample between 10% and 15%. The percentage of graduate students was 44%, while the percentage of undergraduates was 56%. The mean age of the sample was 25. Approximately 60% of the subjects were female participants while the remaining 40% of the subjects were male. Students from liberal arts and similar academic units as well as business and law were represented the most at 30% and 27% respectively. Communication students represented only 10% of the sample in contrast to the F2F setting, while students in engineering and sciences represented 19%. Fine arts, architecture, and other academic units represented 14% of the sample. In terms of demographic markers of age, gender, and academic unit affiliation, the control and experimental groups were found to be homogeneous and were therefore acceptable to compare.

Similar to the F2F setting results, 89% of all subjects reported having used online sources in the last week to learn about the news, while 71% of all subjects reported having used television news. These media were followed by newspapers, radio, magazines and others. Slightly over half of the sample, or 53%, preferred using online sources to learn about the news, and a quarter of the sample, or 24%, preferred watching television to learn the news. These news preferences were followed by newspapers, magazines and then other sources. Similar to the F2F setting, about 66% of the sample watched between 0 to 5 hours of television news the previous week, while 27% watched between 6 and 15 hours. The remaining 7% were classified as heavy television news consumers watching over 16 hours of television news. The top five watched television news stations reported by subjects, from most-watched to least-watched, were CNN, NBC, Comedy Central, ABC, and FOX. The least-watched television news station was C–SPAN. Most subjects reported that comedies (40%), drama (20%), and sci-fi (10%)

were preferred over other genres. See Appendix C.2 for demographic and behavior statistics in the F2F setting.

In order to compare findings from the web version to the F2F setting, it is necessary to consider the demographic makeup of each sample. The web version has a wider demographic representation, including a majority of graduate students and seniors, while the F2F setting represents almost exclusively freshmen and sophomores. Any comparison between the two samples may necessitate the focusing of the demographics to match as much as possible across samples.

Chapter 4: Analysis

TESTING HYPOTHESIS 1

Recall that Hypothesis 1 is the following:

Acquiring knowledge of digital video post-production techniques influences audiences to perceive television news as less credible.

In this study it was assumed that subjects in the experimental groups acquired knowledge of post-production techniques by viewing the stimulus. Several post-production techniques were demonstrated in a step-by-step fashion as discussed earlier. Even though details were not conveyed about how the steps were executed, a subject who saw the stimulus was assumed to have gained minimal knowledge of the existence of post-production techniques. In order to examine this hypothesis, it was necessary to compare subjects who acquired knowledge of digital video post-production techniques and those who did not. This means comparing the subjects in the experimental group with those in the control group. Specifically, the analysis compared the mean of the perceived credibility index in the experimental group to the mean of the perceived credibility index in the control group to see if there is a statistically significant difference. The following sections compare the means across treatment groups first in the F2F setting and then in the web version.

Face-to-face setting comparison

The mean of the perceived credibility index of the experimental group in the F2F setting (M = 3.45) was similar to the mean for the control group (M = 3.26). Mean values greater than 3 signify that both groups were more skeptical of television news than not. Even though this was the case, a t-Test was performed to see if the difference

between these means was statistically significant. The stimulus did not have a statistically significant effect on the experimental group in the F2F setting (*t = 1.386, df = 66, p < .17*) (see Tables 4.1 and 4.2). In sum, this analysis showed that subjects in the F2F sample who acquired knowledge of digital video post-production techniques were not influenced with regard to how they perceived the credibility of television news.

F2F: Treatment Group Statistics for Comparing PCI

	Treatment Group	N	Mean	Std. Deviation	Std. Error Mean
Perceived Credibility Index	F2F Exp	34	3.4461	.50871	.08724
	F2F Control	34	3.2647	.56871	.09753

Table 4.1: F2F: Treatment Group Statistics for Comparing PCI

F2F: Independent Samples Test for Comparing PCI Across Treatment Groups

Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Perceived Credibility Index	.441	.509	1.386	66	.170	.18137	.13086	-.07990	.44264

Table 4.2: F2F: Independent Samples Test for Comparing PCI across Treatment Groups

Web version comparison

The mean of the perceived credibility index of the web version experimental group (M = 3.46) was also similar to the mean for the control group (M = 3.39). A t-Test

was performed to see if the difference between these means was statistically significant. The stimulus did not have a statistically significant effect on the experimental group in the web version regarding perceived credibility of television news (*t = 1.576, df = 719, p < .115*) (see Tables 4.3 and 4.4). Similar to the F2F sample, this analysis found that, in the web sample, subjects who acquired knowledge of digital video post-production techniques were not influenced with regard to how they perceived the credibility of television news.

WEB: Treatment Group Statistics for Comparing PCI

	Treatment Group	N	Mean	Std. Deviation	Std. Error Mean
perceivedCredibility	WEB Exp	291	3.4582	.58891	.03452
	WEB Control	430	3.3872	.59611	.02875

Table 4.3: WEB: Treatment Group Statistics for Comparing PCI

WEB: Independent Samples Test for Comparing PCI Across Treatment Groups

Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
perceivedCredibility	.045	.832	1.576	719	.115	.07098	.04503	-.01742	.15939

Table 4.4: WEB: Independent Samples Test for Comparing PCI across Treatment Groups

Controlling for skepticism

The web and F2F samples were controlled for skepticism regarding the credibility of television news. Once sub samples were formed and analyzed, it was hypothesized

that the stimulus may show an effect in more than one of the sub samples. The subcategories were classified as "non-skeptical subjects," "neutral subjects," and "skeptical subjects." The attribute used to assign a subject into one of the three categories was his or her level of trust for government officials. In order to test if this was an appropriate attribute to use for the sorting of subjects into skepticism categories, two bi-variate correlations were performed. Recall that the *higher* values for the PCI means that the subject deemed television news as having *low* credibility. Conversely, *lower* values for the PCI means that the subject deemed television news as having *high* credibility. Therefore, this means that correlations between the PCI and SI should be interpreted as the inverse of the statistical terminology co-relational values.

For example, within the F2F setting sample, a positive correlation was found between the amount of skepticism subjects possessed and their perceived credibility of television news ($N = 68$, $r = .539$, $p < .01$) (see Tables 4.5 and 4.6). Even though the statistical correlation turned out to be "positive," the result should be interpreted inversely: as subjects felt more skeptical about government officials (high SI values) they tended to perceive television news as having little credibility (high PCI values).

F2F: Descriptive Statistics For PCI & SI

	Mean	Std. Deviation	N
Perceived Credibility Index	3.3554	.54324	68
Skepticism Index	3.0662	.81453	68

Table 4.5: F2F: Descriptive Statistics for PCI & SI

F2F: Correlations Between PCI & SI

		Perceived Credibility Index	Skepticism Index
Perceived Credibility Index	Pearson Correlation	1	.539**
	Sig. (2-tailed)		.000
	N	68	68
Skepticism Index	Pearson Correlation	.539**	1
	Sig. (2-tailed)	.000	
	N	68	68

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4.6: F2F: Correlations between PCI & SI

Also, a significant positive correlation was found in the web version sample (N = 721, r = .434, p < .01) (see Tables 4.7 and 4.8). According to the analysis there is a tendency for people who distrust government officials to perceive television news as less credible. The opposite correlation held as well: as subjects tended to trust government officials, they also tended to perceive television news as credible.

WEB: Descriptive Statistics for PCI & SI

	Mean	Std. Deviation	N
Perceived Credibility Index	3.4159	.59383	721
Skepticism Index	3.2191	.83365	721

Table 4.7: WEB: Descriptive Statistics for PCI & SI

WEB: Correlations Between PCI & SI

		Perceived Credibility Index	Skepticism Index
Perceived Credibility Index	Pearson Correlation	1	.434**
	Sig. (2-tailed)		.000
	N	721	721
Skepticism Index	Pearson Correlation	.434**	1
	Sig. (2-tailed)	.000	
	N	721	721

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4.8: WEB: Correlations between PCI & SI

The level of trust that a subject had for government officials was deemed to be an appropriate attribute to use for the sorting of subjects into skepticism categories. Recall that this study constructed a scale known as the skepticism index that described a subject's level of trust for government officials. The samples were divided into three groups using the following criteria:[9]

- A *non-skeptical category* for subjects with a skepticism index with values between 0 and 2.5
- A *neutral category* for subjects with a skepticism index with a value of 3
- A *skeptical category* for subjects with a skepticism index with values between 3.5 and 5

[9] Skepticism index values were calculated in half number increments, according to corresponding values on the Likert scale used in the questionnaire. There were only two items used to calculate the skepticism index, both of which were recorded using whole number values. The average of these two items was therefore a whole or half number. For example, there was no possibility of an index value of 3.34 or 2.25. This is why the categories were divided according to the above values.

Face-to-face setting: controlling for skepticism

After dividing the samples into these three categories, each contained almost equal numbers of subjects. The F2F non-skeptical category contained 22 subjects. The F2F neutral category contained 21 subjects, and the F2F skeptical category contained 25 subjects.

In order to gauge the effect of the stimulus, the means of perceived credibility indices between the experimental and control groups were compared within each of the three category divisions. To achieve this, t-Tests were conducted across treatment groups within each category. In the non-skeptical category, the mean for the experimental group ($M = 3.26$) was higher than the mean for the control group ($M = 2.80$). Results indicated that the stimulus had a statistically significant effect on experimental subjects in the non-skeptical category in the F2F setting ($t = 2.435$, $df = 20$, $p < .024$). The stimulus did not have a statistically significant effect on the experimental subjects in the neutral category ($t = .476$, $df = 19$, $p < .639$) or the skeptical category ($t = -.006$, $df = 23$, $p < .995$). See Tables 4.9 and 4.10 for details regarding analysis of all three skepticism categories. This subgroup analysis of the F2F sample demonstrated that subjects who trusted government officials, and acquired knowledge of digital video post-production techniques, were markedly influenced in how they perceived the credibility of television news. However, this was not the case for subjects who distrusted government officials—or who claimed no opinion about government officials—*and* acquired knowledge of digital post-production techniques.

F2F: Treatment Group Statistics of PCI by Skepticism Category

Skepticism Category		Treatment Group	N	Mean	Std. Deviation	Std. Error Mean
Non-Skeptical	Perceived Credibility Index	F2F Exp	12	3.2639	.48958	.14133
		F2F Control	10	2.8000	.38329	.12121
Neutral	Perceived Credibility Index	F2F Exp	9	3.3519	.58002	.19334
		F2F Control	12	3.2361	.52924	.15278
Skeptical	Perceived Credibility Index	F2F Exp	13	3.6795	.41086	.11395
		F2F Control	12	3.6806	.42911	.12387

Table 4.9: F2F: Treatment Group Statistics of PCI by Skepticism Category

F2F: Independent Samples Test Comparing PCI Across Treatment Groups For All Skepticism Categories

Equal variances assumed

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
Skepticism Category		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Non-Skeptical	Perceived Credibility Index	1.036	.321	2.435	20	.024	.46389	.19050	.06652	.86126
Neutral	Perceived Credibility Index	.201	.659	.476	19	.639	.11574	.24305	-.39297	.62445
Skeptical	Perceived Credibility Index	.219	.644	-.006	23	.995	-.00107	.16801	-.34862	.34648

Table 4.10: F2F: Independent Samples Test for Comparing PCI across Treatment Groups for All Skepticism Categories

Web version: controlling for skepticism

The web version category divisions showed that more subjects in the web sample fell into the skeptical category than the non-skeptical category. The web version non-skeptical category contained 188 subjects, while the neutral category contained 224 subjects, and the skeptical category contained 309 subjects.

In order to gauge the effect of the stimulus on subjects within the three categories, the means of perceived credibility indices between the experimental and control groups were compared within each of the three category divisions. T-Tests were conducted

across treatment groups within each category. In the skeptical category, the mean for the experimental group (*M = 3.77*) was higher than the mean for the control group (*M = 3.63*.) Results indicated that the stimulus had a statistically significant effect on the subjects in the skeptical category (*t = 2.121, df = 307, p < .035*). This means that subjects in the web sample who distrusted government officials, and who acquired knowledge of digital video post-production techniques, were influenced in their perception of television news credibility.

In addition, the stimulus had an effect, although weak, on the experimental group in the non-skeptical category (*t = 1.913, df = 186, p < .057*). In the neutral category, however, no effect was found (*t = -.005, df = 222, p < .996*). See Tables 4.11 and 4.12 for details regarding analysis of all three skepticism categories. In short, within the web sample, the acquisition of knowledge of digital video post-production techniques may have influenced how skeptical and non-skeptical subjects perceived the credibility of television news, but it may not have influenced subjects who claimed no opinion about whether or not they trust government officials.

WEB: Treatment Group Statistics of PCI By Skepticism Category

Skepticism Category		Treatment Group	N	Mean	Std. Deviation	Std. Error Mean
Non-Skeptical	Perceived Credibility Index	WEB Exp	84	3.1984	.48641	.05307
		WEB Control	104	3.0577	.51345	.05035
Neutral	Perceived Credibility Index	WEB Exp	89	3.2959	.59019	.06256
		WEB Control	135	3.2963	.56268	.04843
Skeptical	Perceived Credibility Index	WEB Exp	118	3.7655	.51577	.04748
		WEB Control	191	3.6309	.55780	.04036

Table 4.11: WEB: Treatment Group Statistics of PCI by Skepticism Category

WEB: Independent Samples Test Comparing PCI Across Treatment Groups For All Skepticism Categories

Equal variances assumed

Skepticism Category		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Non-Skeptical	Perceived Credibility Index	.056	.813	1.913	186	.057	.14072	.07358	-.00443	.28588
Neutral	Perceived Credibility Index	.476	.491	-.005	222	.996	-.00042	.07834	-.15480	.15397
Skeptical	Perceived Credibility Index	.431	.512	2.121	307	.035	.13465	.06348	.00973	.25956

Table 4.12: WEB: Independent Samples Test Comparing PCI across Treatment Groups for all Skepticism Categories

Web Version: demographics that affected perceived credibility of TV news

A linear regression analysis across the entire web sample was performed using demographics variables as predictors for a subject's perceived credibility index value. In order to include interval, ratio, and nominal variables such as gender and academic unit, dummy variables were created for the nominal variables. Gender was coded with binary values of 0 and 1, while academic unit was also coded with binary values with 1 representing communication students and 0 representing all other students. The academic unit recoding was done in this manner because this investigation is concerned with media production literacy which is typically thought to be part of academic preparation in communication. According to the linear regression analysis, the amount of education a subject had and the academic unit with which he or she was affiliated was related to the outcome of how that subject perceived the credibility of television news. Age was found to not be related (see Table 4.13). The following section controls for the amount of education subjects had in order to investigate whether that demographic played a role in stimulus's effect. Controlling for subjects' academic affiliation is detailed within the analysis of hypothesis 3. A regression analysis for factors that affected the PCI was not

performed for the entire F2F sample because its demographic composition was homogeneous.

WEB: Regression Coefficients for Age, Gender, School, and Class for PCI[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.226	.085		37.793	.000
	Age	.002	.004	.028	.618	.537
	Gender	.002	.045	.002	.043	.966
	School	-.182	.073	-.093	-2.479	.013
	Class	.040	.019	.097	2.126	.034

a. Dependent Variable: perceivedCredibility

Table 4.13: WEB: Regression Coefficients for Age, Gender, School, and Class for PCI

Web Version: controlling for amount of education

To control for amount of education, a comparison was made between the level of perceived credibility that undergraduates had about television news and the level of perceived credibility that graduate students had about television news. This comparison was done in two steps. First a comparison was made within each of the treatment groups using t-Tests. It was found that, in the control group for the web version, there was a significant difference between the two types of students. The undergraduates in the control group (M = 3.33) perceived television news as more credible than the graduate students in the control group (M = 3.45). This finding was also statistically significant (*t = -2.190, df=428, p < .029*) (see Tables 4.14 and 4.15). Within the experimental group, there was no significant difference in the way that undergraduate students perceived the credibility of television news and the way that graduate students perceived

the credibility of television news (*t= .564, df=289, p < .573*) (see Tables 4.14 and 4.15). In sum, after acquiring some knowledge of digital video post-production techniques, graduate and undergraduate students perceived the credibility of television news similarly.

WEB: Group Statistics for PCI across Graduate and Undergraduate Subjects within Treatment Groups

Treatment Group		Amount of Education	N	Mean	Std. Deviation	Std. Error Mean
WEB Exp	Perceived Credibilty Index	Undergraduate	163	3.4755	.59121	.04631
		Graduate	128	3.4362	.58753	.05193
WEB Control	Perceived Credibilty Index	Undergraduate	242	3.3320	.59929	.03852
		Graduate	188	3.4583	.58594	.04273

Table 4.14: WEB Group Statistics for PCI across Graduate and Undergraduate Subjects within Treatment Groups

WEB: Independent Samples Test Comparing the PCI across Graduate and Undergraduate Subjects within Treatment Groups

Equal variances assumed

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
Treatment Group		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
WEB Exp	Perceived Credibility Index	.033	.855	.564	289	.573	.03926	.06963	-.09779	.17631
WEB Control	Perceived Credibility Index	.000	.983	-2.190	428	.029	-.12638	.05770	-.23978	-.01297

Table 4.15: WEB: Independent Samples Test Comparing the PCI across Graduate and Undergraduate Subjects within Treatment Groups

A comparison between the levels of perceived credibility for undergraduates and graduates was then made *across* treatment groups using t-Tests. Comparatively, undergraduate students in the experimental treatment, as opposed to those in the control treatment, may have been influenced by the stimulus such that they perceived television news as having less credibility (*t = 2.376, df=403, p < .018*). This means that

undergraduates who acquired knowledge of digital video post-production techniques perceived television news as having less credibility than their control treatment counterparts who perceived television news with more credibility.

