2015

Lights, Camera, Emotion!: an Examination on Film Lighting and Its Impact on Audiences' Emotional Response

Jennifer Lee Poland
Cleveland State University

Recommended Citation

Poland, Jennifer Lee, "Lights, Camera, Emotion!: an Examination on Film Lighting and Its Impact on Audiences' Emotional Response" (2015). *ETD Archive*. 379.
https://engagedscholarship.csuohio.edu/etdarchive/379

LIGHTS, CAMERA, EMOTION! AN EXAMINATION ON FILM LIGHTING AND

ITS IMPACT ON AUDIENCES' EMOTIONAL RESPONSE

JENNIFER LEE POLAND

BACHELOR OF SCIENCE IN EDUCATION

KENT STATE UNIVERSITY

DECEMBER, 2002

Submitted in partial fulfillment of the requirements for the degree
MASTERS OF ARTS FOR APPLIED COMMUNICATION THEORY AND
METHODOLOGY
at
CLEVELAND STATE UNIVERSITY
AUGUST, 2015

We hereby approve this thesis for

Jennifer Lee Poland

Candidate for the Master of Arts in Applied Communication Theory & Methodology degree

for the

School of Communication

and the CLEVELAND STATE UNIVERSITY

College of Graduate Studies

_____

Thesis Chairperson, <u>Cheryl Bracken</u>

_____

Department & Date

_____

Thesis Committee Member, <u>George Ray</u>

_____

Department & Date

_____

Thesis Committee Member <u>Anup Kumar</u>

_____

Department & Date

Student's Date of Defense: May 2014

DEDICATION

I am not one for conveying false devotion or admiration and therefore will not type out a lengthy list of people who might enjoy a dedication of a thesis, not that there are many people dying for a dedication anyway. Certainly none of my friends care if I wrote this thesis for them. In fact, I think they would certainly be weirded out if I told them I spent two years of intensive study and experimentation for them. They would probably distance themselves from me and defriend me from Facebook. None of my friends, even my associates in film, have been the reason I wrote this thesis, and are not eligible for a dedication.

However, there is one person whom I can say I did write this in the spirit of, Dr. Paul Skalski. He was a very inspirational professor and advisor under whom I began this study. He loved the academic world, shared his enthusiasm for conferences, and expressed the importance of taking these academic studies to the public arena. This social and public aspect of the academic world was very inspiring to me as I completed this study, and as a result, I will have presented different stages of this thesis to two different conferences. With an infectious excitement for social science research that could convert the most negative of skeptics, he encouraged me in my experiment design, never letting me know how ambitious it really was. Even though he passed away half way through my time at Cleveland State University, his support and belief in this concept initiated a fire that kept me going all through my Master's Degree and completion of this thesis.

ACKNOWLEDGEMENTS

My advisor Dr. Cheryl Bracken is awesome. I am so glad I got to work with her this last year. She really knows how to navigate through the research procedures and materials while making it fun and interesting to complete research. Her door is always open, and the conversations are always interesting and timely, whether specifically about a research topic, a larger general picture of social concepts or the inner workings of the academic world, or the greatest next concert coming to town. I, of course, could have no way in hell completed this project without all of her guidance and support. I feel privileged to be able to work with her, and hope to work with her in the future.

James Denny has really been a mentor/friend to me this last year. He has shared his experiences with me from when he went through the program, sometimes pulling out some of his own lecture notes, and offering example work to me. He has shown genuine care and compassion towards me as a Teaching Assistant of his, and also as a master's student just trying to navigate the stresses and pressures of the program. I feel very lucky to have the opportunity to work with Jim this last year, and hope I can help him out as much as he has helped me out some day.

I got the pleasure of taking a qualitative analysis class with Dr. George Ray and absolutely loved the work I got to do in that class. He inspired me to put a qualitative

section in my research experiment, and though he suggested saving the qualitative information for another study to support this thesis later down the road, I have the information to fatten up this research later. As busy as he is, being the Director of Communication and all, he still has given his time to be on my advisory committee, and for that I am thankful!

I would also like to thank Anup Kumar for the time and effort he is putting on my advisory committee. His sharp intellect and creative vision has brought a perspective that has elevated the quality of this paper. Though I have never taken a class from him, I definitely would like to sometime in the near future.

I also have to say that I have never been around nicer, more supportive administrative staff than Rachelle Baker and Sandy Thorp. They are seriously the most pleasant and helpful people I have ever had the pleasure of working with. I would show up in their offices like a little lost puppy, and not only would they happily give me their time, but they would always find the information, or office materials, or the paperwork, or just inform me of a procedure that I needed to know. Rachelle even let me raid her office and consolidate and repurpose binders that were in use so I could organize my surveys. They are seriously awesome people and have made my time at CSU pretty sweet.

I have to mention the people who helped make my stimulus piece happen. John Ban let me remove everything from his garage and uproot his living room couch from noon until 4 in the morning during shooting. Aggie Rozek pushed through the shots and was incredibly meticulous on continuity, which allowed the movie to be shot the exact same way three different times. The actors and crew were fantastic and amazing and all

worked for beer and Mexican food. I absolutely would not have a stimulus piece for this study, therefore I would have no study if it wasn't for the amazing people who worked hard and long and for free.