Across the treatment groups, the stimulus showed no significant effect on graduate students' perception of television news' credibility ($t = -.329$, $df=314$, $p < .742$) (see Tables 4.16 through 4.19). In essence, no matter whether or not graduate students acquired knowledge of post-production techniques, they perceived the credibility of television news similarly.

WEB: Treatment Group Statistics for PCI (Undergraduates)

	Treatment Group	N	Mean	Std. Deviation	Std. Error Mean
Perceived Credibility Index	WEB Exp	163	3.4755	.59121	.04631
	WEB Control	242	3.3320	.59929	.03852

Table 4.16: WEB: Treatment Group Statistics for PCI (Undergraduates)

WEB: Independent Samples Test Comparing PCI Across Treatment Groups (Undergraduates)

Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Perceived Credibility Index	.003	.955	2.376	403	.018	.14350	.06040	.02477	.26224

Table 4.17: WEB: Independent Samples Test Comparing PCI Across Treatment Groups (Undergraduates)

WEB: Treatment Group Statistics for PCI (Graduate Students)

	Treatment Group	N	Mean	Std. Deviation	Std. Error Mean
Perceived Credibility Index	WEB Exp	128	3.4362	.58753	.05193
	WEB Control	188	3.4583	.58594	.04273

Table 4.18: WEB: Treatment Group Statistics for PCI (Graduate Students)

WEB: Independent Samples Test Comparing PCI Across Treatment Groups (Graduate Students)

Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Perceived Credibility Index	.025	.875	-.329	314	.742	-.02214	.06722	-.15439	.11012

Table 4.19: WEB: Independent Samples Test Comparing PCI Across Treatment Groups (Graduate Students)

To investigate the idea that with increased amounts of education, a subject's perceived credibility of television news would decrease, a correlation was conducted for undergraduate students. Performing a correlation test for graduate students was not feasible because the questionnaire failed to ask how many years of education these subjects had. When observing only undergraduates, a stronger and more significant positive correlation was found between the amount of education and perceived credibility of television news than when all subjects including graduate students were considered (See Tables 4.20 and 4.21). This means that as the amount of years of education increased, the values of the PCI increased. In other words, subjects with more years of education tended to perceive television news as less credible.

With each successive year of education, undergraduates perceived television news with less credibility. However the same observation could not be made for graduate students because there was no data collected as to how many years of a education a graduate student had completed. This means that a threshold may exist for education beyond which acquiring knowledge of digital video manipulation techniques does not influence perception. Once past the education threshold, other characteristics could influence an individuals' perception of television news. For example, due to age, a person could already be quite aware of digital video manipulation techniques, or exposure to mass media scandals cultivated skepticism within their personality. Essentially, after a certain amount of education, learning about digital video manipulation techniques in the context of television news production may not cause a person's perception to change.

WEB: Correlations between PCI and Amount of Education (Undergraduates)

		perceived Credibility	Class
perceivedCredibility	Pearson Correlation	1	.176**
	Sig. (2-tailed)		.000
	N	405	405
Class	Pearson Correlation	.176**	1
	Sig. (2-tailed)	.000	
	N	405	405

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4.20: WEB: Correlations between PCI and Amount of Education (Undergraduates)

WEB: Correlations Between Amount of Education & Perceived Credibility Index

		Academic Classification	Perceived Credibility Index
Academic Classification	Pearson Correlation	1	.121**
	Sig. (2-tailed)		.001
	N	721	721
Perceived Credibility Index	Pearson Correlation	.121**	1
	Sig. (2-tailed)	.001	
	N	721	721

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4.21: WEB: Correlations between Amount of Education and PCI

TESTING HYPOTHESIS 2

Recall that Hypothesis 2 is the following:

Subjects who are familiar with digital compositing software and techniques perceive television news as less credible than those who are less familiar.

To test this hypothesis, a correlation test was performed between the two variables of the technology familiarity index and the perceived credibility index. Next, the sample was divided into sub groups containing subjects who possessed a low amount of familiarity with digital compositing software and techniques, uncertainty regarding software and techniques, and a high amount of familiarity with software and techniques. An ANOVA test was performed against all three groups to learn if there was a significant difference between the means of the groups' perceived credibility indices. If a difference was apparent, then t-Tests were performed between the group with a high amount of familiarity and the other groups.

Face-to-face setting: technology familiarity analysis

In the F2F setting, a correlation test performed between the technology familiarity index and the perceived credibility index showed that there was no correlation between familiarity with technology and perceived credibility ($N = 68$, $r = -.059$, $p < .635$) (see Tables 4.22 and 4.23). This data analysis showed that there was no relationship between subjects' familiarity with compositing software and their perception of television news credibility.

F2F: Descriptive Statistics for PCI & TFI

	Mean	Std. Deviation	N
Perceived Credibility Index	3.3554	.54324	68
Technology Familiarity Index	2.7206	.97669	68

Table 4.22: F2F: Descriptive Statistics for PCI & TFI

F2F: Correlations Between PCI & TFI

		Perceived Credibility Index	Technology Familiarity Index
Perceived Credibility Index	Pearson Correlation	1	-.059
	Sig. (2-tailed)		.635
	N	68	68
Technology Familiarity Index	Pearson Correlation	-.059	1
	Sig. (2-tailed)	.635	
	N	68	68

Table 4.23: F2F: Correlations between PCI & TFI

To divide the samples into subgroups, subjects with a TFI value of 2.4 or lower were placed into the "familiar" group, subjects with a TFI value between 2.6 and 3.4

were placed into the "no knowledge" group, and subject with a TFI value greater than 3.6 were placed into the "unfamiliar" group.[10] Tables 4.24 and 4.25 show the distribution of subjects into the three subgroups for each methodology for comparison purposes.

F2F: TFI Subgroup Descriptive Statistics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Familiar with software and techniques	27	39.7	39.7	39.7
	No knowledge about software and techniques	25	36.8	36.8	76.5
	Unfamiliar with software and techniques	16	23.5	23.5	100.0
	Total	68	100.0	100.0	

Table 4.24: F2F: TFI Subgroup Descriptive Statistics

WEB: TFI Subgroup Descriptive Statistics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Familiar with software and techniques	224	31.1	31.1	31.1
	No knowledge about software and techniques	282	39.1	39.1	70.2
	Unfamiliar with software and techniques	215	29.8	29.8	100.0
	Total	721	100.0	100.0	

Table 4.25: WEB: TFI Subgroup Descriptive Statistics

The ANOVA test performed across the three groups and showed no significant difference between the means of the PCI for each group (see Tables 4.26 and 4.27). This

[10] Recall that this scale had three items. Therefore, all TFI values resulted in either whole numbers or numbers with repeating decimals such as .33333 and .66667.

means that no matter how familiar subjects were with digital compositing software and techniques, there was no difference in how they rated the credibility of television news.

F2F: Descriptives for ANOVA Comparing the PCI across all three TFI subgroups

Perceived Credibility Index

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Familiar with software and techniques	27	3.3642	.59563	.11463	3.1286	3.5998	2.17	4.67
No knowledge about software and techniques	25	3.3467	.57719	.11544	3.1084	3.5849	2.33	4.17
Unfamiliar with software and techniques	16	3.3542	.41220	.10305	3.1345	3.5738	2.50	3.83
Total	68	3.3554	.54324	.06588	3.2239	3.4869	2.17	4.67

Table 4.26: F2F: Descriptives for ANOVA Comparing the PCI across all three TFI subgroups

F2F: ANOVA Comparing the PCI across all three TFI subgroups

Perceived Credibility Index

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.004	2	.002	.007	.993
Within Groups	19.768	65	.304		
Total	19.772	67			

Table 4.27: F2F: ANOVA Comparing the PCI across all three TFI subgroups

Web version: technology familiarity analysis

A correlation test was then performed between the technology familiarity index and the perceived credibility index for the web version sample. Results showed again that there was no correlation between familiarity with technology and perceived credibility ($N = 721, r = -.059, p < .111$) (see Tables 4.28 and 4.29). Thus, the subjects in the web sample were similar to the subjects in the F2F sample in regards to the

relationship between their familiarity with digital compositing software and their perception of television news credibility.

WEB: Descriptive Statistics for PCI & TFI

	Mean	Std. Deviation	N
perceivedCredibility	3.4159	.59383	721
Technology Familiarity Index	2.9699	.99141	721

Table 4.28: WEB: Descriptive Statistics for PCI & TFI

WEB: Correlations Between PCI & TFI

		perceived Credibility	Technology Familiarity Index
perceivedCredibility	Pearson Correlation	1	-.059
	Sig. (2-tailed)		.111
	N	721	721
Technology Familiarity Index	Pearson Correlation	-.059	1
	Sig. (2-tailed)	.111	
	N	721	721

Table 4.29: WEB: Correlations between PCI & TFI

The ANOVA test performed across the three subgroups showed no significant difference between the means of the PCI for each group (see Tables 4.30 and 4.31). This means that no matter how familiar subjects were with digital compositing software and techniques, there was no difference in how they rated the credibility of television news.

WEB: Descriptives for ANOVA comparing PCI across TFI subgroups

perceivedCredibility

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Familiar with software and techniques	224	3.4807	.62709	.04190	3.3981	3.5632	2.00	5.00
No knowledge about software and techniques	282	3.3989	.57351	.03415	3.3317	3.4662	2.00	5.00
Unfamiliar with software and techniques	215	3.3705	.58130	.03964	3.2924	3.4487	2.00	5.00
Total	721	3.4159	.59383	.02212	3.3724	3.4593	2.00	5.00

Table 4.30: WEB: Descriptive for ANOVA comparing PCI across TFI subgroups

WEB: ANOVA comparing PCI across TFI subgroups

perceivedCredibility

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.463	2	.731	2.080	.126
Within Groups	252.433	718	.352		
Total	253.895	720			

Table 4.31: WEB: ANOVA comparing PCI across TFI subgroups

TESTING HYPOTHESIS 3

Recall that Hypothesis 3 is the following:

Subjects with academic preparation in the discipline of communication perceive television news as less credible than subjects with other academic preparation.

For both the F2F setting and the web version data analysis, it proved useful to divide the colleges of the University of Texas at Austin into six different academic groups. The diversity of individual schools and colleges represented in the web sample

proved too numerous for meaningful statistical testing. The colleges were divided as follows:

1. Communication:	College of Communication
2. Liberal Arts, et al:	College of Liberal Arts
	College of Education
	LBJ School of Public Policy
	College of Social Work
	College of Information Science
3. Engineering, et al:	College of Engineering
	College of Natural Sciences
	Jackson School of Geosciences
	College of Pharmacy
4. Business, Law:	McCombs School of Business
	School of Law
5. Architecture, Fine Arts:	College of Architecture
	College of Fine Arts
6. Other:	College of Graduate Studies
	Interdisciplinary Units
	College of Nursing
	Declaration of no affiliation

Face to face setting: academic group analysis

In the F2F sample, 87% of subjects were affiliated with the Communication and Liberal Arts, et al. groups. There were 41 subjects from the Communication group and 18 subjects from Liberal Arts, et al. Other groups were represented by 6 subjects from

Engineering, et al. and one subject each from Business, Law; Other; and Architecture, Fine Arts. Due to the small number of subjects from the latter four academic groups, data analysis of the F2F sample focused specifically on the academic groups of Communication and Liberal Arts, et al. (see Table 4.32)

F2F: Descriptives For PCI Broken Down By Academic Unit

Perceived Credibility Index

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Communication	41	3.2967	.53426	.08344	3.1281	3.4654	2.33	4.33
Liberal Arts, et. al.	18	3.5093	.56439	.13303	3.2286	3.7899	2.17	4.67
Engineering, et. al.	6	3.0000	.31623	.12910	2.6681	3.3319	2.50	3.33
Business, Law	1	3.8333	.	.	.	.	3.83	3.83
Other	1	3.8333	.	.	.	.	3.83	3.83
Architecture, Fine Arts	1	4.1667	.	.	.	.	4.17	4.17
Total	68	3.3554	.54324	.06588	3.2239	3.4869	2.17	4.67

Table 4.32: F2F: Descriptives for PCI Broken down by Academic Unit

The perceived credibility indices of Communication subjects in the experimental group were compared with the perceived credibility indices of Liberal Arts, et al. subjects in the experimental group. Meanwhile, the same comparison was made in the control group. This was done because acquiring knowledge of digital video post-production techniques could have had more of an effect on subjects from Communication than subjects from other academic groups, including Liberal Arts, et al. A t-Test was performed to compare the perceived credibility of subjects from the two academic groups within the experimental group. The mean for the Communication group ($M = 3.43$) was less than the mean for the Liberal Arts et al group ($M = 3.53$) but results indicated that there was no statistically significant difference between the perceived credibility of the two academic groups ($t = -.422$, $df = 27$, $p < .676$) (see Tables 4.33 and 4.34). This means that among subjects who acquired knowledge of digital video post-production

techniques, there was no difference in how Communication students and Liberal Arts, et al. students perceived the credibility of television news.

F2F: Group Statistics for Communication & Liberal Arts by Liberal Arts et al

Treatment Group		School	N	Mean	Std. Deviation	Std. Error Mean
F2F Exp	Perceived Credibility Index	Communication	23	3.4275	.51204	.10677
		Liberal Arts, et. al.	6	3.5278	.54177	.22118
F2F Control	Perceived Credibility Index	Communication	18	3.1296	.52877	.12463
		Liberal Arts, et. al.	12	3.5000	.59882	.17286

Table 4.33: F2F: Group Statistics for Communication & Liberal Arts et al. by Treatment Group

F2F: Independent Samples Test Between PCI Means for Communication & Liberal Arts et al by Treatment Group

Equal variances assumed

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
Treatment Group		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
F2F Exp	Perceived Credibility Index	.005	.944	-.422	27	.676	-.10024	.23731	-.58716	.38668
F2F Control	Perceived Credibility Index	.096	.759	-1.783	28	.085	-.37037	.20771	-.79584	.05510

Table 4.34: F2F: Independent Samples Test between PCI Means for Communication & Liberal Arts et al. by Treatment Group

A t-Test was then performed to compare the perceived credibility of subjects from the two academic groups who did not acquire knowledge of digital video post-production techniques. The mean for Communication students (*M =3.13*) was less than the mean for the Liberal Arts et al. students (*M =3.50*), and results indicated that there was a slight statistical difference between the two types of students' perceived credibility (*t =-1.783*,

df =28, p < .085) (see Tables 4.33 and 4.34). This means that Communication students perceived television news as having more credibility than did Liberal Arts et al. students.

Web version: academic group analysis

The perceived credibility indices of Communication students in the web experimental group were compared with the perceived credibility indices of all other academic divisions in the web experimental group. The same comparison was then made in the control group. The perceived credibility indices of Communication subjects in the control group were compared with the perceived credibility indices of all other academic divisions in the control group. An ANOVA test was performed in order to determine if there was a statistically significant difference in the way that subjects from each academic unit perceived the credibility of television news for both treatment groups. The Communication students showed the lowest mean (*M = 3.33*, *M = 3.15*) amongst all academic units for both experimental and control groups (see Table 4.35). Unexpectedly, Communication students deemed television news to be most credible among all other types of students—no matter whether or not they acquired knowledge of digital video post-production techniques.

WEB: Academic Group Descriptives for PCI by Treatment Groups

perceivedCredibility

Treatment Group		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
WEB Exp	Communication	33	3.3283	.58850	.10244	3.1196	3.5370	2.33	4.50
	Liberal Arts, et. al.	92	3.5471	.60741	.06333	3.4213	3.6729	2.17	4.83
	Engineering, et. al.	50	3.4567	.46268	.06543	3.3252	3.5882	2.50	4.67
	Business, Law	81	3.3601	.60751	.06750	3.2258	3.4944	2.00	5.00
	Other	18	3.5185	.62593	.14753	3.2072	3.8298	2.33	4.67
	Architecture, Fine Arts	17	3.6373	.64073	.15540	3.3078	3.9667	2.67	4.83
	Total	291	3.4582	.58891	.03452	3.3902	3.5261	2.00	5.00
WEB Control	Communication	40	3.1542	.61020	.09648	2.9590	3.3493	2.00	4.83
	Liberal Arts, et. al.	126	3.5582	.61403	.05470	3.4499	3.6665	2.00	5.00
	Engineering, et. al.	90	3.2963	.55910	.05893	3.1792	3.4134	2.17	5.00
	Business, Law	113	3.2596	.52039	.04895	3.1626	3.3566	2.17	5.00
	Other	42	3.5119	.65786	.10151	3.3069	3.7169	2.33	5.00
	Architecture, Fine Arts	19	3.6579	.49527	.11362	3.4192	3.8966	3.00	5.00
	Total	430	3.3872	.59611	.02875	3.3307	3.4437	2.00	5.00

Table 4.35: WEB: Academic Group Descriptives for PCI by Treatment Group

Results indicated that there was not a statistically significant difference between the means of the perceived credibility indices across all academic affiliation groups within the experimental group ($F = 1.557$, $df = 5, 285$, $p < .172$) (see Table 4.36). Results indicated, however, that there was a statistically significant difference between the means of the perceived credibility indices across all academic affiliation groups within the control group ($F = 6.264$, $df = 5, 424$, $p < .01$) (see Table 4.36). This means that among the students who acquired knowledge of digital video post-production techniques, students with differing academic preparations perceived the credibility of television news similarly. However, for those students who did not acquire knowledge of digital video post-production techniques, students with differing academic preparation perceived the credibility of television news in a different way.

WEB: ANOVA Test Comparing PCI Across Academic Groups by Teatment Groups

perceivedCredibility

Treatment Group		Sum of Squares	df	Mean Square	F	Sig.
WEB Exp	Between Groups	2.675	5	.535	1.557	.172
	Within Groups	97.900	285	.344		
	Total	100.575	290			
WEB Control	Between Groups	10.486	5	2.097	6.264	.000
	Within Groups	141.960	424	.335		
	Total	152.446	429			

Table 4.36: WEB: ANOVA Test Comparing PCI across Academic Groups by Treatment Group

Because there was a statistical difference between all academic groups within the control sample, a series of t-Tests were used to compare the Communication group against every other academic group in the control sample (see Tables 4.37 through 4.46). In the experimental group, there was no significant difference between academic groups, and therefore no further analysis was needed for those experimental subjects. After the series of t-Tests was performed, there was a statistically significant difference between the mean of the Communication group (*M =3.15*) *and* the Liberal Arts, et al. group (*M = 3.56*), the Other group (*M = 3.51*), and the Architecture, Fine Arts group (*M = 3.66*). There was no statistically significant difference between the mean of the Communication group and the Engineering, et al. and Business, Law groups (see Tables 4.37 through 4.46). In short, for those students who did not acquire knowledge of digital video post-production techniques, Communication students perceived television news to be more credible than a majority of other types of students.

WEB: Academic Group Statistics for Communication & Liberal Arts et al (Control Group Subjects Only)

	School	N	Mean	Std. Deviation	Std. Error Mean
perceivedCredibility	Communication	40	3.1542	.61020	.09648
	Liberal Arts, et. al.	126	3.5582	.61403	.05470

Table 4.37: WEB: Academic Group Statistics for Communication & Liberal Arts et al. (Control Group Subjects Only)

WEB: Independent Samples Test between PCI Means for Communication & Liberal Arts et al (Control Group Subjects Only)

Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
perceivedCredibility	.086	.770	-3.631	164	.000	-.40403	.11127	-.62374	-.18432

Table 4.38: WEB: Independent Samples Test between PCI Means for Communication & Liberal Arts et al. (Control Group Subjects Only)

WEB: Academic Group Statistics for Communication & Other (Control Group Subjects Only)

	School	N	Mean	Std. Deviation	Std. Error Mean
perceivedCredibility	Communication	40	3.1542	.61020	.09648
	Other	42	3.5119	.65786	.10151

Table 4.39: WEB: Academic Group Statistics for Communication & Other (Control Group Subjects Only)

WEB: Independent Samples Test between PCI Mean for Communication & Other (Control Group Subjects Only)

Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
perceivedCredibility	.002	.960	-2.550	80	.013	-.35774	.14031	-.63696	-.07852

Table 4.40: WEB: Independent Samples Test between PCI Means for Communication & Other (Control Group Subjects Only)

WEB: Academic Group Statistics for Communication & Architecture, Fine Arts (Control Group Subjects Only)

	School	N	Mean	Std. Deviation	Std. Error Mean
perceivedCredibility	Communication	40	3.1542	.61020	.09648
	Architecture, Fine Arts	19	3.6579	.49527	.11362

Table 4.41: WEB: Academic Group Statistics for Communication & Architecture, Fine Arts (Control Group Subjects Only)

WEB: Independent Samples Test between PCI Mean for Communication & Architecture, Fine Arts (Control Group Subjects Only)

Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
perceivedCredibility	2.506	.119	-3.137	57	.003	-.50373	.16060	-.82532	-.18214

Table 4.42: WEB: Independent Samples Test between PCI Means for Communication & Architecture, Fine Arts (Control Group Subjects Only)

WEB: Academic Group Statistics for Communication & Engineering et al (Control Group Subjects Only)

	School	N	Mean	Std. Deviation	Std. Error Mean
perceivedCredibility	Communication	40	3.1542	.61020	.09648
	Engineering, et. al.	90	3.2963	.55910	.05893

Table 4.43: WEB: Academic Group Statistics for Communication & Engineering et al. (Control Group Subjects Only)

WEB: Independent Samples Test between PCI Means for Communication & Engineering et al (Control Group Subjects Only)

Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
perceivedCredibility	.620	.433	-1.300	128	.196	-.14213	.10930	-.35839	.07413

Table 4.44: WEB: Independent Samples Test between PCI Means for Communication & Engineering et al. (Control Group Subjects Only)

WEB: Academic Group Statistics for Communication & Business, Law (Control Group Subjects Only)

	School	N	Mean	Std. Deviation	Std. Error Mean
perceivedCredibility	Communication	40	3.1542	.61020	.09648
	Business, Law	113	3.2596	.52039	.04895

Table 4.45: WEB: Academic Group Statistics for Communication & Business, Law (Control Group Subjects Only)

WEB: Independent Samples Test between PCI Mean for Communication & Business, Law (Control Group Subjects Only)

Equal variances assumed

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
perceivedCredibility	1.588	.210	-1.051	151	.295	-.10542	.10027	-.30354	.09270

Table 4.46: WEB: Independent Samples Test between PCI Means for Communication & Business, Law (Control Group Subjects Only)

TESTING HYPOTHESIS 4

Recall that Hypothesis 4 is the following:

Subjects who consume a low amount of television news perceive television news as less credible than those who consume a high amount of television news.

To test this hypothesis, a correlation test was performed between the two variables of the approximate amount of television news a subject consumed in the prior week and the perceived credibility index. Next, the samples were divided into three sub groups containing subjects who consumed a small amount of television news, subjects who consumed a moderate amount of television news, and subjects who consumed a high amount of television news. An ANOVA was performed across the three subgroups to determine if there was a significant difference between the subgroups' means of the perceived credibility indices. If a difference was found with the ANOVA test, t-Tests were then performed between the low consumption group and the other groups.

Face to face setting: television news consumption analysis

In the F2F setting, a correlation test *across the entire sample* showed that there was no relationship between how much television news a subject consumed and how he or she perceived its credibility (*N = 68, r = .068, p < .584*) (see Tables 4.47 and 4.48).

F2F: Descriptive Statistics for PCI & Consumption of TV News

	Mean	Std. Deviation	N
Perceived Credibility Index	3.3554	.54324	68
Hours of television news watched last week.	7.0882	8.67960	68

Table 4.47: F2F: Descriptive Statistics for PCI Consumption of TV News

F2F: Correlation Between PCI & Consumption of TV News

		Perceived Credibility Index	Hours of television news watched last week.
Perceived Credibility Index	Pearson Correlation	1	.068
	Sig. (2-tailed)		.584
	N	68	68
Hours of television news watched last week.	Pearson Correlation	.068	1
	Sig. (2-tailed)	.584	
	N	68	68

Table 4.48: F2F: Correlation between PCI & Consumption of TV News

The same correlation test performed *within both treatment groups* in the F2F setting showed no relationship between how much television news a subject consumed and how he or she perception its credibility—regardless of whether or not the subject

acquired knowledge of digital video post-production techniques (*N= 34, r= -.014, p< .937*) (*N= 34, r= .118, p< .507*) (see Table 4.49). In brief, in the F2F sample, there was no association between the number of hours spent watching television news and how a subject perceived the credibility of television news.

F2F Correlations between Television News Consumption and PCI by Treatment Group

Treatment Group			Hours of television news watched last week.	Perceived Credibility Index
F2F Exp	Hours of television news watched last week.	Pearson Correlation	1	-.014
		Sig. (2-tailed)		.937
		N	34	34
	Perceived Credibility Index	Pearson Correlation	-.014	1
		Sig. (2-tailed)	.937	
		N	34	34
F2F Control	Hours of television news watched last week.	Pearson Correlation	1	.118
		Sig. (2-tailed)		.507
		N	34	34
	Perceived Credibility Index	Pearson Correlation	.118	1
		Sig. (2-tailed)	.507	
		N	34	34

Table 4.49: F2F: Correlations between Television News Consumption and PCI by Treatment Group

Web version: television news consumption analysis

A correlation test was performed between the amount of television news subjects consumed and their perceived credibility indices for the web version sample. Results showed a slight negative correlation between consumption of television news and perceived credibility of television news (*N = 721, r = -.077, p < .038*). This means that

as subjects viewed more hours of television news they tended to perceive television news to be more credible (low PCI values). As the number of hours increased, the value of the perceived credibility index decreased. Recall that lower values on the PCI scale equate to higher levels of credibility (see Tables 4.50 and 4.51).

WEB: Descriptive Statistics for PCI & Consumption of TV News

	Mean	Std. Deviation	N
Perceived Credibility Index	3.4159	.59383	721
Hours of television news watched last week.	6.2436	8.79848	721

Table 4.50: WEB: Descriptive Statistics for PCI & Consumption of TV News

WEB: Correlation Between PCI & Consumption of TV News

		Perceived Credibility Index	Hours of television news watched last week.
Perceived Credibility Index	Pearson Correlation	1	-.077*
	Sig. (2-tailed)		.038
	N	721	721
Hours of television news watched last week.	Pearson Correlation	-.077*	1
	Sig. (2-tailed)	.038	
	N	721	721

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.51: WEB: Correlation between PCI & Consumption of TV News

It was possible that the acquisition of knowledge of digital video post-production techniques influenced how a subject perceived the credibility of television news—no

matter their television news consumption level. Thus, the same correlation test was performed *within both treatment groups* in the web setting. Results showed that there was no relationship between consumption of television news and perceived credibility of television news in the experimental group (*N= 291, r= -.029, p< .621*) but that there was a slight negative correlation in the control group (*N=430, r= -.101, p< .037*) (see Table 4.52). This means that, within the control group, subjects who viewed more hours of television news tended to perceive television news to be more credible. As expected, when the number of television news viewing hours increased, the value of the perceived credibility index decreased.

WEB: Correlations between Television News Consumption and PCI by Treatment Group

Treatment Group			perceived Credibility	Hours of television news watched last week.
WEB Exp	perceivedCredibility	Pearson Correlation	1	-.029
		Sig. (2-tailed)		.621
		N	291	291
	Hours of television news watched last week.	Pearson Correlation	-.029	1
		Sig. (2-tailed)	.621	
		N	291	291
WEB Control	perceivedCredibility	Pearson Correlation	1	-.101*
		Sig. (2-tailed)		.037
		N	430	430
	Hours of television news watched last week.	Pearson Correlation	-.101*	1
		Sig. (2-tailed)	.037	
		N	430	430

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.52: WEB: Correlations between Television News Consumption and PCI by Treatment Group

Television news consumption subgroup analysis

To further clarify the correlations performed, the samples were then divided into subgroups. Subjects who reported having consumed 3 or less hours of television news in the last week were placed into the "low consumption" subgroup, while those who reported having consumed more than 3 but less than 8 hours were placed in the "moderate consumption" subgroup. Those who reported having consumed more than 8 hours of television news were placed into the "high consumption" subgroup. These divisions were based on the web version sample, which showed that on average, subjects consumed 6.24 hours of television news in the least week (see Table 4.53). This marker acted as the gauge for the F2F sample in order to keep the analysis consistent across methodologies. The distribution of the subjects into the subgroups are shown in Tables 4.54 and 4.55.

WEB: Statistics for Hours of Television News Consumed In The Last Week

Hours of television news watched last week.

N	Valid	721
	Missing	0
Mean		6.2436

Table 4.53: WEB: Statistics for Hours of Television News Consumed In The Last Week

F2F: Descriptives for TV News Consumption Subgroups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low Consumption	29	42.6	42.6	42.6
	Moderate Consumption	22	32.4	32.4	75.0
	High Consumption	17	25.0	25.0	100.0
	Total	68	100.0	100.0	

Table 4.54: F2F: Descriptives for TV News Consumption Subgroups

WEB: Descriptives for TV News Consumption Subgroups

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low Consumption	365	50.6	50.6	50.6
	Moderate Consumption	177	24.5	24.5	75.2
	High Consumption	179	24.8	24.8	100.0
	Total	721	100.0	100.0	

Table 4.55: WEB: Descriptives for TV News Consumption Subgroups

The ANOVA test performed across the three subgroups showed no significant difference between the means of the PCI for each subgroup in the F2F sample (*F =.118, df =2,65, p < .889*) or the web sample (*F =1.371, df =2,718, p < .255*) (see Tables 4.56 through 4.59). This means that no matter how familiar subjects were with digital compositing software and techniques, there was no difference in how they rated the credibility of television news.

F2F: ANOVA Descriptives for TV News Consumption Subgroups

Perceived Credibility Index

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Low Consumption	29	3.3678	.65523	.12167	3.1186	3.6171	2.17	4.67
Moderate Consumption	22	3.3106	.46089	.09826	3.1063	3.5150	2.50	4.00
High Consumption	17	3.3922	.44854	.10879	3.1615	3.6228	2.67	4.17
Total	68	3.3554	.54324	.06588	3.2239	3.4869	2.17	4.67

Table 4.56 F2F: ANOVA Descriptives for TV News Consumption Subgroups

F2F: ANOVA Comparing PCI across TV News Consumption Subgroups

Perceived Credibility Index

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.072	2	.036	.118	.889
Within Groups	19.701	65	.303		
Total	19.772	67			

Table 4.57: F2F: ANOVA Comparing PCI across TV News Consumption Subgroups

WEB: ANOVA Descriptives for TV News Consumption Subgroups

perceivedCredibility

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Low Consumption	365	3.4516	.61469	.03217	3.3883	3.5149	2.00	5.00
Moderate Consumption	177	3.3870	.59201	.04450	3.2992	3.4748	2.00	5.00
High Consumption	179	3.3715	.54932	.04106	3.2905	3.4525	2.17	4.83
Total	721	3.4159	.59383	.02212	3.3724	3.4593	2.00	5.00

Table 4.58: WEB: ANOVA Descriptives for TV News Consumption Subgroups

WEB: ANOVA Comparing PCI across TV News Consumption Subgroups

perceivedCredibility

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.966	2	.483	1.371	.255
Within Groups	252.930	718	.352		
Total	253.895	720			

Table 4.59: WEB: ANOVA Comparing PCI across TV News Consumption Subgroups

To investigate in the same manner as with the previous correlations, ANOVA tests were performed to compare the PCI values of the three television news consumption subgroups *within each treatment group for both the F2F and web samples.* No significant difference between the subgroups within each treatment of both samples was

found. This means that no matter how many hours of television news subjects consumed in the past week, their perception of television news credibility was the same whether or not they acquired knowledge of digital video post production techniques (see Tables 4.60 through 4.63).

F2F: Descriptives for ANOVA Comparing TV News Consumption Subgroups Within Treatment Groups

Perceived Credibility Index

Treatment Group		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
F2F Control	Light TV News Consumer	23	3.2319	.64889	.13530	2.9513	3.5125	2.17	4.67
	Moderate TV News Consumer	10	3.3000	.36683	.11600	3.0376	3.5624	2.67	3.83
	Heavy TV News Consumer	1	3.6667	.	.	.	.	3.67	3.67
	Total	34	3.2647	.56871	.09753	3.0663	3.4631	2.17	4.67
F2F Exp.	Light TV News Consumer	21	3.4921	.53613	.11699	3.2480	3.7361	2.33	4.33
	Moderate TV News Consumer	8	3.2083	.38576	.13639	2.8858	3.5308	2.67	3.67
	Heavy TV News Consumer	5	3.6333	.51908	.23214	2.9888	4.2779	2.83	4.17
	Total	34	3.4461	.50871	.08724	3.2686	3.6236	2.33	4.33

Table 4.60: F2F: Descriptives for ANOVA Comparing TV News Consumption Subgroups Within Treatment Groups

F2F: ANOVA Comparing PCI Across TV News Consumption Subgroups Within Treatment Groups

Perceived Credibility Index

Treatment Group		Sum of Squares	df	Mean Square	F	Sig.
F2F Control	Between Groups	.199	2	.099	.294	.747
	Within Groups	10.474	31	.338		
	Total	10.673	33			
F2F Exp.	Between Groups	.672	2	.336	1.324	.281
	Within Groups	7.868	31	.254		
	Total	8.540	33			

Table 4.61: F2F: ANOVA Comparing TV News Consumption Subgroups Within Treatment Groups

WEB: Descriptives for ANOVA Comparing TV News Consumption Subgroups Within Treatment Groups

perceivedCredibility

Treatment Group		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
F2F Control	Low Consumption	221	3.4178	.61085	.04109	3.3368	3.4988	2.00	5.00
	Moderate Consumption	97	3.4227	.60623	.06155	3.3005	3.5449	2.00	5.00
	High Consumption	112	3.2961	.55196	.05216	3.1928	3.3995	2.17	4.83
	Total	430	3.3872	.59611	.02875	3.3307	3.4437	2.00	5.00
F2F Exp.	Low Consumption	144	3.5035	.61907	.05159	3.4015	3.6054	2.17	5.00
	Moderate Consumption	80	3.3438	.57512	.06430	3.2158	3.4717	2.00	4.83
	High Consumption	67	3.4975	.52504	.06414	3.3694	3.6256	2.33	4.50
	Total	291	3.4582	.58891	.03452	3.3902	3.5261	2.00	5.00

Table 4.62: WEB: Descriptives for ANOVA Comparing TV News Consumption Subgroups Within Treatment Groups

WEB: ANOVA Comparing PCI Across TV News Consumption Subgroups Within Treatment Groups

perceivedCredibility

Treatment Group		Sum of Squares	df	Mean Square	F	Sig.
F2F Control	Between Groups	1.258	2	.629	1.776	.171
	Within Groups	151.188	427	.354		
	Total	152.446	429			
F2F Exp.	Between Groups	1.447	2	.723	2.101	.124
	Within Groups	99.128	288	.344		
	Total	100.575	290			

Table 4.63: WEB: ANOVA Comparing PCI Across TV News Consumption Subgroups Within Treatment Groups

Chapter 5: Discussion & Conclusion

DISCUSSION OF HYPOTHESIS 1

Acquiring knowledge of digital video post-production techniques influences audiences to perceive television news as less credible.