"I get by with a little help from my friends." Thank you fellow grad students! It was fun and tough at the same time. It was a give and take and a collaborative effort especially with my fellow teaching assistants and my cowriters for the sexiness paper we wrote for Cheryl Bracken's independent study.

Last, but definitely not least, I want to thank Dr. Evan Lieberman the professor of Film and Digital Media. I am not sure how much proper gratitude I can express here. Not only was he my Cinematography teacher for this thesis, where I shot my stimulus pieces, but he is my partner, my inspiration, my co-creator, my intellectual bounce board, my best friend, and my support. He and I spent so many dinners where he cooks and I rattle off research I found, ideas to connect, questions that push outside the box, frustrations, new ideas, my plans for finishing work, questions on how to apply different concepts, production plans for shooting my stimulus piece, the future of academics, and getting into conferences. Last year, we went to the University Film and Video Conference together where I presented my thesis for the first time resulting in much conversation that effected how I tailored my experiment. Throughout this whole process, he has been here, helping bridge the worlds of Social Science and Film. Though seemingly effortless in this thesis, these studies do not always co-exist under the same School of Communication, as I learned from going to the conference. Regardless, Evan has been supportive every step of the way and can't be thanked enough.

LIGHTS, CAMERA, EMOTION! AN EXAMINATION ON FILM LIGHTING AND ITS IMPACT ON AUDIENCES' EMOTIONAL RESPONSE

Jennifer Lee Poland

ABSTRACT

The current study examined the impact of three film lighting styles on participants' emotional responses. The light styles - High Key, Low Key, and Available Light – were selected based on Film theory. Thus, this study combines Media Effects and Film literature to empirically study the impact of structural elements of film on media audiences.

An experiment was conducted manipulating three levels of lighting. The According to film theory, a film presented in high key will cause audiences to feel higher levels of uplifting emotions such as happiness, joy, or humor, a film in low key will cause more feelings of suspense, mystery, and intrigue, and a film presented in available light will illicit feelings of realness or grittiness. A total of 162 participants viewed the film, 54 people watched each stimulus piece.

Significant relationship between different lighting styles and the emotional response of viewers was found. Participants who viewed the film in Low-Key lighting reported significantly more feelings of mystery, suspense, malice, intrigue, and other

uneasy feelings associated with Low Key lighting. Surprisingly, Low Key lighting also elicited higher levels of emotional response in more happy and positive emotions. .

Though this is just the first empirical study of emotional responses in relation to film lighting style, significant results were found. Further studies must be conducted to develop a database and to provide more support to the findings in this study as the results indicate a relationship between film lighting and emotional response that has been indicated in film literature. This relationship can be empirically tested with significant results.

TABLE OF CONTENTS

xi

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION AND RATIONALE

"Lighting is to film what music is to opera" – C.B. Demille [Brown 1996]

"When people look at a beautiful countryside, we like to derive pleasure from it. We receive light sensations of different colors, different wavelengths reflected by the various objects all over the field of vision. This concert of light is similar to the one played by a hundred different instruments, in other words, *a symphony of visual music"* [Alton 1995]

For the last 100 years, the moving image has been illuminated with specific lighting styles defined and practiced by filmmakers. Ideally, if a filmmaker is performing his or her job correctly, the audience member should never be conscious of all the theory, methodology, and craft the lighting designer is manipulating to create a deep and engaging viewing experience. Nevertheless, filmmakers work very hard to bring audiences experiences that will make them "feel they are right there in the movie," or are experiencing presence (Lombard & Ditton, 1997). The goal is to make the viewer

1

integrate what he or she knows as reality with what is being seen on the screen in order to feel transported to the world crafted by the filmmaker.

One way film theorists and filmmakers achieve creating this media effect is by employing lighting theory. From the early days of cinema, lighting has been a fundamental element in creating the final picture. Just as in real life, light is everything for the moving image. Light is all the human eye sees. People do not see objects; they see light bouncing off objects at different color temperatures. The human eye observes light through the iris and the brain interprets the world as 3 dimensional. A camera, a model of the human eye able to record an image passing through the iris onto film, reproduces the image in only 2 dimensions. In order to produce images that appear 3 dimensional and help the audience interpret the intended story or plotline, intense work on developing defined lighting theory and practice has been ongoing since film's creation.

Genres such as comedy, drama, romance, science fiction, fantasy, and mystery, have been defined since the earliest forms of human storytelling. As cinema and film lighting theory developed, different lighting techniques grew to become associated with different types of stories to provoke audience emotional response and assist in narrative interpretation. These lighting styles used to enhance film's power to impact audiences' emotional response and narrative interpretation have been practiced for the last century but have not been examined by empirical study of how the audience actually responds to various lighting styles.

This study investigates the impact three different lighting styles may have on audience perceptions. The methodology section details an experiment that isolates the variable of film lighting from other structural features. The study was conducted with

both quantitative and qualitative questionnaires to evaluate audience responses. Unlike many of the experiments from Communication and Psychology, this evaluative design is simple and only tests three basic lighting styles of High Key, Low Key, and Available Light in isolation.

Rationale

Film theory has been developed and practiced for a century but not many empirical studies have been conducted to examine if the established theories that drive application in the field in fact produce the media effects documented in film literature. Formal elements, as they are known in film literature, include lighting, sound, shot scale, editing, color, and pacing among others and are the basic structures that present the content to the viewer.

Within Communication, Film Lighting, along with all of film theory's formal elements are considered to be structural features of media. There are numerous academic articles concerning the emotional and behavioral effects of media on audiences, though they are mostly conducted by evaluating content, not by the structural features. Some communication scholars have studied different structural features such as sound, pacing, and editing but neither communication nor film scholars have empirically studied the impact of Film Lighting. Psychological experiments testing architectural lighting design in real physical spaces has been completed and has provided positive results that lighting has emotional, cognitive, and behavioral effect on participants. Bridging the links between these fields demonstrates support for why and how empirically testing the application of Film Lighting theory on audience response and narrative interpretation is an important study.

3

The current study manipulates three film lighting styles and tests the impact on participants' emotional responses. The goal of the study is to provide empirical evidence for the relationship between lighting styles and emotions discussed in film literature... The next chapter will detail literature from Media Effects literature, Film Theory, and existing empirical study of lighting. Chapter X presents the methodology of the study. The results and discussion are then presented.

CHAPTER II

LITERATURE REVIEW

Though neither the field of Film nor the field of Communication have conducted empirical studies to measure the emotional impact of film lighting, there is rich history and theory speculating emotional response from different lighting conditions. There are also connections in the fields of Psychology and Architecture where similar theories are discussed and some empirical testing has been completed. The field of Communication also has developed a general theoretical category into which testing the effect on film lighting on emotional response fits. The following is a literature review of how all these different fields support the theory and testing of audiences' emotional response to film lighting.

Media Effects

The definition of Media Effects has evolved over time within the field of Communication. Bryan & Zillman (1986) define media effects as "the social, cultural, and psychological impact of communicating via the mass media" (p. xiii). According to Perse, (2001) media effects "control, enhance, or mitigate the impact of the mass media on individuals and society" (p. ix). Other definitions are offered by, Emmers-Sommer &

Allen (1999) who define mass media effects as "independent or predicting variables that involve the mass media and the effects of various independent or predictor variables on media outcomes" (p. 486). These different definitions cover the basic concept of the impact on audiences as the result of being engaged in a mass media style of communication, as a controlling agent used for societal manipulation, and as variables resulting from and causing further effects, though do not define how effects are created. These varying definitions led Eveland (2006) to state that it "is clear that there has been little effort made to discuss what it is about mass media that is producing the effect" (p. 396).

However, Potter (2012) argues that "it is important to use a broad perspective on media effects in order to understand the incredibly wide range of influence the media exert and also to appreciate the truly wide range of effects research that has been produced by media scholars" (p. 35). Only a broad perspective on Media Effects can allow all of the different explications, conceptualizations, experimentations, theories, models, and vocabulary to all be classified under media effects. He further explicates, "media influenced effects are those things that occur as a result – either in part or whole – from media influence" (Potter, 2012 p. 38). The organization of said effects, are uniquely both explanatory and simplistic enough to provide a basis for understanding media effects, and also malleable enough to allow most other theories and models to find a place within, or using his organization of effects.

He suggests that there are six basic types of media effects on individuals and two questions that should be posed while evaluating media phenomena. Researchers should

ask has the individual experienced one of these six effects, and if so, how has the media

achieved this effect? According to Potter (2012) the six media effects on individuals are

> 1. Cognition, or the acquisition, memorization and interpretation of
> information presented by media.
> 2. Beliefs, or faith that an event or object is presented in a way that
> is authentic to the associated attributes.
> 3. Attitudes, or judgments about an event, object, or person being
> displayed through the media.
> 4. Affect, or emotional responses to media stimuli such as fear,
> lust, anger or laughter.
> 5. Physiology, automatic body response such as pupil dilation,
> blood pressure, or heart rate.
> 6. Behaviors, individuals' actions are altered by consuming media,
> such as buying a product after an advertisement (p. 41-42).

The current study is concerned with the affect or emotional responses to media.

Potter also recommends that after an individual or researcher is able to identify which

type or types of media effects the audience member has experienced or is actively

displaying, the person or researcher must identify how the media caused the effect. Most

media effect studies, models, and literature focus on the actual effect of the media, and

not so heavily on the technique behind achieving effects. The majority of media effects

studies focus is on the study of violence and the impact of watching violent content has

on human behavior (Huesmann, 2006, p. 396). Many of these studies have been

conducted through audience response from media content only. "Content-specific

formulations continue to dominate conceptions of media effects" (McLeod et al., 1991, p.

247) even though there many structural features that greatly impact audience members

and are rarely tested. Eveland (2003) states that "If we do not include some theoretical

concepts besides 'content' in our formulations of media effects theories, then they are not

media effects theories at all, they are content effects theories" (p. 400). Structural features should be examined as media effects stimulus to further communication studies on the topic. The following sections define and discuss prior relatable research findings.