Key findings from testing this hypothesis showed that, when comparing all subjects within each methodology, acquiring knowledge of digital video post-production techniques did not influence how a subject perceived the credibility of television news. However, a relationship was found between how trusting a subject was of government officials and his or her perception of television news credibility. That is, as subjects tended to trust government officials, they also tended to perceive television news as credible. It was also found that a subject's amount of education and his or her academic preparation may have influenced how that subject perceived the credibility of television news. Subjects with more years of education tended to perceive television news as less credible than subjects with fewer years of education. Most importantly, however, is the finding that subjects with fewer years of education who acquired knowledge of digital video post-production techniques perceived television news to have less credibility.

There are several explanations for the absence of a relationship between credibility assessments and knowledge of techniques. The stimulus may have failed to show an effect on subjects across treatment groups within the entire F2F and WEB samples because it did not communicate enough knowledge of digital post-production techniques. The assumption that simply watching the stimulus would effectively communicate knowledge of post-production techniques may have been mistaken.

Becoming aware of post-production techniques may not be as simple as watching a video demonstration showing the results of particular operations for compositing disparate digital video footage sources. Becoming aware of a technique may require multiple exposures to the technique's methods so that it may be conceptualized as a technique by a perceiver. Detailed knowledge of a technique may also be cultivated through the practice and application of skills over a period of time. The expectation that subjects would acquire enough knowledge of digital video post-production techniques to influence their perception of television, even temporarily, news credibility may have been unrealistic.

Perhaps, also, there was not enough detail in demonstrating the techniques within the video stimulus. For example, the software tool interface for performing the techniques was never shown visually. Seeing icons, menus, and window dialogues could have helped subjects understand that the techniques were being produced by a tangible software and hardware application. No human operator was shown using the software or hardware for performing the techniques. Showing a person actually *doing* the technique could have helped subjects realize that a person has the capacity to choose how and for what reason to execute a digital compositing technique. Interviews with professional operators may have also helped to contextualize the use of digital video post-production techniques in news stations. Such additions to a video stimulus could have made the subjects more aware that the production methods for manipulating video are now prevalent and easily accessible.

Furthermore, the stimulus could have lost subjects' focus of attention. As there was no audio track, subjects could have missed part of the video if they looked away for a brief moment. Audio, such as a voice over, could have helped subjects retain parts of the demonstration in memory or, at the very least, helped them comprehend it better. Recall that Fahmy (2007) found this to be the case as her study's video stimulus showing the

manipulation of digital still images with *Adobe Photoshop* had a voice over. This supports the notion that to communicate knowledge effectively more than one sense should be stimulated.

Even though the video stimulus showed no overall effect on the experimental groups in both the F2F and web versions, it would also seem that, because the techniques were demonstrated with broadcast television news clips, the stimulus would still influence a person's perception of television news. The lack of an effect from the stimulus across the entire samples therefore warranted more investigation and statistical analysis on *subsets* of the F2F and web samples.

On the other hand, perhaps a *majority* of subjects perceived television news as having little credibility. If this were the case, then perhaps this is why when those subjects saw the stimulus manipulating television news clips, their perceptions were not changed. Perhaps also the majority of subjects were masking the effect of the stimulus on the subjects that perceived television news as having credibility. After dividing the subjects into sub samples based on levels of skepticism, it was found that in the F2F setting, the stimulus had an effect on the "non-skeptical" sub sample, but not the "neutral" or "skeptical" sub samples. In the web setting, the stimulus had an effect on the "non-skeptical" and "skeptical" sub samples, but not the "neutral" sub sample.

An apparent discrepancy was found between the two different methodologies of the experiment when using the sub samples scheme. Because the samples for the F2F and web versions of the experiment differed significantly in their demographic makeup, one logical step towards understanding the discrepancy was to investigate whether demographic variables played a role in the stimulus's effect. The amount of education a subject had appeared to be a factor that differentiated the effect of the stimulus in the web sample. After the stimulus was shown to the web experimental group, the undergraduate

subjects were affected by the stimulus so that they perceived television news as less credible. However, this was not the case for graduate students in the web sample. The stimulus did not affect graduate students in the web experimental group. This may have been the case because the graduate students already perceived television news as having little credibility. These findings show that the stimulus had a significant effect on subjects with less education but not on subjects with more education. This implies that the stimulus performed some type of education or filled in a "gap" of media literacy knowledge. *Therefore, Hypothesis 1 is supported among particular groups.*

DISCUSSION OF HYPOTHESIS 2

> *Subjects who are familiar with digital compositing software and techniques perceive television news as less credible than those who are less familiar.*

Recall that there was no relationship between how familiar a subject was with digital compositing software and techniques and how credible he or she perceived television news. This means that subjects in both web and F2F settings did not connect their familiarity of the tool with how they perceive the credibility of television news. One possibility as to why such a connection did not exist is that simply because a person is familiar with a tool or a technique, does not mean he or she will consider the use of that tool in a particular context—such as during the post-production phase of television news. For example, an artist, journalist, or scientist may be familiar with a tool only in a context that is particular to his or her practice. A scientist may not be as familiar with a tool like *Adobe Photoshop* as an artist may be.

Reaves (1992) found that visual editors at newspapers who were familiar with computer technology were not as tolerant of digital manipulation as visual editors who were unfamiliar with computer technology. In contrast, Greer and Gosen (2002) found that subjects who were familiar with technology had more tolerance for image manipulation. What is salient here is the general makeup of the samples in these researchers' respective studies. In the Reaves study, subjects were professional journalists working at newspaper companies, while Greer and Gosen did not acquire a sample from the population of professional journalists. The differing findings in their studies regarding tolerance of digital manipulation could be traced to the familiarity the subjects had with the use of image manipulation tools within specific contexts. Some subjects knew the tools' use within their role as professional visual editors, while other subjects, for example, knew the tools' use in their role as college students. Media literacy education could thus play a role in helping people become familiar with how a tool like *Adobe Photoshop* or *Adobe Aftereffects* can be used in different contexts. This would, in effect, help people to understand that the context within which manipulation techniques are used is relevant to the concept of media credibility.

The lack of a correlation could also imply that people have some kind of expectation that operators who work with digital video post-production tools do so ethically. For example, people may not expect news producers, who are certainly familiar with the tools and techniques of their trade, to mislead the public. This notion means, for example, that knowing what *Adobe Photoshop*, *Adobe AfterEffects*, or chroma keying is capable of may have little to do with how one perceives the credibility of television news. Rather, knowing that an operator can use such tools and techniques to manipulate imagery in order to purposefully mislead viewers may affect perceived credibility.

It is apparent from the present study that image manipulation techniques can be used to mislead people. However, it seems that audiences may not infer that news producers have the potential to use image manipulation techniques in unethical ways because they are not familiar with the tools in the same ways that news producers are. Meanwhile, tools in newsrooms are becoming so complex in their capabilities yet so intuitive to interface with that education for news professionals or journalists should emphasize the ethical use of image manipulation tools especially for video post-production. Straubhaar & LaRose (2006) noted that "since relatively few people get to create professional media content, those who do need to consider the impact of their actions on society" (471). *Hypothesis 2 is not supported.*

DISCUSSION OF HYPOTHESIS 3

Subjects with academic preparation in the discipline of communication perceive television news as less credible than subjects with other academic preparation.

In the control samples for both versions of the experiment, subjects with academic preparation in the discipline of communication perceived television news to be *more credible* than a majority of other types of students. Thus, hypothesis 3 is not supported.

In order to understand why Communications students perceived television news with the highest amount of credibility when compared to other types of students, it should be recognized that Communication students may simply want to believe that the media produce credible products in a professional manner. Communication students, perhaps more so than other types of students, approach their studies with a particular aspiration to

become a practitioner in the media or communications industry who they identify with. With this aspiration comes a belief that their object of identification maintains some semblance of credibility—along with all the media products that showcase their object of identification. Another reason that Communications students perceived television news with the highest amount of credibility could be that they are not taught enough media literacy curricula, or that perhaps there is a limited amount of media literacy curricula required by communication departments.

In addition to their aspirations, Communication students may give credence to the existing media literacy curriculum and instruction they encounter during their studies. If this is the case, they may predict that when they make use of the media literacy knowledge and production skills they gain as communication students, they will perceive their own work as having credibility. This theory may provide one explanation for why communication students perceived television news as credible more so than students from other academic groups.

A narrative example can illustrate this theory. Take, for example, an average media production student: Eddie. As a student, Eddie learns from his teachers, whom he generally deems as credible sources of information. Eddie imagines that he may one day be working at a news broadcast station. For his future career, Eddie has dreamed of being a video editor that cuts news segments together for broadcasts. While acquiring skills in editing class, Eddie learns in his media studies class that there is a code of ethics by which media content producers are expected to abide, and that when producers fail to operate within this ethical code, it can have a detrimental effect on society at large and cost them their jobs. Eddie extrapolates from this that if he does not abide by that ethical code when he becomes a video editor, he could be fired from his imagined job because his actions would be detrimental to society. As a student, Eddie deduces that most

professional media producers operate within an ethical code to avoid harming society and possibly losing their jobs. He tells himself that his future news segments will need to be cut so as to maintain as much truth to the story as possible so that he will not harm society or lose his dream job. For this reason, Eddie may deem television news as credible more so than his friends with academic preparations in other disciplines.

While Eddie does not represent all communications students, this illustration provides one explanation for why communication students perceived television news as credible more so than students from other academic groups. Because the code of ethics for news media producers may not necessarily be taught in fields other than communications, students within these other fields may not expect news media producers to abide by ethical standards. If a person does not think there is an ethical standard for producing news media content, he or she may perceive news content to have little credibility. This is a problem that Greer and Gosen (2002) identified as well: "Newsrooms should revisit their ethics policies and add or update photo manipulation standards on their lists. Sharing such policies with the public could help increase trust in journalism and stop the erosion of media credibility that has taken place in recent years" (8).

In order to address this problem, a state mandated policy whereby television news media producers are certified, much in the same way that lawyers and physicians are, would essentially protect the credibility of television news. As part of a certification process, a television news media producer would be assessed for his or her understanding of media ethics and knowledge of history in mass media scandal. Certification would also require continuing education in order to keep certified individuals up to date on the ethics of emerging post-production techniques. This could effectively preserve the

credibility of video as it shifts onto mobile devices with screens that have limited spatial resolution.

DISCUSSION OF HYPOTHESIS 4

Subjects who consume a low amount of television news perceive television news as less credible than those who consume a high amount of television news.

In the F2F setting, the frequency at which subjects consumed television news was not related to the way they perceived the medium's credibility. The television news consumption patterns of the subjects in the F2F sample were homogeneous enough that a relationship involving television news consumption would be unlikely to emerge. A majority of the subjects (65%) reported being light television news consumers, which meant that the sample contained a limited type of television news consumer.

In the present study, the web sample contained a wider range of television consumption behavior than the F2F sample, allowing for a higher probability that a relationship could emerge in the web sample. In the web setting, there was a slight positive association between the perceived credibility of television news and the amount of television news consumed by subjects. As noted in the Literature Review section, Rimmer and Weaver (1987) also found a slight association between these variables. Perhaps this slight relationship could mean that when people consume television news frequently, there may be a tendency for them to perceive television news as having credibility. This conclusion is supported by Rimmer and Weaver's (1987) finding that "those who normally watch television two or more hours a day are somewhat more likely

to rate the credibility of TV news higher than those who watch less than two hours a day" (32).

The correlation between television news consumption and perceived credibility held for people in the web control group, but it did not hold for people in the web experimental group. From this observation across the two web treatment groups, *the stimulus* may have been the cause for disconnecting the relationship between how much television news people consume and how they perceive television news credibility. This could imply that when people who watch a lot of television news learn about the malleability of digital video, their perception of television news credibility could shift such that they would perceive television news as less credible. Thus, for people who engage with television news frequently, acquiring knowledge of digital video post-production techniques has the potential to influence how they perceive the credibility of television news.

It has been noted that there is an appropriate and inappropriate way of reading pictorial representations according to the styles associated with a particular time period (Kepes 1944; Arnheim 1954). Subjects who have a high engagement with television news may therefore be well adjusted to the appropriate way of reading pictorial representations. Now consider the stimulus as the revealing of how an illusion is constructed. Arnheim theorized that,

> Actual illusions are, of course rare; but they are the extreme and most tangible manifestation of the fact that, as a rule, in any given cultural context the familiar style of pictorial representation is not perceived as that at all—the [illusory] image looks simply like a faithful reproduction of the object itself (137).

In the context of this theory, the illusory characteristic of the stimulus may have redefined how frequent television viewers read images and therefore think about their credibility.

For further clarification, however, it was found that when the web sample was divided into three subgroups of subjects of low, moderate, and high television news consumption there was no difference in how subjects across those subgroups perceived television news credibility. Furthermore, when investigating across the subgroups within the treatments of both methodologies, there was no significant difference either. While the correlation showed a very slight relationship between perceived credibility and television news consumption, the subgroup comparison showed no difference among subjects with differing television news consumption levels. In reconciling these findings, it should be noted that the amount of consumed television news may or may not have a bearing on the consumer's perception of television news whether or not they learned about digital video post-production techniques. While this may be the case, it would be of interest to investigate if increased exposure to knowledge for digital video manipulation techniques—rather than to television news—has any bearing on how an individual perceives the credibility of television news.

A slight correlation found within the web sample amongst the subjects who did not acquire any knowledge of digital video post-production techniques faintly supports the Hypothesis 4. However, Hypothesis 4 is not supported for all other groups.

CONCLUSION

The results of this study may inform how media literacy is taught, how television news producers can protect the credibility of television news, and how media effects experiments are designed and conducted. With regards to media literacy, future research could investigate what is included in media literacy curricula with regards to the technical manipulation of moving imagery. A content analysis of editing courses across a series of universities could be helpful in determining whether or not media ethics are being taught

alongside technical skills. Another future research endeavor could investigate how an entire course in digital compositing or visual effects influences the way that people with academic preparation in media production perceive the credibility of television news. In this case, a research project would consider the course itself as a stimulus that might be more likely to do a thorough job in communicating knowledge of digital video post-production techniques.

It would also be interesting for the development of media literacy curricula to replicate this experiment with samples at more varied educational levels than the subjects in this study. The demographic variable of education seemed to play a significant role in how people perceive the credibility of television news and how people acquire knowledge of digital post-production techniques. Sampling subjects from a population of individuals who are in earlier stages of their education, for example—children, would provide additional information as to the power of the education demographic in determining how an individual perceives credibility of television news. Alternatively, it would be of interest to note how the perception of older adults, who have less education than a typical college student, would be influenced after having learned about digital video manipulation techniques. While this study examined small to medium sized samples, it would be useful for future research to seek out larger samples with a wider demographic composition in order to understand what other factors, if any, affect a person's perception of television news credibility in the context of acquiring knowledge of digital video post-production techniques. While this study showed some subtle effects of acquiring knowledge of digital video manipulation techniques, larger samples with a wider range of demographics may show more significant effects.

Future television news credibility research employing different methodologies could provide data that may further clarify the findings presented in this study. The

present study used an experiment with a questionnaire to evaluate how people perceived the credibility of television news having acquired or not acquired knowledge of digital video post-production techniques. Benefits of this approach include the fact that the study is extremely portable and replicable. The study could be conducted with samples from another large U.S. university to corroborate the current findings. Furthermore, there is a limited time commitment on the part of subjects who participated in the experiment as well as on the part of the administrator. Extending this time commitment could mean less participation—for example interviews would require more preparation time for the administrator and more time for codification of interviewee's answers. Naturally, the subjects participating in a study that uses interviews as the main source of data would have to commit more time. From a statistical analysis standpoint, quantitative data collected in this study could be easily analyzed for significant findings. Furthermore, data collected through the web version of this study's experiment could be honed down into a randomly selected group of subjects for further investigation. For example, it would be possible to ensure that the experimental and control groups in the web version of the study be the same size. It would also be possible to do more a more refined random selection of subjects from the web sample so that more conclusions could be made between the F2F and web implementation of the experiment.

Other future research activities derived from this study could inform how television news producers maintain the credibility of television news. An exploratory investigation could survey television news producers on their thoughts about a state mandated policy for certification and continuing education in their field. This investigation could gauge whether or not initiating such a policy would be accepted by a community of television news producers. In addition, members of the public could be surveyed to measure their reactions to the same policy.

One important question derived from this study addresses how television news can maintain its credibility in the face of new technological developments. Mobile technologies, in combination with developing digital compositing techniques, could impact the way that people perceive the journalistic, moving image. As video shrinks spatially, it is more difficult to detect any type of artifact after a compositing operation. This could be verified by conducting an experiment that tested whether people noticed composite artifacts on small screens as opposed to large screens. The resulting information would be useful to television news producers as they seek to maintain the credibility of television news in a shifting technological landscape. In addition, if results showed that it was more difficult to detect compositing artifacts on mobile devices, this would support scientific research for the development of technology that could reconcile mobility with credibility. For example, a nano-sized projector embedded into an iPod could significantly enhance the resolution of visual information coming through the iPod. New markers for credibility may emerge as a result of new technologies, and such a study could show that resolution of news media content may act as one of many credibility markers.