Structural Features

The labels "structural features" a Communication term, and "formal elements," a Film Studies term, are interchangeable, and may be referred to as either term during this paper. Formal elements are the fundamental mechanisms that construct a moving image piece of media. In a very simple example, such as the mass medium of the newspaper, the structural features may include the type and size of font, the color and texture of the paper, advertisement size and placement, the order of articles, etc. not the actual content of the advertisements or articles. Similarly, when equating this concept to moving image media such as film, television, commercials, and video games, there are formal elements that create and present the content that the audience consumes. These features include, but are not limited to, the ones listed in Table X .According to http://classes.yale.edu/film-analysis, (2002 Yale University) there are four main headings under which the formal elements for film are categorized, and they are depicted in the following chart (See Table 1 and Figure 1).

Figure 1. For definitions for each formal element listed here, visit http://classes.yale.edu/film-analysis or scan the QRcode for explications, descriptions and pictures.

Table 1: *Structural Features and Effects*

MISE EN SCENE – The representation of space affects the reading of a film. Depth, proximity, size and proportions of the places and objects in a film can be manipulated through camera placement and lenses, lighting, decor, effectively determining mood or relationships between elements in the diegetic world.	CINEMATOGRAPHY- The elements at play in the construction of a shot. The look of an image, its balance of dark and light, the depth of the space in focus, the relation of background and foreground, etc. all affect the reception of the image.	SOUND – sound heard while cinematic images are played, does not necessarily have to match the image.	EDITING- The shot is defined by editing but editing also works to join shots together. In the analytical tradition, editing serves to establish space and lead the viewer to the most salient aspects of a scene.
Set	Shot scale	Diegetic	Shot sequencing
Props	Camera movement	Non diegetic	Ellipsis- time
Makeup	Camera angle	Narration	Kuleshov Effect
Wardrobe	composition	Musical scores	Cross cutting/parallel action
Blocking	Lighting	Sound editing	Transition types
Actors	Lenses	Direct sound	Color
Action	Zooms	Sound bridge	Contrast
Body motions	Focus pulls	Sonic flashback	Special effects
Facial expressions	Film stock	Nonsimultaneous sound	Animation
Deep space	Digital format	Off screen sound	Montage
Shallow space	Camera type	Post synchronization dubbing	Matting
Décor	Frame rate	Sound perspective	Superimposition
Rear projection	Stop motion	Synchronous sound	Continuity editing
Lighting- High/Low Key	Exposure	Voice over	Elliptical editing
	Aspect ratio	Quality	Overlap editing
	Color temperature		Cut in/ cut away
	Aspect ratio		Cheat cut
	Long take		Jump cut
			Establishing shot/reestablishing shot
			Matching eye line
			Matching action
			Matching graphic
			Rhythm

This table is not comprehensive and some of the formal elements listed have several more formal elements within them, such as shot scales, which include 7 types that represent different symbolic meanings when used, multiple camera angles, a variety of lenses, varying camera movements, etc. Each structural feature, or formal element changes the delivery of the content and potentially has great impact on audience perceptions and responses. They are used like a writer chooses her words, pen, and paper to verbally construct a literary world, or like a painter chooses his canvas, brushes, paint, subject, and light to create his vision of what he sees. In Communication, structural features are formal elements that form the basis of the film language, are designed to relay a symbolic message to the audience, and have an influence on the total media effect experienced by the viewer.

The impact of structural features (of television and film) as a media effects is a growing area of research. "A small but growing area of research and theory in communication concerns the physiological and psychological processing and impact of structural features of television such as editing pace, camera angle, special effects, and text and graphics" (Lombard et al. 1996, pg. 2). Studies of structural features include analyzing the impact of sound, music, camera movement, in frame motion, screen size, image size, zooms, scene changes, still images, motion graphics, frame rate, and editing order on audiences' attention, arousal, memory and cognitive response (Detenber et al., 1996; Ellis et al., 2005; Geiger & Reeves, 1993; Hoeckner et al., 2011; Kipper 1986; Lang, 1990; Lang et al., 1999; Lang et al., 2000; Lombard et al., 1996; Mobbs et al., 2006; Reeves et al., 1999).

Many of these studies found a positive relationship between the structural features and some type of media effect. The effects of pace, camera movement, screen size, and music provided strong evidence of impacting audience response. Some examples of the impact of structural features on media audiences include physiological responses such as startle responses (Lang, 2000) and difference pace rates impact skin conductance (Lang, 1999). Cognitive effects have also been reported. For example, Kipper (1986) reported that changes in camera movement can "provides viewers with more information about the physical form of objects and 3–dimensional layout of a television scene" (p. 304). Detenber (1996) claims his "study provides empirical evidence for what film theorists have suggested for some time- that screen size will have an impact on one's movie watching experience" (p. 78). Music in movies also has shown a positive relationship with audience interpretation as Hoeckner et al (2011) states "for the first time, film musical schemas influence how much viewers like or dislike a character and how confident viewers feel about how well they know a character's thoughts" (p. 150). Though only a few structural features have been empirically studied thus far, results seem to indicate a general relationship between each feature and audience response.

Film theorists and practitioners have used formal elements, for over 100 years to elicit audience response and persuade audience interpretation. As the motion picture industry developed, the craft of creating moving media, and study of the techniques used to produce media effects have been theorized, practiced, and taught in the field of Film. The field of film studies itself has been moved over the years to be categorized under different academic umbrellas of English, Fine Arts, and currently Communication, and can be classified differently under different universities. This has created research

directives of varying natures, overlapping research that goes unconnected during interpretation and creation of academic journals, and different terms in different fields for the same concept. Detenber et al (1996) stated that the results of his study "support the claim that the form a picture takes can affect the emotional and cognitive responses it elicits independent of its content. The findings underscore the need to investigate the psychological impact of different modes of presentation" (p. 82). Linking Film studies and practices with Communication literature and theory, Psychology's experiments and conclusions, Architecture's steeped history, and Advertising's selling points, will help bridge complicated and duplicated concepts of structural features in media effects, specifically the formal effect of Film Lighting.

Communication researchers have only empirically tested a handful of these formal elements, and many of these studies are designed to analyze many structural features at once. In 1990, Lang suggests after she attempted such a study, that "the stimulus should be chosen or designed with only a limited number of structural features of interest spaced far enough apart to allow for analysis" (p. 295). One formal element that has not been empirically tested in Communication, but has extensive literature in film studies and architecture is film lighting. Additionally there are collegiate programs specifically on the subject and highly trained and lucrative professionals skilled in the craft. Though some psychological research has been completed on the impact of lighting in advertisements and on people in a real life environment and has produced positive results establishing a relationship between a type of angle of light and a person's mood, (Boray et al 1989; Hutchison et al, 2011). To date, there has not been a study on the impact of film lighting on audience mood and narrative interpretation. The following

section describes the history of lighting in film and presents an overview on lighting studies in other disciplines.

Film Lighting

Cinematic theory suggests that audience members experiencing a film lit in the noir style will interpret the highly shadowed, dark, and contrasting images with feelings of danger, suspense, depression, mystery, and evil. Characters in this mode should be interpreted as having evil intentions, being manipulative and untrustworthy. Cinematographers lighting a comedy use bright lighting set ups, less contrast, and a slick, shiny look to trigger emotional responses of joy, enlightenment, honesty, and happiness. In this lighting style, characters are interpreted as good hearted, funny, lovable, and heroic. For Mumblecore, the raw realistic lighting is intended to give the audience the feeling of reality and truth. Audience members are thought to connect with these characters as though they could be from an audience member's life.

Cinematographers use these lighting approaches to enhance a movie's plot, characters, theme, style, and overall mood. "One could say that the technical ability and the expressive effectiveness of a director's or of a cameraman's work is revealed above all in the lighting" – Bettetini (as cited in Grotal, 2005, p. 2). Bettetini has made this claim that lighting has a monumental impact on cinematic expression but no empirical studies have been performed to support or deny such a declaration.

Lighting History

A three dimensional world is how humans perceive reality, but people do not actually "see" the world around them. Humans see light reflecting off of objects in the everyday world. Our reality is constructed completely of light waves bringing us visual

information, which we compute into thoughts, interpretations, and emotions. The human eye is identical to the first models of the camera, or camera obscura. It uses the effect of light passing through a small hole, or iris, and projecting an image upside down on the other side of the hole. A reflective surface flips the image back around and light can now be observed as a reality. Where the light passing through the human eye is immediately interpreted as 3- dimensional by the human brain, the image projected from a camera is only 2-dimensional. It has taken cinematographers and filmmakers many years to develop the technology and skill to sculpt and manipulate light for the reconstruction a three dimensional moving image.

Human's ability to control light began with fire. "Lighting creates the environment for storytelling. The first lighting for storytelling was the fire" (Brown, 1996, p. 12). Originally, fire was associated with heat and protection with its warm and glowing light providing a place to gather at night to communicate and tell stories. People would gather around, with firelight as the only source for visual focus and share dramatic or comical tales until it slowly burned out and the audience went to bed.

Human stories developed into theatrical performances as dramas became more elaborately written with scripts, props, actors, and growing audiences. Firelight was not bright enough to light all the aspects of these performances so theater performances depended on exterior daylight to illuminate performances. It wasn't until 1781 that a French chemist named Laviosier invented controllable directional lighting by putting mirrors on oil lanterns. Some wealthy theaters were able to begin lighting under primitive lanterns, but it wasn't until the gas lantern was invented that theater could have more

widespread indoor shows. Eventually the limelight was invented and implemented on theater stages, coining the common phrase "Step into the limelight."

These advances in lighting technology enhanced the theater experience, but when motion picture creation began in 1888, cameras could only get a decent exposure when using exterior daylight. Early film sets such as Thomas Edison's Black Maria, had retractable roofs open to the sky. Interior lighting was not widely used until the introduction of White Flame Carbon Arcs in 1912. They were very loud and dangerous to use on sets, while tungsten lights, also invented at the same time, were safer and eventually became the predominant film light when panchromatic film stock was invented in 1927, which was sensitive to all light wavelengths (Brown, 1996).