This study also introduced a novel methodology in the design of media effects experiments. This included the acquisition of subjects through the World Wide Web and the conducting of an experiment within a "virtual" laboratory. Two main problems emerged from the web version of the experiment conducted for this study: the lack of control that the experiment administrator had on whether or not subjects paid full attention to the stimulus while it played and the fact that there were more subjects in the control group than in the experimental group. Methodologies that consider a "virtual" laboratory for conducting experiments should consider what interaction and visual designs will help subjects maintain engagement with stimuli that appear on screen or emit

from a speaker. With social research conducted with surveys, the line between an administrated survey and a self-administered survey is likely to blur. The role of the administrator can now be embodied into an on-screen survey by employing new interface engineering techniques whereby certain elements appear to the respondent as they fill things out. To keep subjects engaged with the survey, it would be worth investigating the difference in the response rates to surveys that employ multimedia components against a survey that used only text. Such multimedia components could include audio that plays when the user needs help, or video that plays when users need a visual example of what the item on the survey is asking. Real-time error notification can help ensure data is coming in consistently as well. Many of these suggestions are now possible with the latest programming and scripting trends in web-based applications (i.e. AJAX or ActionScript).

In considering the dual methodologies used in this study, the face-to-face version was more difficult to administer than the web version due to necessary time and labor constraints. However, the web version required a significant amount of computer programming knowledge and pilot testing. From an economic perspective, developing the web version was more costly than administering the face-to-face version. Furthermore, the face-to-face version did not require obtaining a database of several thousand email addresses, which makes it simpler to replicate for future research. One drawback to the face-to-face version, however, was that the sample size was smaller and demographics were more homogenous than the web version. However, with a large sample size in the web version, it would be possible to randomly select subjects from the original sample into group sizes that matched the face-to-face groups. In addition, it is possible to randomly select additional matching groups in order to gauge the viability of

conducting media effects experiments within a "virtual" laboratory without the need for a face-to-face experiment.

One interesting aspect to the face-to-face methodology was that participants had an incentive to watch the video stimulus or complete the questionnaire. In the web version, no incentive was given to participants. This shows that with web mediated studies, there may be less of a need to provide incentives than with face-to-face surveys. Perhaps this is due to the relative convenience of web mediate surveys as opposed to the arduous task of being present at a physical setting for fifteen to thirty minutes.

One way to reconcile the sample size problem in the face-to-face setting, and to minimize administrative efforts, would be to conduct an experiment in more than one auditorium filled with subjects. That is to say, for example, researchers could show a video stimulus to an audience of four hundred subjects at one time, and these subjects could afterwards complete a questionnaire. Meanwhile, the same questionnaire would be handed to another set of subjects in a different auditorium without showing a video stimulus.

While some of the results between the two methodologies differed, other results were found to be similar. From a methodological perspective, this may show that there is some validity in conducting an experiment in an online setting. Until online experiment methodologies are more refined, researchers should still consider implementing and administering a parallel experiment in a physical setting in addition to an online version. Dillman (2000) speculates on the future of the survey with new technologies:

> Although it is my expectation that the use of self-administered surveys will increase dramatically in the early years of the twenty-first century, I expect the dominant form of survey design to be mixed mode. Being able to access people by multiple means (visiting the location, sending postal mail to the location mail, sending courier mail to the location, calling on a voice phone, sending to a fax number, or sending to an email address), and the large cost differentials associated

> with different methods mean that pressures will exist to use multiple modes to maintain quality while keeping costs as low as possible. (431)

Although Dillman sees the future of the electronic survey as being mixed mode, his suggestion for the amount of actions to be taken by a social researcher may be too costly. Perhaps a limited number of modes is sufficient for economic reasons and for effective data analysis. Dillman also does not address new trends in telecommunications technologies such as online chat and instant messaging services that may be hosted on an electronic survey in real time as a user responds to items within the survey. In sum, the notion that all communication for an effective survey could be conducted within a virtual space should be considered.

This research study is significant because it shows that in some cases production technique is related to how audiences perceive. This leads to the conclusion that media literacy should strive to include the dissemination of techniques. This needs careful consideration from a media literacy and media production curricula perspective. The curricula for media studies and media production should strive to become more enmeshed with each other insofar as credibility is concerned. For example, news studio production courses should emphasize technique choice, while a course on race and identity should emphasize the technical possibilities to which producers have access. This poses a challenge, since these two curricula have been traditionally separated within courses of study.

Furthermore, the present study is significant because it recognizes that techniques for producing moving images are constantly researched and developed. As a result of the findings in this study, those who practice research and development of image-making techniques should be cautious as to where and how their intellectual property is distributed to various media production outlets, specifically news organizations. For

example, major computer graphics software development firms may want to consider more cautiously where their new visual simulation algorithms are embedded and how tools containing those algorithms are marketed. In terms of marketing, having an operator demonstrate a newly released simulation algorithm on a broadcast television news story should be discouraged. In terms of embedding the algorithms, economic opportunities exist for differentiating the packaging of media production software tools based on the content that is produced with the tools. For example, Autodesk Media and Entertainment, Inc. could market a newsroom compositing software package that is different from a visual effects studio compositing software package.

At the same time, a public that watches television news should be assured that news producers are ethical in their use of techniques. There is much research necessary in order to find an appropriate method to achieve this, but it is important to begin the research process. As mentioned earlier, I have proposed a state-mandated government certification or a requirement for continuing education. This may be problematic because, with the emergence of blogging, it would be difficult to require every blogger who posted video to a website to be accredited. Today, it is more important than ever, to know who is responsible for manipulated imagery that is used for news.

To this end, it would seem that meta-data embedded into digital video posted on blogs and mainstream online news sources would help to identify the processing of footage from the moment it is captured through a camera lens to its presentation on a media channel. For example, a website visitor to a blog could examine whether or not a video he or she is watching on a web page had been processed by *Adobe Photoshop*, *Adobe Premiere*, *Adobe AfterEffects* or all three. Essentially this shifts accreditation from the producer to the video product itself. For this to be effective, however, manufacturers of digital video production applications would need to make the meta-data embedding

process an internal function of its software applications. Ensuring that such a function be implemented in every digital video software package would prove very difficult in the face of video processing technologies independently developed. However, a standard interface component to many digital video editing and compositing applications is that of a list of actions taken upon source footage—sometimes known as a "history record." This is essentially a record of actions the user invoked on the original digital media so that they can "undo" as many actions as possible. This "history record" could easily be embedded as meta-data into broadcasted video. To be sure, a producer should have a choice as to whether or not to embed the history into their file for a public to view. If they producer did embed the history meta data into the video file, it would signal to the audience that they cared—at least nominally—about the credibility of the video footage.

Further social implications for this research study could imply that there is an increasing inability for people to determine whether or not media have credibility due to a lack of media production literacy. Researchers have noted this previously when they investigated the adoption of digital photo retouching tools in news rooms, as cited in the Literature Review. In Hantz and Diefenbach's philosophical treatise (2002), the authors point out that "the study of manipulated images is the study of a moving target" (23). What is "moving" is media production technique, but what we do not know is *how* it "moves".

Consider that media production technique, rather than progressing in a sustained linear fashion, fluctuates over time. That is to say, there are periods of time when production technique is more heavily researched and developed, and there are also periods of time when production technique development plateaus. Perhaps when production technique is not heavily researched and developed, the perceived credibility of media is less than when production technique is being developed. The susceptibility of a

society to manipulated imagery fluctuates together with the emergence of media production technique or lack thereof. Figure 5.1 attempts to diagram this fluctuation.

An interesting research project regarding this theory would be to investigate how historical image-making techniques affected the perceived credibility of news media content during the time of the technique's emergence. For example, considering that typography is an abstract form of imagery, perhaps the techniques that were developed with the Gutenberg press or Linotype machine influenced how people perceived the credibility of the content made with those machines. Lewis Mumford (1952) theorized that,

> for the sake of general legibility and universality it was important that the human being who copied a book should achieve a certain kind of neutrality and impersonality, that he should sacrifice expressiveness to order, subduing his idiosyncrasies, making each letter conform to a common type, rigorously standardizing the product (69).

Before typographic machines were utilized in the development of messages, individuals read pages of hand-written text. How, then, did people perceive the credibility of messages as they began to appear on paper that was processed through a machine that "neutralized" the visual form of the page? Similar questions regarding perceived credibility can be asked regarding other emerging image-making techniques that attempted to simulate visual reality in particular periods of history, such as perspective for drawing and painting during the Renaissance, or Daguerreotypy in the mid 19th century. Devising a reasonable methodology to investigate such questions is the first step in the research process, but should first consider when the rate of the development of image-making techniques is high as opposed to low. One reason image-making techniques may be heavily developed is because of demands coming from varying fields and disciplines such as medicine, military, or engineering.

Rate of Research and Development for Image-Making Techniques Across Time

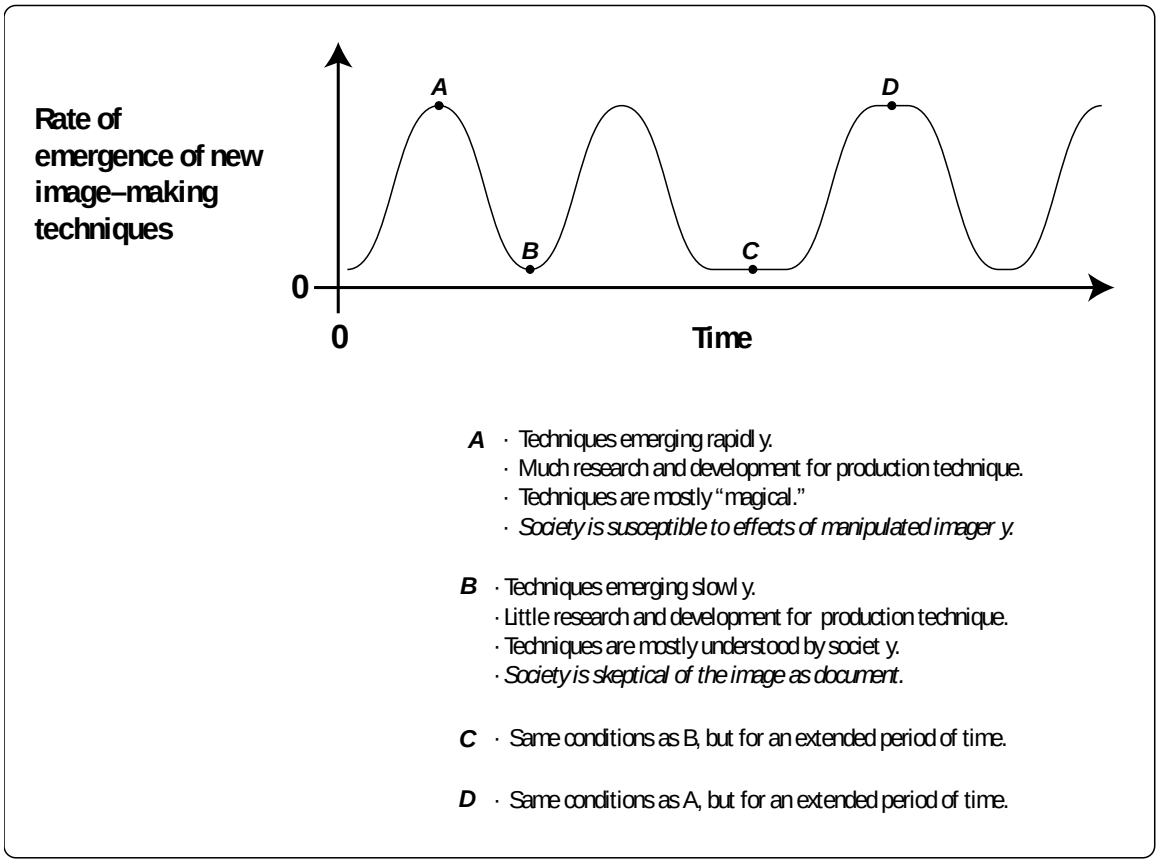


Figure 5.1: Rate of Research and Development for Image-Making Techniques Across Time

With future research, we should avoid focusing on the dangerous effects of manipulating television news imagery. This perspective has been thoroughly explored in the manipulation of digital still imagery. Instead, it is important to focus on how to preserve the credibility of the documented moving image and how to preserve the trust of audiences as new digital video post-production techniques are developed.

In light of this recommendation it is also worthy to promote a healthy amount of skepticism within citizens of a democratic society during a time when the delivery and consumption of news is changing. As news media distribution and exhibition platforms

change, there is an increasing need to remind citizens that they should maintain a skeptical eye when learning of new events in their world. A public communication campaign delivered through a variety of media channels could assist in this endeavor. Such a campaign could emphasize the verification and corroboration of news messages by seeking out different channels of information. Of course, such a campaign should not scare the public into becoming so skeptical of every message that is delivered over news media channels—otherwise this would defeat the purpose of the news. It is important to avoid the opinion that news media organizations are typically the manipulators of truth. Instead, perceivers themselves should be well aware that truth can be easily manipulated.

Appendix A: Technical Foundations of Digital Video & Video Masking

Technical foundations of the digital video image

In order to effectively discuss the techniques used in the experiment's stimulus, a brief explanation of the technical components of digital video imagery is necessary. The illusion of motion in film and digital video occurs when a sequence of still images is projected at a fixed rate. While motion picture film is comprised of sequences of photographs, digital video files contain serialized matrices of numbers. Each still image on a filmstrip or within a digital video file is a collection of discrete units that form a whole. Specifically, the units of a photograph are emulsion molecules that react to light, while the units of a digital image are numbers mapped to locations within a matrix created by a computer algorithm and stored on magnetic tape or disc. With celluloid the unit is actually part of the image itself, but with digital video the unit is a symbolic representation of a miniscule fraction of the image.

Focusing on the "molecular level" of digital video will help clarify the properties of the medium as well as the tasks of a digital compositor. The discrete unit of a digital image is generally referred to as a "pixel". This term is derived from a combination of the words "picture" and "element" (Negroponte 1995). In a tangible sense, a pixel is a minuscule square embedded into an electronic screen. Illumination of a pixel occurs when a display algorithm processes a group of three numerical values that are stored within a digital recording medium. Each numerical value within the group informs a display algorithm how much red, green, and blue light should emit from the pixel. Thus, in an abstract sense, a pixel corresponds to an ordered triplet of values.

This ordered triplet of values is known as a "vector" (Bretscher 2001). A vector's first numerical value always represents the amount of red light emitted by a pixel. The

second value represents the amount of green light, and likewise, the third value represents the amount of blue light. The acronym "RGB" is derived from the order of vector values: red, green, and blue. To explain by example, the RGB vector that defines a black pixel is stored on a digital recording medium as *< 0, 0, 0 >*, while a white pixel is stored as *< 255, 255, 255 >*. The range of vector values begins at zero, corresponding to the absence of light. The range ends at 255, a fully saturated amount of light. For a black pixel, red, green, and blue light are absent, while for the white pixel, red, green, and blue light are present at fully saturated levels. A vector such as *< 0, 255, 0 >* defines a purely green pixel because red and blue light are absent, while *< 102, 51, 102 >* equates to a violet pixel due to higher values for red and blue light than green light.

The use of red, green, and blue light to illuminate a pixel is not an arbitrary choice. In fact, the human eye contains receptor cones and rods that are sensitive to these specific colors of light. A display algorithm can recreate any color by illuminating a pixel with specified amounts of red, green, and blue light, which are then interpreted by the eye's receptor cones (Hullfish and Fowler 2003). When this light converges in the retina, the mind perceives the pixel's color. Because pixels are so small, the mind is unable to perceive the individual components of light within a pixel. The brain essentially adds three distinct colors of light to create a single perceived pixel color. For this reason, the colors red, green, and blue are known as "additive primaries" and are used to display imagery through objects that emit and add light to the natural environment. Such objects include computer and television monitors and cell phone displays. In contrast, cyan, magenta, and yellow are the "subtractive primaries," which are used to color imagery on objects that absorb or subtract light from the natural environment—for example, a printed image on paper.

Unless displayed with a million others, a single pixel is nothing more than an isolated point of light. Digital imagery on a computer or television monitor is comprised of millions of pixels arranged in columns and rows, known as a "raster grid." When people look at a raster grid, their minds resolve its pixels into a perceived image. The amount of cognitive work the mind performs to resolve the raster grid into a perceivable image depends on the quantity of pixels within the grid. Thus, digital media imagery has the property of "resolution" which simultaneously describes the quantity of pixels that make up the imagery and the quality of the perception. For example, digital video now comes in multiple sizes of raster grids. High definition video has 1,280 columns and 720 rows of pixels, while standard definition video has 720 columns and 480 rows. Viewers perceive images on high-definition video as having more verisimilitude to the natural environment than images on standard-definition video simply because a viewer will resolve more pixels. Figure A.1 exemplifies the general make up of a raster grid.