Cameras, lights, film stock, and digital technology, have all advanced continuously since the origination of filmmaking. However, movie genres and the lighting styles associated with each type of story have developed into standard cinematic theories. It seems as though basic characteristics of storytelling, perhaps not straying that far from early humans' storytelling gatherings around the fire, offer the fundamental tales humans have the need and ability to tell. Genres of comedy, drama, mystery, romance, etc..., showcase human struggles, accomplishments, and emotion and are a constant force in storytelling. "In visual storytelling, few elements are as effective and as powerful as light and color. They have the ability to reach the viewers at a purely emotional gut level" (Brown, 2012, p. 8). Perhaps because of the visceral nature of spiritual motivation and emotional reaction to light, the lighting styles theorized to be critical in the illumination and visual display of our developed genres remain solidly connected through time.

Lighting Styles

High Key

While High Key lighting, a style that brightly lights characters and set in a flat wash of illumination, was the first and only lighting style operable in early film, it found its niche in comedy. "Although claims about 'firsts' always seem disputable when it comes to the history of film, a case can be made that the first film was a comedy – depending on whether one dates *Fred Ott's Sneeze* as having been made in 1889 or 1892" (Carroll, 1991, p. 25). Whether actually the first movie ever made or not, comedies were very common theme of early cinema. They were shot in High Key, with ample exterior light, and were often physical in nature, gravitating towards roughhouse and slapstick. High Key lighting allows the viewer to clearly see all of the visual space and is lit flat with no shadows, leaving a sense of safety and positivity.

Sound became commercially popular in 1927, when panchromatic film stock equally sensitive to the entire all light spectrum allowed filmmakers to use tungsten light on set as opposed to the noisy and dangerous carbon arc lights. This enabled filmmakers to be able to record sound on set and comedic plots began to have dialogue. In the 1930's the screwball comedy became very popular, building comedic tension through a "Battle of the Sexes" type plot line. This style of comedy has evolved into the Romantic Comedy, but the lighting style, High Key, has not changed. "They are bright, generally set in affluent or fairly affluent environments, where no one lurks in the shadow and everything is bright and visible, even during night scenes" (Frost, 2009, p. 135). Thus the following hypothesis is posited:

Hypothesis 1: Participants who view High Key lighting will report higher levels of positive emotions than participants who viewed Low Key or Available Lighting.

Low Key

Low Key lighting, though previously used in the theater, transferred onto film with the genre of Film Noir. With its high contrast, dark shadows, and half lit sets and faces, it is said to have "originated in America, emerging out of the synthesis of hard boiled fiction and German expressionism" (Naremore, 2008, p. 9) in the 1920's. Low Key features stylistic sculpting of dark shadow and bright light. It became popular between 1941 and 1958 - but it is still used today (Silver & Ward, 1992). This is coincidentally the same year panchromatic film stock allowed filmmakers more freedom with interior lighting set ups. Coined Film Noir, or Dark Film in 1946 by French critics, this movement became popularized by cineastes of the French new wave movement. The genre is associated with Low-Key lighting, wet down city streets, and Femme Fatales (French for deadly women). "Stylistically shadows prevail, characters walk out of darkness with slashes of shadow across their faces, even during the day, darkness is the predominant feeling. Pessimism and doom are certainties" (Frost, 2009, p. 140). Based on the literature, the following is predicted:

Hypothesis 2: Participants who view Low Key lighting will report higher levels of suspenseful emotions than participants who viewed High Key or Available Lighting.

Available Light.

Though documentary films have always used available light, which is simply using whatever light is available to the filmmaker from the setting, one of the latest narrative genres of film to emerge around 2002, developed out of the advancing technology and the commercial accessibility of the digital video camera. Labeled Mumblecore of the 1990's, the name "is the flippant term for any number of recent micro-budget American independent films that favor low-key realism over technical fireworks" (Woodward, 2011, p. D7). Almost a combination of documentary, traditional narrative, and reality television, these movies use only available lighting, allegedly giving them a very real life, gritty quality and tone, even though they are fictional stories. With the proliferation of amateur styles of filmmaking, via the Internet and reality television, these movies have had success in the Independent filmmaking world. "Quickly gaining ground in the film-festival circuits and Netflix queues across the country, these films combine art house aspirations with reality television directness" (Maerez, 2007, p. 82). Available Light tends to make the story believable to audiences and is easy for a filmmaker to use.

Available lighting also is heavily used in reality television shows or any cinema verite that is attempting to transport the viewer into a story that is real or truthful. Available lighting tends to make the viewer believe that he or she is watching a true story. With the development of advancing technology, and increasingly light sensitive phone cameras, it is convincingly easier to bring a sense of reality though lighting and camera operation. Based on this literature, the following hypothesis is posited:

Hypothesis 3: Participants who view Available Lighting will report higher levels of feeling realness than participants who viewed Low Key or High Key Lighting.

Cognitive Approach

In the 1990's a cognitive approach to film theory began to develop, analyzing how film impacts audiences' emotional response. The element of light is largely responsible for our perception as "objects, characters, events or scenes are perceived as representations under certain lighting conditions" (Grodal, 2005, p. 25). The average viewer has already had life experiences through which they relate tone or mood to perceived light. Psychological research results seem to support that if a filmmaker can recreate a visual image that draws on the emotional memories of the audience, he or she can enhance the information relayed to the viewer and the overall viewing experience.

Some cognitive theorists also suggest that "the human observer must be placed squarely in his ecological niche, bounded on every side by the biological and psychological capacities developed through evolution. To be able to intuit another person's intentions has always been crucial to our survival" (Anderson, 2005, p. 35). Associating shadows with danger, bright lights with enjoyment and safety, flat and motivated lighting with realistic human activity is an interpretative mechanism developed through evolutionary survival. Filmmakers tap into this primal visual interpretive mechanism to enhance audience emotional response, stimulate narrative interpretation and maximize engagement. Thus,

Hypothesis 4: Participants will report higher levels of believability of characters and events in the plot if the lighting style thematically matches what the participant is already familiar associating with the narrative content.

Genres

Specific lighting styles are intrinsically tied to genres; low-key and high contrast for Film Noir, high-key and low contrast for Comedy, and low-key and available light for Mumblecore or Documentary style films. According to Henri Alekan, a prestigious French cinematographer,

> Light becomes mood that gives its tone to a film. It calls upon our memory to react to physical phenomena such as cold, rain, fog, sun, or dryness, ad come up with psychological equivalents such as annoyance, sadness, mystery, fear, anguish, comfort, joy, gaiety, etc. As these effects produce immediate impressions in viewers, the cinematographer is able to obtain psychological reactions out of mere technical means (Geuens, 2000, p. 153).

The shadowy low-key lighting effects of Noir provoke viewers to react to plot and characters with a depressive and suspicious frame of mind evoking feelings of danger, suspense, and mystery. The bright high-key lighting in Comedies set viewers in a mood to laugh, see an uplifting plotline, and find characters likeable, whereas the realistic available lighting in Mumblecore films set the viewer up for a story not that unlike their real life with believable characters and plot events.

High Key, Low Key, and Available Light are now used in different types of movies with varying genres, and also in combinations in different kinds of movies. Though they have originated from specific genres and are still generally tied closely to their origin, it is important to note that the label of the genre can be subjective but the

actual lighting styles of high key, low key, and available light are specifically defined and are terms used in the field to produce a cinematographer's desired narrative psychological results. It is predicted that participants will be able to identify genres based on the lighting style.

Hypothesis 5: Participants will associate genre based on lighting style regardless of the plot.

Although Communication literature recognizes lighting as a structural feature, the field has not yet conducted empirical research on the formal element of lighting and its impact on audience response, interpretation, and mood. However, the field of psychology has studied lighting effects on work in architectural lighting design, advertisements, urban planning, and even video games. The following section discusses an architectural examination of lighting.

Architecture and Film Lighting

Architectural Lighting is the closest field to Film Lighting. These subjects share a similar history, much of the same vocabulary, and the same theory for applied lighting designs on human psychology. Architectural Lighting and Film Lighting both start with the two primal lighting sources, fire and daylight. Early architecture constantly adapted building design to light with natural sunlight and entire rooms were built to align with the sun's rays (Ganslandt & Harald, 1992) just like Tomas Edison's first studio, the Black Maria was built with a retractable roof to film under full sunlight (Brown, 1996). As

artificial lighting began, so did the ability to light spaces differently. As technology developed from the oil lamp, to gas lighting, to electrical lighting, many different types of lights, with different color temperatures and strengths, became available.

This allowed for more artistic design, both in architecture and film, which both took their cues from the common source of theater when developing their artistic styles.

> Stage lighting goes much further in its intentions than architectural lighting does – it strives to create illusions, whereas architectural lighting is concerned with rendering real structures visible. Nevertheless stage lighting serves as an example for architectural lighting. It identifies methods of producing differentiated lighting effects and the instruments required to create these particular effects –both areas from which architectural lighting can benefit. It is therefore not surprising that stage lighting began to play a significant role in the development of lighting design and that a large number of well-known lighting designers have their roots in theatre lighting (Ganslandt & Harald, 1992, p. 24).

Though film and theater lighting have more of a symbiotic relationship as theater was forced to adapt to a more filmic like set with the induction of new lighting technology that was unfavorable to old theater actors, costumes, and painted sets, (Baxter, 1975) the concepts of High Key and Low Key were adopted from theater into as plays were the first to light narratives according to theme. "Comedies were bright; dramas were uncheerful. Day was yellow; night blue" (Rosenthal & Wertenbaker, 1964, p. 55)

Architecture and Film both use perceptual psychology to get people to see spaces in a certain way. Architecture lighting designers skillfully illuminate buildings and rooms with psychological intentions.

> Lighting designers think about psychological response and how behavior is affected by lighting. Some examples are:
> 1. Visibility of vertical and horizontal junctions aids orientation.
> 2. People follow the brightest path.
> 3. Brightness can focus attention.