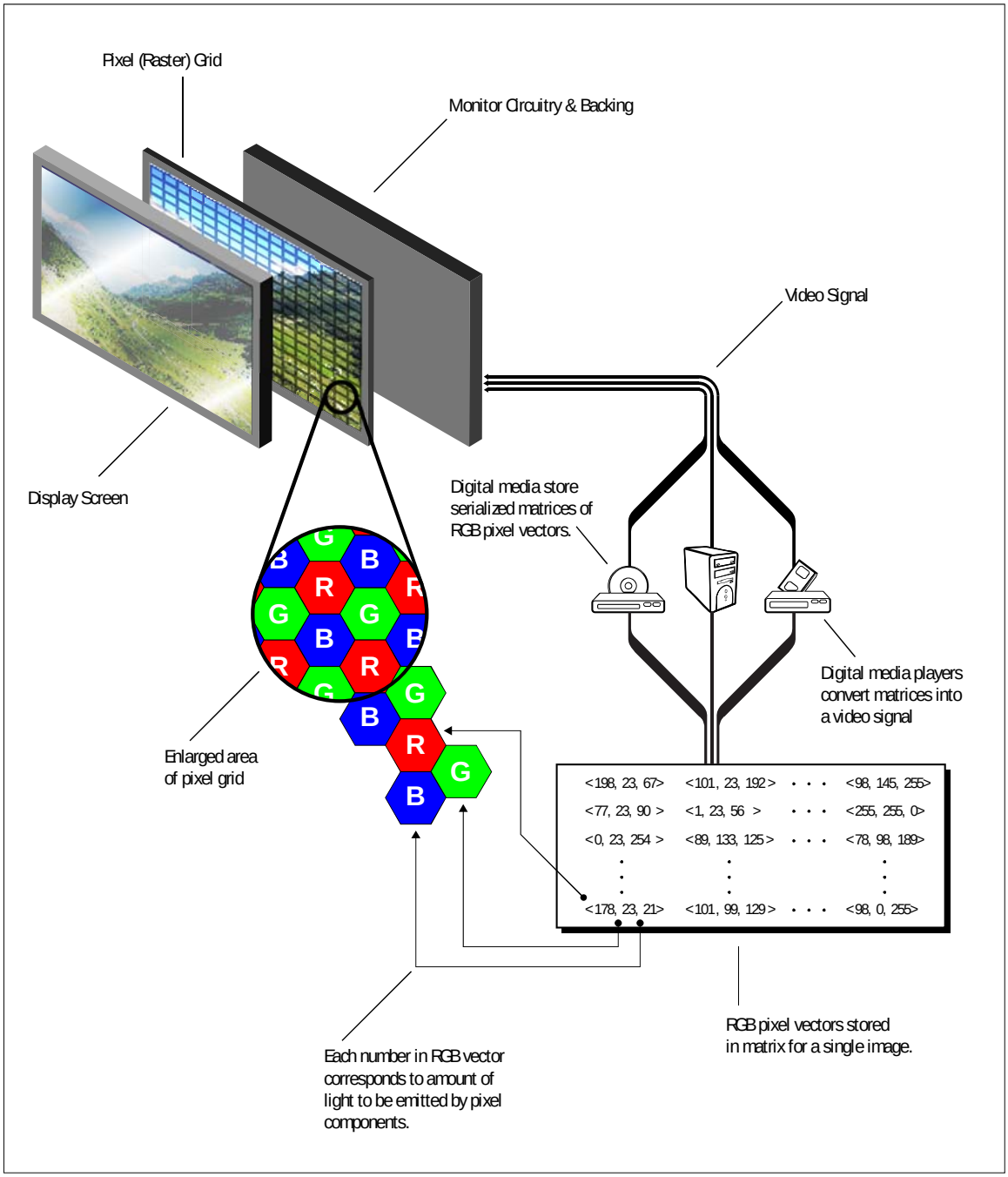


Figure A.1: “Molecular Level” of Digital Video Imagery

Technical foundations of the digital video mask

The controlling mechanism of a digital video mask can be understood by reviewing basic arithmetic. To begin, every pixel within a digital video mask has a corresponding pixel within the video image it intends to mask. Stored as RGB vectors, these corresponding pixels are subject to the rules of addition, subtraction, and multiplication. Generally, digital video intended for use as a mask contain only black or white pixels. Thus, a black pixel within a mask could be multiplied by its corresponding pixel in the image it is masking. In this scenario, the value of a single color component from each of the corresponding pixels is multiplied. However, before any calculation, the scale of values for an RGB vector's color component in a pixel must be normalized. Normalization is the scaling down of a range of values so that they fall between 0 and 1. When this happens, the red, green, and blue components in the RGB vectors represent a percentage of saturation.

For example, to normalize the RGB vector representing white, *<255, 255, 255>*, each color component is divided by the value *255*. This results in a vector represented by *<1, 1, 1>*. Any other pixel undergoing normalization is also divided by 255, so for example *<133, 76, 212>* becomes *<0.52, 0.29, 0.83>*. This pixel may now be characterized as having a red component at 52% full saturation, green at 29%, and blue at 83%. Conveniently, after multiplying corresponding color components of normalized RGB vectors, the product will always be between 0 and 1. To "un-normalize" the value for use by a display algorithm, the new color component is then multiplied by 255—the factor that initially divided the RGB vector. Figure A.2 shows various RGB vectors and their corresponding normalized values.

With special case images intended for use as masks, the product of multiplying a black pixel by any other pixel always results in a black pixel. On the opposite side of the

spectrum, the product of multiplying a white pixel by second pixel always results in a new pixel with the same RGB values as the second pixel. Figure A.3 shows basic pixel multiplication with examples. Many types of digital video files allow masking pixels to be embedded within the file itself. Such video is referred to as “pre-multiplied” because the file inherently multiplies the masking pixels by the RGB pixels before performing any compositing operations. In essence, pre-multiplied video is inherently masked.

Color Name	*Color's RGB Values*	*Normalized RGB Values*
Black	<0 0 0>	<0 0 0>
Middle Gray	<128 128 128>	<0.5 0.5 0.5>
White	<255 255 255>	<1 1 1>
Red	<255 0 0>	<1 0 0>
Green	<0 255 0>	<0 1 0>
Blue	<0 0 255>	<0 0 1>
Violet	<255 0 255>	<1 0 1>
Orange	<255 128 0>	<1 0.5 0>
Pink	<255 128 255>	<1 0.5 1>

Figure A.2: RGB Vectors and their corresponding normalized values.

Aside from multiplication, pixels can also be added together and subtracted from each other. Inverting a digital image mask so that white becomes black and black becomes white requires a subtraction operation and is essential to basic digital image compositing. To achieve this, pixels within the digital mask are subtracted from a set of

corresponding white pixels generated by compositing software. Figure A.4 shows the details of inverting black and white pixels.

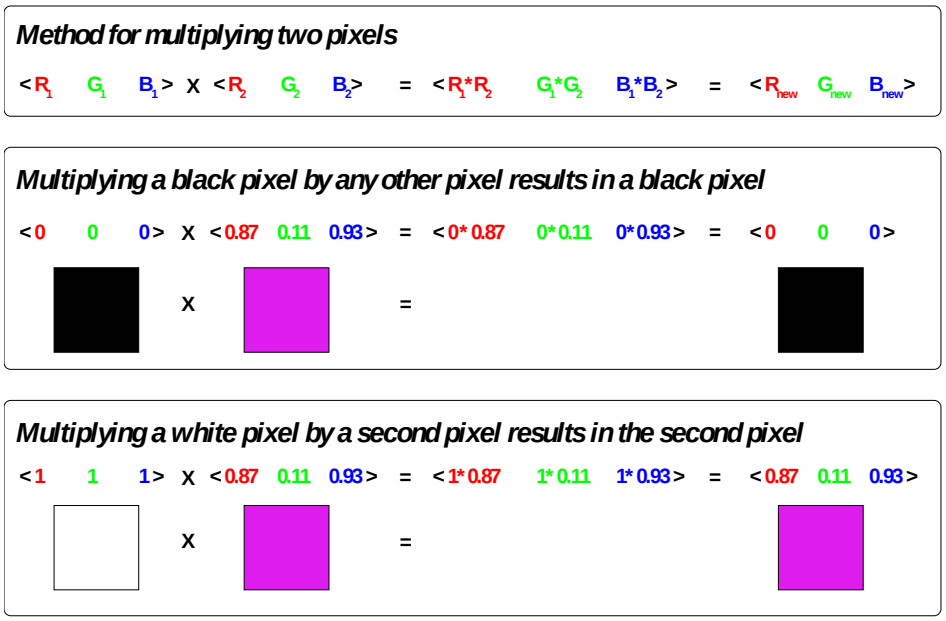


Figure A.3: Method for multiplying RGB vectors and examples.

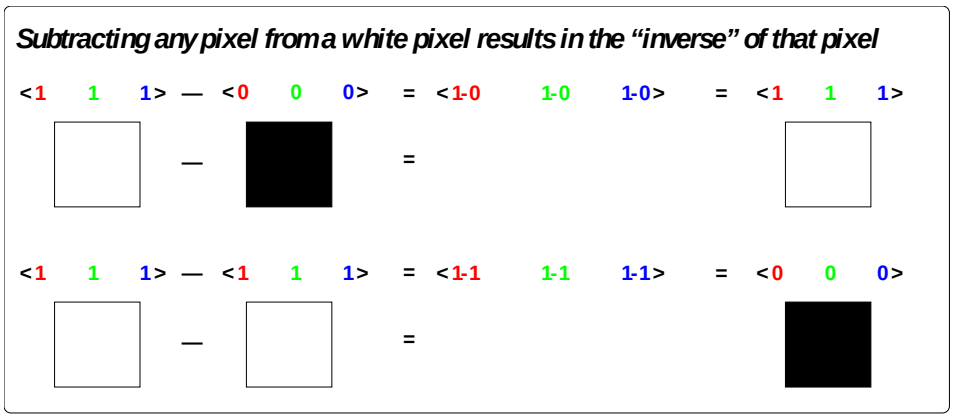


Figure A.4: Inverting black and white pixels with subtraction.

RGB vectors that rest on the left side of the equal sign in a matrix algebra equation are referred to as "inputs," while RGB vectors on the right side are "outputs."

This is important when considering entire digital images rather than single pixels values as shown in Figures A.3 and A.4. In the visual effects industry, digital images used as inputs for a composite image are known as "plates." In order to predict the outcome of a compositing operation, it is useful to express a plate as a single letter variable within an equation. The letter represents the entire set of RGB vectors that comprise the plate. For example, a common compositing operation, called "Over," takes a visual element from one plate and places it over another plate to form an output. (Brinkmann 1999) Three essential inputs are required to perform the Over operation: a foreground plate ("A"), a background plate ("B"), and a mask plate ("M"). Figure A.5 shows three example inputs used in a digital composite expressed in the following equation:

The "Over" Operation

$$(A * M) + [(1 - M) * B] = \text{Output}$$

By examining this equation with logic, we can understand how the "Over" operation works. The first part of the operation multiplies input "A" by the digital mask, "M". Next, the digital mask is inverted by subtracting it from a grid of RGB vectors with a value of *1* in all color components. The inverted mask is then multiplied by the input B. Finally, to achieve the output, the two products are added together to form the final composite. Figure A.6 demonstrates these steps with visual examples.

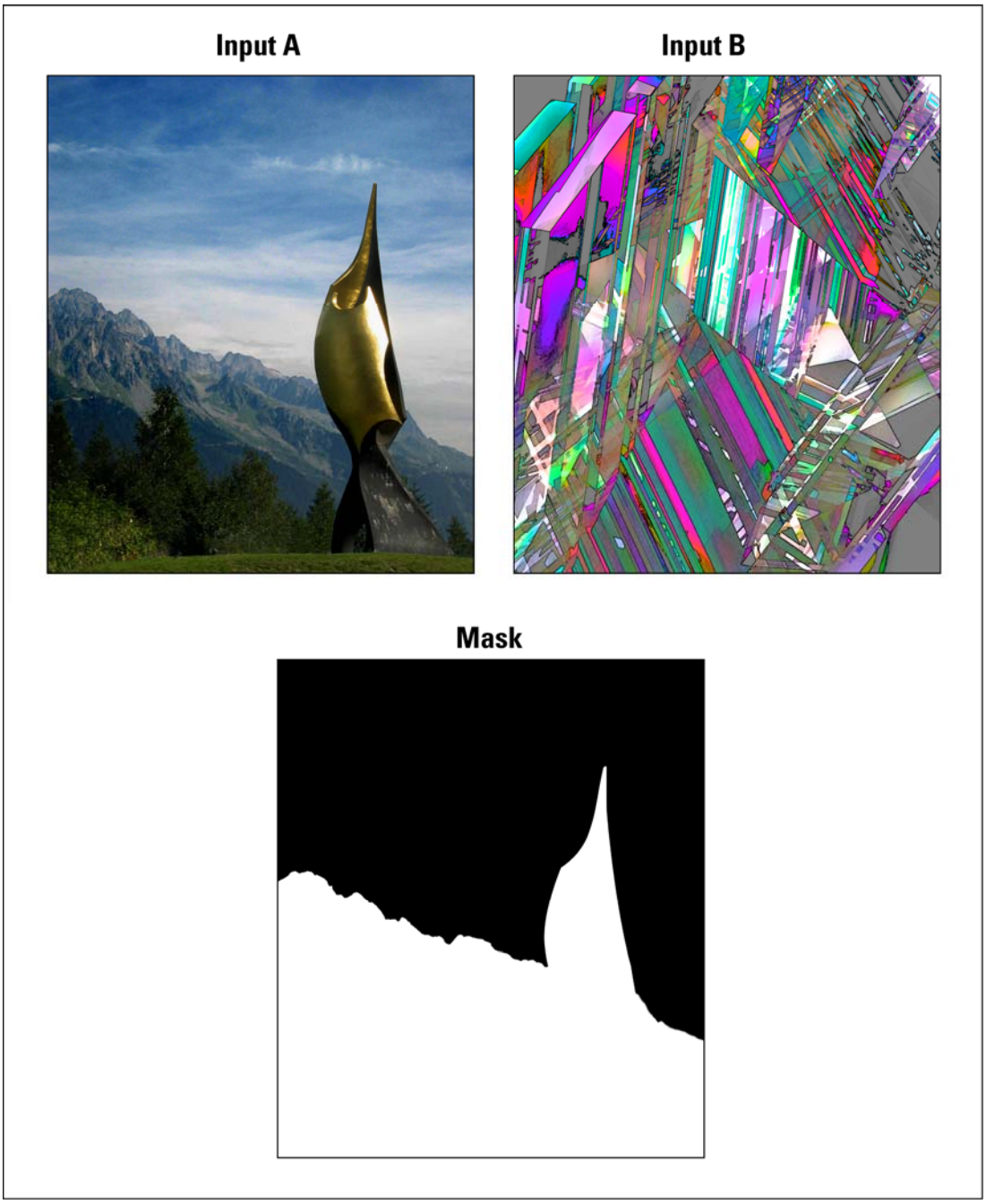


Figure A.5: Three input plates for use in the “Over” operation.

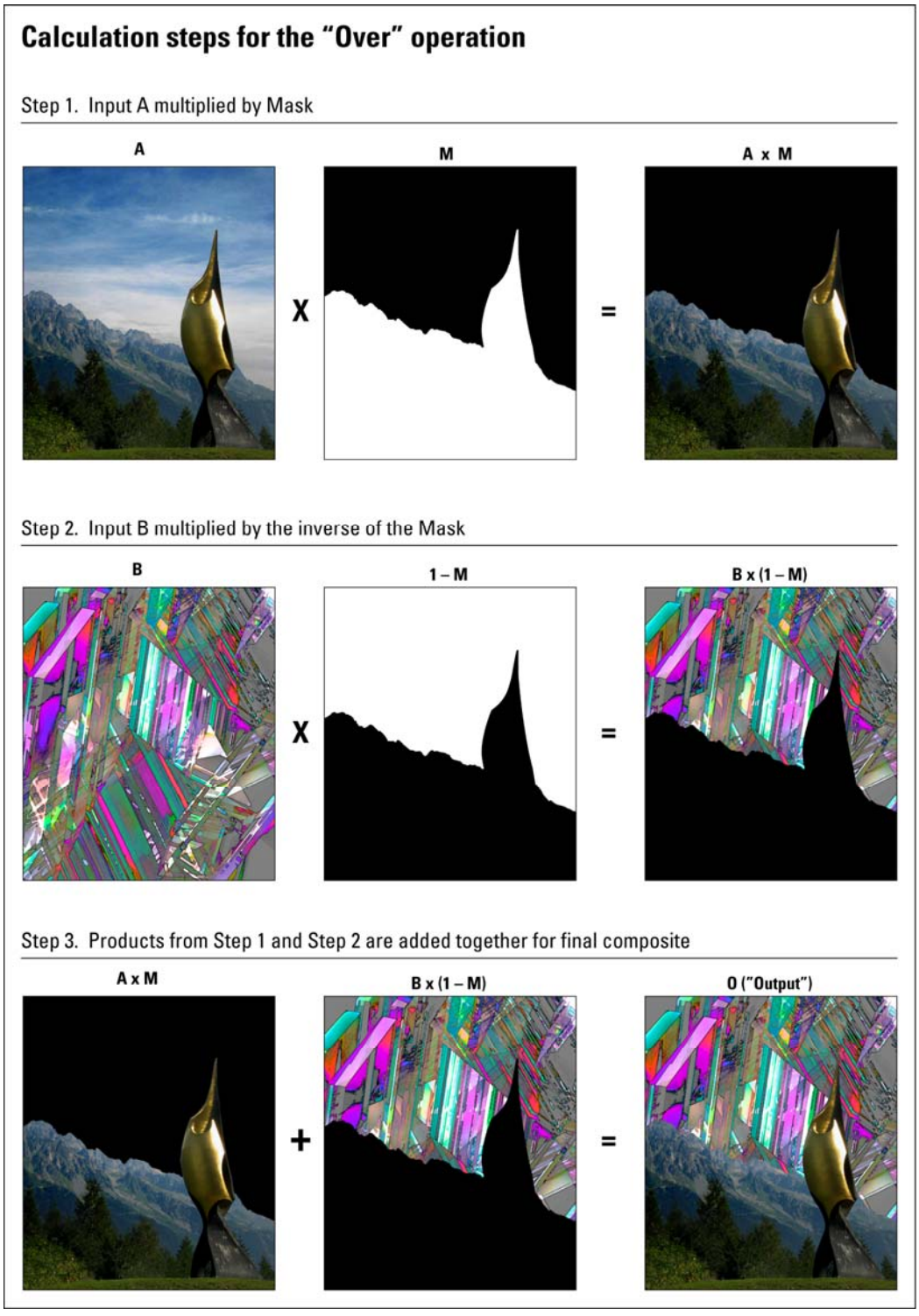
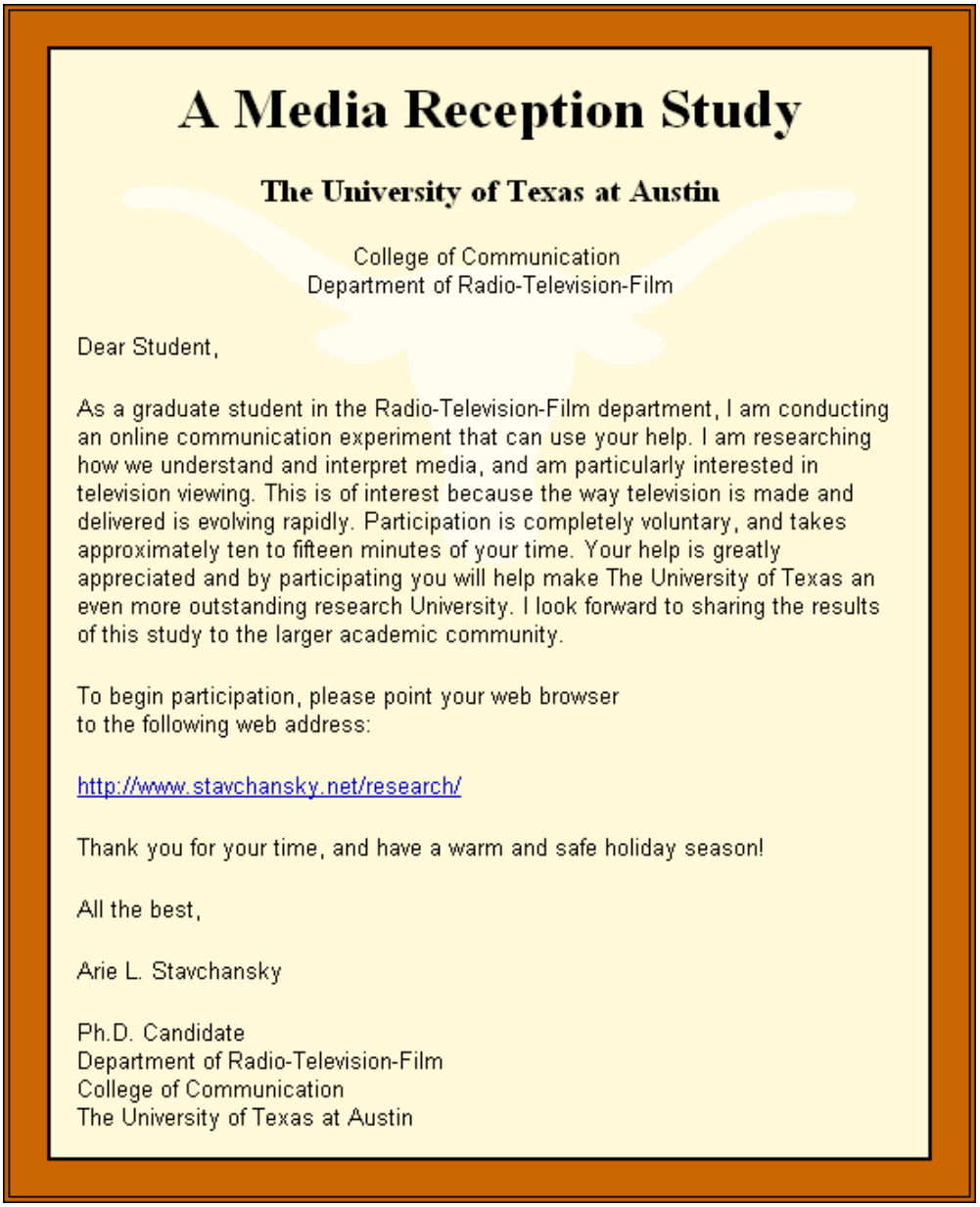


Figure A.6: The "Over" operation broken down into smaller steps

Appendix B: Instrumentation for Experiment



A Media Reception Study

The University of Texas at Austin

College of Communication
Department of Radio-Television-Film

Dear Student,

As a graduate student in the Radio-Television-Film department, I am conducting an online communication experiment that can use your help. I am researching how we understand and interpret media, and am particularly interested in television viewing. This is of interest because the way television is made and delivered is evolving rapidly. Participation is completely voluntary, and takes approximately ten to fifteen minutes of your time. Your help is greatly appreciated and by participating you will help make The University of Texas an even more outstanding research University. I look forward to sharing the results of this study to the larger academic community.

To begin participation, please point your web browser
to the following web address:

http://www.stavchansky.net/research/

Thank you for your time, and have a warm and safe holiday season!

All the best,

Arie L. Stavchansky

Ph.D. Candidate
Department of Radio-Television-Film
College of Communication
The University of Texas at Austin

Figure B.1: Email sent to all undergraduate and graduate students at UT Austin to recruit participants for the online methodology of the experiment.

FULL PRESENTATION OF QUESTIONNAIRE

Before you begin, did you get a head or tails when you flipped the coin?

☐ Heads ☐ Tails

1. **Which media have you used to learn about the news during the past week?**

Please check all that apply.

☐ television
☐ magazines
☐ newspapers
☐ radio
☐ online
☐ other | please specify ____

2. **Which medium do you most prefer when you want to learn about the news?**

Please select one.

☐ television
☐ magazines
☐ newspapers
☐ radio
☐ online
☐ other | please specify ____

3. **Approximately how many hours of television news did you watch last week?**

I watched about ____ hours of television last week.

4. **Please indicate how much you agree or disagree with the following statements by clicking the circles below.**

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

Once I learn about a news story, I want to learn more about it from other news sources.

SA	A	N	D	SD

I trust city-wide government officials.

SA	A	N	D	SD

I trust federal government officials.

SA	A	N	D	SD

I trust TV news.

SA	A	N	D	SD

TV news gives the complete overview of a story.

SA	A	N	D	SD

TV news is not very accurate.

SA	A	N	D	SD

TV news is plausible.

SA A N D SD

TV news is biased.

SA A N D SD

TV news is fair.

SA A N D SD

I am familiar with software programs like *Adobe Photoshop* or *Adobe AfterEffects*.

SA A N D SD

I am familiar with chroma keying and green screen techniques used in video production.

SA A N D SD

I am familiar with computer vision tracking techniques used in video production.

SA A N D SD

I am familiar with quantum projection compositing used in video production.

SA A N D SD

5. **Which national television network(s) do you actively watch to learn about the news?**

Please check all that apply.

- ☐ NBC
- ☐ CBS
- ☐ ABC
- ☐ FOX
- ☐ CNN
- ☐ MSNBC
- ☐ C-SPAN
- ☐ Comedy Central
- ☐ other | please specify

6. **Which genre of film do you enjoy the most?**

Please select one.

- ○ science fiction
- ○ comedy / romantic comedy
- ○ romance
- ○ drama
- ○ suspense / thriller / horror
- ○ mystery
- ○ documentary
- ○ foreign
- ○ other | please specify

7. **If a student, which college are you enrolled in.**

Note: If cross enrolled, please select one you would like to declare affiliation to.

Select One . . .

8. **Academic Classification**

- ☐ freshman
- ☐ sophomore
- ☐ junior
- ☐ senior
- ☐ graduate student
- ☐ other | please specify

9. **Gender**

☐ male ☐ female

10. **Age**

Please enter your age

When you have completed the questionnaire, please press the button below. Thank you!

Submit Questionnaire

CONSENT FORM FOR SUBJECT PARTICIPATION IN RESEARCH STUDY

IRB APPROVED ON: 11/29/2006 ***EXPIRES ON: 11/28/2007***

IRB# 2006-08-0072

Informed Consent to Participate in Research
The University of Texas at Austin

You are being asked to participate in a research study. This form provides you with information about the study. The Principal Investigator (the person in charge of this research) or his/her representative will provide you with a copy of this form to keep for your reference, and will also describe this study to you and answer all of your questions. Please read the information below and ask questions about anything you don't understand before deciding whether or not to take part. Your participation is entirely voluntary and you can refuse to participate without penalty or loss of benefits to which you are otherwise entitled.

Title of Research Study:
Media Reception Study

Principal Investigator:
Arie L. Stavchansky Doctoral Candidate, Department of Radio-TV-Film 1-512-481-1369

Faculty sponsor:
Karin Wilkins Associate Professor, Department of Radio-TV-Film 1-512-471-4071

What is the purpose of this study?

The overall goal of the study is to better understand how humans perceive news media messages given certain conditions. The total number of subjects for the physical setting experiment will be no more than 90 individuals. The total number of subjects for the online methodology is unknown. However, a realistic estimation would be approximately 70 participants per group. In total, it is estimated that 230 individual will participate.

What will be done if you take part in this research study?

Participants may or may not screen a three minute video. All participants will be asked to fill out a questionnaire to the best of their ability.

The Project Duration is:

Participation will take no more than twenty minutes of time for each participant.
The project will take place M-F, Wednesday, November 29th – Tuesday, December 12th
MWF 2:30PM — 5:30PM
T TH 12:00PM — 3:00PM
To participate in the physical setting experiment, you must have registered online.

What are the possible discomforts and risks?

The risks associated with this study are no greater than those of everyday life. If you believe that your participation has caused you psychological or emotional difficulty, you can receive counseling free of charge at the University Health Center. To schedule an appointment, simply call 1-512-471-3515 or visit http://www.utexas.edu/student/cmhc/.

What are the possible benefits to you or to others?

While there are no individual benefits to participant, their participation will help researchers better understand media reception and perceived credibility in relationship to knowledge of image making techniques.

Will you receive compensation for your participation in this study?

If you are a University of Texas at Austin undergraduate who is enrolled in RTF305: Introduction To Media Studies, you can receive up to one point on your final course grade after you complete all the tasks required. This is a total of 1% out of your final RTF course grade.

If you do not want to take part in this study, what other options are available to you?

Your participation in this study is entirely voluntary. You are free to refuse to be in the study, and your refusal will not influence current or future relationships with The University of Texas at Austin

How can you withdraw from this research study and who should you call if you have questions?

If you wish to stop your participation in this research study for any reason, you should contact the principal investigator: Arie Stavchansky at 1-512-481-1369. You should also call the principal investigator for any questions, concerns, or complaints about the research. You are free to withdraw your consent and stop participation in this research study at any time without penalty or loss of benefits for which you may be entitled. Throughout the study, the researchers will notify you of new information that may become available and that might affect your decision to remain in the study.

In addition, if you have questions about your rights as a research participant, or if you have complaints, concerns, or questions about the research, please contact Lisa Leiden, Ph.D., Chair, The University of Texas at Austin Institutional Review Board for the Protection of Human Subjects, or the Office of Research Compliance and Support at (512) 471-8871.

How will your privacy and the confidentiality of your research records be protected?

In no instance, except for registering to participate in the physical-setting experiment, will you be asked to contribute any personal information. All registration information will be destroyed after the duration of the project. Furthermore there will be no way for the

principal investigator, Arie Stavchansky, or any future researcher to link your questionnaire answers to your name. You participation will be made anonymous and confidential. All data will be kept on a secure, private, server maintained by the principal investigator.

If in the unlikely event it becomes necessary for the Institutional Review Board to review your research records, then the University of Texas at Austin will protect the confidentiality of those records to the extent permitted by law. Your research records will not be released without your consent unless required by law or a court order. The data resulting from your participation may be made available to other researchers in the future for research purposes not detailed within this consent form. In these cases, the data will contain no identifying information that could associate you with it, or with your participation in any study.

If the results of this research are published or presented at scientific meetings, your identity will not be disclosed.

Will the researchers benefit from your participation in this study?

By participating in this project, you will help the principal investigotor reach his goal of receiving a Doctoral degree.

You will be given a copy of this consent form for your records.

Signature of Principal Investigator **Date**

Signatures:

As a representative of this study, I have explained the purpose, the procedures, the benefits, and the risks that are involved in this research study:

_____

Signature and printed name of person obtaining consent **Date**

You have been informed about this study's purpose, procedures, possible benefits and risks, and you have received a copy of this form. You have been given the opportunity to ask questions before you sign, and you have been told that you can ask other questions at any time. You voluntarily agree to participate in this study. By signing this form, you are not waiving any of your legal rights.

_____

Printed Name of Subject **Date**

_____

Signature of Subject **Date**

_____

Signature of Principal Investigator **Date**

Appendix C: Demographic and Behavioral Data for Samples

FACE-TO-FACE ("F2F") SETTING SAMPLE

F2F demographics

F2F: Academic classification * Treatment Group Crosstabulation

			Treatment Group		
			F2F Exp	F2F Control	Total
Academic classification	freshman	Count	23	23	46
		% within Treatment Group	67.6%	67.6%	67.6%
	junior	Count	3	3	6
		% within Treatment Group	8.8%	8.8%	8.8%
	senior	Count	0	1	1
		% within Treatment Group	.0%	2.9%	1.5%
	sophomore	Count	8	7	15
		% within Treatment Group	23.5%	20.6%	22.1%
Total		Count	34	34	68
		% within Treatment Group	100.0%	100.0%	100.0%

Table C.1: F2F: Academic Classification * Treatment Group Crosstabulation

F2F: Gender * Treatment Group Crosstabulation

			Treatment Group		
			F2F Exp	F2F Control	Total
Gender	Female	Count	21	23	44
		% within Treatment Group	61.8%	67.6%	64.7%
	Male	Count	13	11	24
		% within Treatment Group	38.2%	32.4%	35.3%
Total		Count	34	34	68
		% within Treatment Group	100.0%	100.0%	100.0%

Table C.2: F2F: Gender * Treatment Group Crosstabulation

F2F: School * Treatment Group Crosstabulation

			Treatment Group		
			F2F Exp	F2F Control	Total
School	Communication	Count	23	18	41
		% within Treatment Group	67.6%	52.9%	60.3%
	Liberal Arts, et. al.	Count	6	12	18
		% within Treatment Group	17.6%	35.3%	26.5%
	Engineering, et. al.	Count	3	3	6
		% within Treatment Group	8.8%	8.8%	8.8%
	Business, Law	Count	0	1	1
		% within Treatment Group	.0%	2.9%	1.5%
	Other	Count	1	0	1
		% within Treatment Group	2.9%	.0%	1.5%
	Architecture, Fine Arts	Count	1	0	1
		% within Treatment Group	2.9%	.0%	1.5%
Total		Count	34	34	68
		% within Treatment Group	100.0%	100.0%	100.0%

Table C.3: F2F: School * Treatment Group Crosstabulation

F2F: Mean Age of Subjects

Age

N	Valid	68
	Missing	0
Mean		18.87

Table C.4: F2F: Mean Age of Subjects

F2F descriptive data

F2F: Used TELEVISION to learn news last week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	19	27.9	27.9	27.9
	Yes	49	72.1	72.1	100.0
	Total	68	100.0	100.0	

Table C.5: F2F: Used Television to Learn News Last Week?

F2F: Used MAGAZINES to learn news last week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	52	76.5	76.5	76.5
	Yes	16	23.5	23.5	100.0
	Total	68	100.0	100.0	

Table C.6: F2F: Used Magazines to Learn News Last Week?

F2F: Used NEWSPAPERS to learn news last week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	29	42.6	42.6	42.6
	Yes	39	57.4	57.4	100.0
	Total	68	100.0	100.0	

Table C.7: F2F: Used Newspapers to Learn News Last Week?

F2F: Used RADIO to learn news last week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	61	89.7	89.7	89.7
	Yes	7	10.3	10.3	100.0
	Total	68	100.0	100.0	

Table C.8: F2F: Used Radio to Learn News Last Week?

F2F: Used ONLINE sources to learn news last week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	9	13.2	13.2	13.2
	Yes	59	86.8	86.8	100.0
	Total	68	100.0	100.0	

Table C.9: F2F: Used Online Sources to Learn News Last Week?

F2F: Used OTHER sources to learn news last week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	63	92.6	92.6	92.6
	Yes	5	7.4	7.4	100.0
	Total	68	100.0	100.0	

Table C.10: F2F: Used Other Sources to Learn News Last Week?

F2F: Medium preference for learning about the news.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	magazines	1	1.5	1.5	1.5
	newspapers	10	14.7	14.7	16.2
	online	33	48.5	48.5	64.7
	other	1	1.5	1.5	66.2
	television	23	33.8	33.8	100.0
	Total	68	100.0	100.0	

Table C.11: F2F: Medium Preference for Learning about the News

F2F: TV News Consumption During Previous Week

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Light TV News Consumer	44	64.7	64.7	64.7
	Moderate TV News Consumer	18	26.5	26.5	91.2
	Heavy TV News Consumer	6	8.8	8.8	100.0
	Total	68	100.0	100.0	

Table C.12: F2F: TV News Consumption during Previous Week

F2F: Ranking Of Television News Network Preference

	N	Sum
Watch CNN for news?	68	34
Watch ABC for news?	68	30
Watch NBC for news?	68	28
Watch COMEDY CENTRAL for news?	68	27
Watch FOX for news?	68	23
Watch CBS for news?	68	16
Watch MSNBC for news?	68	15
Watch OTHER television station for news?	68	11
Watch CSPAN for news?	68	5
Valid N (listwise)	68	

Table C.13: F2F: Ranking of TV News Network Preference

F2F: Which genre of film do you enjoy the most?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	comedy	28	41.2	41.2	41.2
	drama	16	23.5	23.5	64.7
	suspense	11	16.2	16.2	80.9
	foreign	4	5.9	5.9	86.8
	sci-fi	4	5.9	5.9	92.6
	mystery	2	2.9	2.9	95.6
	documentary	1	1.5	1.5	97.1
	other	1	1.5	1.5	98.5
	romance	1	1.5	1.5	100.0
	Total	68	100.0	100.0	

Table C.14: F2F: Which Genre of Film Do You Enjoy the Most?

ONLINE WEBSITE ("WEB") SAMPLE

WEB demographics

WEB: Academic Classification * Treatment Group Crosstabulation

			Treatment Group		
			WEB Exp	WEB Control	Total
Class	Freshman	Count	35	63	98
		% within Treatment Group	12.0%	14.7%	13.6%
	Sophomore	Count	33	43	76
		% within Treatment Group	11.3%	10.0%	10.5%
	Junior	Count	40	48	88
		% within Treatment Group	13.7%	11.2%	12.2%
	Senior	Count	55	88	143
		% within Treatment Group	18.9%	20.5%	19.8%
	Graduate Student	Count	128	188	316
		% within Treatment Group	44.0%	43.7%	43.8%
Total		Count	291	430	721
		% within Treatment Group	100.0%	100.0%	100.0%

Table C.15: WEB: Academic Classification * Treatment Group Crosstabulation

WEB: Gender * Treatment Group Crosstabulation

			Treatment Group		
			WEB Exp	WEB Control	Total
Gender	Female	Count	169	262	431
		% within Treatment Group	58.1%	60.9%	59.8%
	Male	Count	122	168	290
		% within Treatment Group	41.9%	39.1%	40.2%
Total		Count	291	430	721
		% within Treatment Group	100.0%	100.0%	100.0%

Table C.16: WEB: Gender * Treatment Group Crosstabulation

WEB: School * Treatment Group Crosstabulation

			Treatment Group		
			WEB Exp	WEB Control	Total
School	Communication	Count	33	40	73
		% within Treatment Group	11.3%	9.3%	10.1%
	Liberal Arts, et. al.	Count	92	126	218
		% within Treatment Group	31.6%	29.3%	30.2%
	Engineering, et. al.	Count	50	90	140
		% within Treatment Group	17.2%	20.9%	19.4%
	Business, Law	Count	81	113	194
		% within Treatment Group	27.8%	26.3%	26.9%
	Other	Count	18	42	60
		% within Treatment Group	6.2%	9.8%	8.3%
	Architecture, Fine Arts	Count	17	19	36
		% within Treatment Group	5.8%	4.4%	5.0%
Total		Count	291	430	721
		% within Treatment Group	100.0%	100.0%	100.0%

Table C.17: WEB: School * Treatment Group Crosstabulation

WEB: Mean Age of Subjects

Age

N	Valid	721
	Missing	0
Mean		24.51

Table C.18: WEB: Mean Age of Subjects

WEB descriptive data

WEB: Used TELEVISION to learn news last week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	515	71.4	71.4	71.4
	No	206	28.6	28.6	100.0
	Total	721	100.0	100.0	

Table C.19: WEB: Used Television to Learn News Last Week?

WEB: Used MAGAZINES to learn news last week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	543	75.3	75.3	75.3
	Yes	178	24.7	24.7	100.0
	Total	721	100.0	100.0	

Table C.20: WEB: Used Magazines to Learn News Last Week?

WEB: Used NEWSPAPERS to learn news last week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	396	54.9	54.9	54.9
	No	325	45.1	45.1	100.0
	Total	721	100.0	100.0	

Table C.21: WEB: Used Newspapers to Learn News Last Week?

WEB: Used RADIO to learn news last week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	450	62.4	62.4	62.4
	Yes	271	37.6	37.6	100.0
	Total	721	100.0	100.0	

Table C.22: WEB: Used Radio to Learn News Last Week?

WEB: Used ONLINE sources to learn news last week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	638	88.5	88.5	88.5
	No	83	11.5	11.5	100.0
	Total	721	100.0	100.0	

Table C.23: WEB: Used Online Sources to Learn News Last Week?

WEB: Used OTHER sources to learn news last week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	699	96.9	96.9	96.9
	Yes	22	3.1	3.1	100.0
	Total	721	100.0	100.0	

Table C.24: WEB: Used Other Sources to Learn News Last Week?

WEB: Medium Preference For Learning About The News.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	online	383	53.1	53.1	53.1
	television	175	24.3	24.3	77.4
	newspapers	83	11.5	11.5	88.9
	radio	56	7.8	7.8	96.7
	magazines	12	1.7	1.7	98.3
	other	12	1.7	1.7	100.0
	Total	721	100.0	100.0	

Table C.25: WEB: Medium Preference for Learning about the News

WEB: Ranking Of Television News Network Preferences

	N	Sum
Watch CNN for news?	721	359
Watch NBC for news?	721	260
Watch COMEDY CENTRAL for news?	721	256
Watch ABC for news?	721	248
Watch FOX for news?	721	211
Watch CBS for news?	721	174
Watch MSNBC for news?	721	157
Watch OTHER television station for news?	721	132
Watch CSPAN for news?	721	66
Valid N (listwise)	721	

Table C.26: WEB: Ranking of TV News Network Preferences

WEB: TV News Consumption During Previous Week

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Light TV News Consumer	468	64.9	65.6	65.6
	Moderate TV News Consumer	192	26.6	26.9	92.6
	Heavy TV News Consumer	53	7.4	7.4	100.0
	Total	713	98.9	100.0	
Missing	System	8	1.1		
Total		721	100.0		

Table C.27: WEB: TV News Consumption during the Previous Week

References

Agarwala, A., M. Dontecheva, et al. (2004). "Interactive Digital Photomontage." ACM Transactions on Graphics (TOG) **Volume 23**(3): 9294-302.

Agarwala, A., A. Hertzmann, et al. (2004). "Keyframe-Based Tracking for Rotoscoping and Animation." ACM Transactions on Graphics (TOG) **23**(3): 584-591.

Akehurst, L., G. Kohnken, et al. (2001). "Content credibility of accounts derived from live and video presentations." Legal and Criminological Psychology **6**: 18.

Anderson, K. (1999). Image Consultants. Broadcasting & Cable. **129:** 52

Arnheim, R. (1954). Art And Visual Perception: A Psychology Of The Creative Eye. Berkeley, CA, University of California Press.

Autodesk (2005). Turner Studios Realizes Collaborative HD Finishing with Autodesk Solutions, Autodesk, Inc.**:** 2.http://usa.autodesk.com/adsk/servlet/item?siteID=123112&id=6521486&linkID=5572508 October 30, 2006

Autodesk (2006). Broadcasters Worldwide Turn to Autodesk's Graphics Solutions to Differentiate Themselves, Autodesk, Inc. Investor Relations.http://investors.autodesk.com/phoenix.zhtml?c=117861&p=irol-newsArticle_Print&ID=845986&highlight= October 30, 2006

Babbie, E. (2004). The Practice Of Social Research, 10th Edition, Thomson Wadsworth.

Barker, D. (1988). ""It's Been Real": Forms of Television Representation." Critical Studies in Mass Communication **5**: 42-56.

Barron, J. (1994). Dueling Magazing Covers: A Police Photo vs. a 'Photo-Illustration'. The New York Times. New York, New York**:** 8

Baym, G. (2005). "*The Daily Show:* Discursive Integration and the Reinvention of Political Journalism." Political Communications **22**: 259-276.

Bretscher, O. (2001). Linear Algebra with applications. Upper Saddle River, New Jersey, Prentice Hall.

Brinkmann, R. (1999). The Art And Science Of Digital Compositing. San Diego, CA, Morgan Kaufmann.

Burgoon, M., J. K. Burgoon, et al. (1981). "Newspaper Image and Evaluation." Journalism Quarterly(58): 411-419, 433.

Campbell, D. T. and J. C. Stanley (1963). Experimental and Quasi-Experimental Designs For Research. Chicago, Rand McNalley College Publishing Company.

Cohen, B. C. (1963). The Press and Foreign Policy. Princeton, N.J., Princeton University Press.

Connell, I. (1979). "Ideology / discourse / institution." Screen **19**: 129-134.

Cooke, L. (2003). "Information Acceleration and Visual Trends in Print, Television, and Web News Sources." Technical Communication Quarterly **12**(2): 155-181.

Cooke, L. (2005). "A visual convergence of print, television, and the internet: charting 40 years of design change in news presentation." New Media & Society **1**(22): 22-46.

Davis, M. (2007). Morphing a Conspiracy? The Chattanooga Times-Free Press. Chattanooga, Tennessee**:** 8

Dillman, D. (2000). Mail and Internet Surveys: The Tailored Design Method. New York, NY, John Wiley & Sons.

Ernst, W. (2002). "Between Real Time and Memory on Demand: Reflections on / of Television." The South Atlantic Quarterly **101**(3): 625-637.

Fahmy, S. (2007). Re: Question about your study on priming. A. L. Stavchansky. Austin, Texas**:** Personal email communication with Shahira Fahmy asking about details concerning video stimulus in their study.

Fahmy, S. and W. Wanta (2005). "Testing Priming Effects: Differences Between Print and Broadcast Messages." Studies in Media & Information Literacy Education **5**(2).

Farid, H. (2006). "Digital Doctoring: How to tell the real from the fake." Significance **In press at time of reference**: 5.

Farid, H. Digital Tampering in the Media, Politics, and Law http://www.cs.dartmouth.edu/farid/research/digitaltampering/ 22 July 2007

Flanagin, A. J. and M. J. Metzger (2000). "Perceptions of Internet Information Credibility." Journalism & Mass Communication Quarterly **77**(3): 515-540.

Garson, G. D. http://www2.chass.ncsu.edu/garson/pa765/reliab.htm Febuary 10, 2007

Gaziano, C. and K. McGrath (1986). "Measuring the Concept of Credibility." Journalism Quarterly **63**(3): 451-462.

Gladney, G. A. and M. C. Ehrlich (1996). "Cross-Media Response to Digital Manipulation of Still and Moving Images." Journal of Broadcasting & Electronic Media **40**: 496-508.

Grabe, M. E., S. Zhou, et al. (2001). "Explicating Sensationalism in Television News: Content and the Bells and Whistles of Form." Journal of Broadcasting & Electronic Media **45**(4): 635-655.

Greer, J. D. and J. D. Gosen (2002). "How Much Is Too Much? Assessing Levels of Digital Alteration as Factors in Public Perception of New Media Credibility." Visual Communications Quarterly.

Hall, S. (1980). Encoding/Decoding. Culture, Media, Language: Working Papers in Cultural Studies, 1972-79. S. Hall, D. Hobson, A. Lowe and P. Willis. New York

London, Routledge**:** 128-138.

Hantz, A. M. and D. L. Diefenbach (2002). Digital Image Manipulation, Communication Theory, and the Public Trust. Annual Conference of The International Visual Sociology Association, Petros M. Nomikos Conference Center

Santorini Island, Greece.

Hullfish, S. and J. Fowler (2003). Color Correction for Digital Video. San Francisco, CA, CMP Books.

Ibelema, M. and L. Powell (2001). "Cable Television News Viewed As Most Credible." Newspaper Research Journal **22**(1): 41-51.

IN-VSEE Engineering: Scanning Probe Microscopy - Magnetic Media http://invsee.asu.edu/ImageGallery/Real/Engineering/Spm/m_media.html#tape April 17, 2007

Jia, J., J. Sun, et al. (2006). "Drag-And-Drop Pasting." ACM Transactions on Graphics (TOG) **25**(3): 631-637.

Johnson, T. J. and B. K. Kaye (1998). "Cruising Is Believing? Comparing Internet and Traditional Sources On Media Credibility Measures." Journalism & Mass Communication Quarterly **75**(2): 325-340.

Kaufmann, G., G. C. B. Drevland, et al. (2003). "The Importance Of Being Earnest: Displayed Emotions and Witness Credibility." Applied Cognitive Psychology **17**: 21-34.

Kensicki, L. J. (2003). "Building Credibility for Non-Profit Organizations through Webpage Interface Design." Journal of Visual Literacy **23**(2): 139-162.

Kepes, G. (1944). Language of Vision. Mineola, New York, Dover Publications Incorporated.

Kiousis, S. (2001). "Public Trust or Mistrust? Perceptions of Media Credibility in the Information Age." Mass Communication & Society **4**(4): 381-403.

Li, Y., J. Sun, et al. (2004). "Lazy Snapping." ACM Transactions on Graphics (TOG) **23**(3): 303-308.

Liebes, T. (2000). "Inside a News Item: A Dispute Over Framing." Political Communication **17**: 295-305.

Livingstone, S. (2003). The changing nature of audiences: from the mass audience to the interactive media user. Blackwell Companion to Media Studies. A. Valdivia. Oxford, UK, Blackwell Publishing**:** 337-359.

McCombs, M. E. and D. L. Shaw (1972). "The Agenda-Setting Function of Mass Media." The Public Opinion Quarterly **36**(2): 176-187.

Meckel, R. D. Spring 2006 enrollment figures show increased minority student representation http://www.utexas.edu/opa/news/2006/02/enrollment15.html March 20, 2007

Meyer, P. (1988). "Defining and Measuring Credibility Of Newspapers: Developing and Index." Journalism Quarterly **65**: 567-574.

Mittell, J. (2000). "The Cultural Power of an Anti-Television Metaphor." Television & New Media **1**(2): 215-238.

Morris, J. S. (2005). "The Fox News Factor." Press / Politics **10**(3): 56-79.

Morse, M. (1998). Virtualities: television, media art, and cyberculture. Bloomington, Indiana, Indiana University Press.

Mumford, L. (1952). Art And Technics. New York, NY, Columbia University Press.

Negroponte, N. (1995). Being Digital. New York, NY, Vintage Books.

Newcomb, H. (2005). "Studying Television: Same Questions, Different Contexts." Cinema Journal **45**(1): 107-111.

Nguyen, A. (2003). "The Current Status and Potential Development of Online News Consumption: A Structural Approach." First Monday: 10.

Reaves, S. (1992). "What is wrong with this picture?" Newspaper Research Journal **13 & 14**: 131-155.

Reaves, S. (1995). "The Vulnerable Image: Categories of Photos as Predictor of Digital Manipulation." Journalism & Mass Communication Quarterly **72**(3): 706-715.

Rimmer, T. and D. Weaver (1987). "Different Questions, Different Answers? Media Use and Media Credibility." Journalism Quarterly **64**: 28-36, 44.

Roper, B. W. (1985). Public attitudes toward television and other media in a time of change. New York, Television Information Office.

Rother, C., V. Kolmogorov, et al. (2004). ""Grab Cut": interactive foreground extraction using iterated graph cuts." ACM Transactions on Graphics (TOG) **23**(3): 309-314.

Ryan, M. (1975). "The Impact of Television News Film on Perceived Media Credibility." Journal of Applied Communication Research **3**(2): 69-75.

Slattery, K. and J. T. Tiedge (1992). "The Effect Of Labeling Staged Video On The Credibility Of TV News." Journal of Broadcasting & Electronic Media **36**(3).

Straubhaar, J. D. and R. LaRose (2006). Media Now: Understanding Media, Culture, and Technology. Belmont, California, Wadsworth Thompson.

Suydam, M. (1999). Graphics get high-tech look. Broadcasting & Cable. **129:** 46

Tobias, J. (2004). "Truth To Materials: Modernism and US Television News Design since 1940." Journal of Design History **18**(2): 179-190(12).

Wang, W. and H. Farid (2006). Exposing Digital Forgeries in Video by Detecting Double MPEG Compression. ACM Multimedia and Security Workshop, Geneva, Switzerland.

Wanta, W. and Y.-W. Hu (1994). "The Effects of Credibility, Reliance, and Exposure on Media Agenda-Setting: A Path Analysis Model." Journalism Quarterly **71**(1): 90-98.

West, M. D. (1994). "Validating A Scale For The Measurement of Credibility: A Covariance Structure Modeling Approach." Journalism Quarterly **71**(3): 159-168.

Young, J. (2003). "The Role of Fear in Agenda Setting by Television News." American Behavioral Scientist **46**(12): 1673-1695.

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Arie L. Stavchansky was born in Austin, Texas on February 15, 1977, the son of Ruth Neumann de Stavchansky and Dr. Salomon Stavchansky. After graduating from L.C. Anderson High School in Austin, Texas, he entered The University of Texas at Austin where he earned a Bachelor of Science in Radio–Television–Film (RTF) in 1998. In 1995 he co-founded Web Presence, LLC and developed websites for various Austin based businesses. Between 1999 and 2000 he worked as an information, interface, and interaction designer for Netpliance, Inc. In the summer of 2000 he entered The School of Design at Carnegie Mellon University and earned a Masters of Design in Interaction Design in 2002. For that university, he taught an interactive media production course to design majors. The RTF department at The University of Texas at Austin welcomed him back as a doctoral student upon completing his master's degree. As a doctoral student he designed and taught courses covering digital media production, visual effects for film and television, and theories of technique development for motion pictures. In the summer of 2004, he worked as a motion graphics designer and digital compositor for Digital Kitchen, LLC in Chicago, Illinois where he participated in the design of national television advertising campaigns and sports broadcasts. Some of his work as a freelance designer, visual effects artist, and filmmaker has been exhibited at international conferences and festivals such as ACM SIGGRAPH and Cinematexas. His work has garnered several awards. In 2007, he co-founded Blue Globe Media, LLC, a company that develops interactive media products and software.

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