4. Facing wall luminance is a preference.
5. Lighting can affect body position (Ginthner, accessed April, 2013 p.2).

Just as lighting designers light spaces to stimulate human mood and behavior, Cinematographers light the space inside a movie frame with the intent to persuade a viewer's perception. The way objects are lit in the frame will focus the viewer's attention, the amount of shadows cast will limit perception, and changing lights can indicate change in a character or opportunity (Brown, 2012). Each scene in a film can be considered a new architectural space that is visually illuminated with the intent using perceptual psychology to initiate audience response, interpretation, mood, and behavior.

Film and Architecture also have collegiate programs in lighting design and cinematography and produce highly skilled professionals who not only practice the theory and methodology behind their crafts as truths, but are also well compensated for quality work using their training. They both have prestigious clubs and awarding systems honoring professionals who are trained and skillfully implement new techniques and create innovative visual images and spaces. They share similar terminology, work with comparable tools and technology, and essentially developed in a parallel fashion. However, unlike film, architecture has had psychological study on how different light in a physical space effects human arousal, concentration, memory, work productivity and mood.

Psychological Lighting Theory.

The High Key, Low Key, and Available Light were created and implemented from the primal development of the human psyche, and even if the film lighting effects have yet to be empirically tested on audiences, psychology has conducted lighting tests in

controlled physical environments with significant results. Though psychologists do not use the same terminology as film studies, correlations can be made that suggest if architectural lighting design does have an impact on human interpretation, mood, and behavior in the physical world then it may also have an impact of the audience of a film. Like structural features in within the topic of Media Effects in Communication, aspects of the impact of architectural lighting design on psychological interpretation have been conducted in Psychology.

Different psychological studies proved significant results in varying areas of the human condition. "Light is a pervasive feature of the environment, which exerts broad effects on human behavior" (Sburlea, 2011, p.1). Felix Deutch writes "Every action of light has, in its influence, physical as well as psychic components" (Birren, 1969, p. 400). Sleegers et al. (2013) state, after testing two different Dutch elementary school classes in different lighting environments that "the results of our study offer support for the influence of classroom lighting conditions on concentration" (p. 15). Knez (1995) found significant results when measuring mood and memory under different lighting conditions. "The results in long-term recall and recognition tasks showed that both retrieval processes were affected by in accordance with congruent, incongruent mood valence" and suggests "that highly structure to be learned was indeed sensitive for memory-mood effects" (p. 50). Additionally, Veitch et al. (1991) found that lighting differences can increase arousal and task performance and suggests "If information is provided to employees concerning the lighting installation and its effects on people, performance and mood might improve" (p. 94). Positive results continually verify psychological effect

lighting has on the human psyche while the subject is in the architecture of the physical environment.

Lighting and Facial Recognition.

Another area that lighting has been examined is facial recognition in real spaces. Hill and Bruce's study on the "Effects of lighting on the perception of facial surfaces" documented a series of experiments that tested participant recognition and likability of faces and objects in different positions and lighting conditions. Though termed differently, the researchers used film lighting techniques in the design. They tested what they called 'top lighting' or overhead lighting in film, a "45 degree light" or key light, and 'bottom lighting' or under lighting on positions of faces, or in film terms, the blocking of faces, in profile, full front, and quarter face positions. Results indicated that participants showed more accuracy and likability when viewing subjects with overhead lighting (Hill & Bruce, 1996). This would support the fact that filmmakers use under lighting to put audiences at unease in mysteries and thrillers, and is a part of the Low Key lighting style.

They also concluded that "When matching faces, changes in lighting directions pose difficulties" (Hill & Bruce, 1996 p. 1001). This finding is supported by Braje et al. (1998) who studied face recognition of full front faces either was "illuminated" or in film terms in High Key lighting, or with 'cast shadows' or Low Key lighting revealed significant data. "Face recognition was found to be sensitive to the presence of cast shadows and to changes in illumination. Observers were slower and less accurate at matching and naming faces when there was a change in illumination direction" (p. 21). Again, these findings support why Filmmakers light High Key for comedies for audience

comfort and easy recognition and Low Key for mysteries and movies of suspense to make the audience less able to recognize elements of the movie and keep them on the edge. Together these studies suggest that participants may respond differently to film characters differently when seen in differently lighting conditions.

Research Question 1: Will participants will report feeling differently in the likability of the characters depending on the lighting styles.

Summary

Architectural lighting design, facial recognition, advertisements, and the moving image medium of video games have all been psychologically tested for the impact of lighting on human mood, cognition, behavior, or in the very least, preference. Though terminology may differ between the fields of Communication, Film, and Psychology, it should not hinder academic advancement in any field, or other intersecting fields such as Architecture or Marketing. A psychological study of the impact the formal film element of lighting has while communicating narrative plot and character development, not only can, but also should be conducted.

John E Flynn, one of the first and adamant researchers of the impact of lighting on human perception states "Lighting can be discussed as a vehicle that alters information content of the visual field, and this intervention has some effect on behavior and on sensations of wellbeing" (1973, p. 94). Lighting is the very basic element required to see the world and crucially impacts the way that humans experience reality. It is thoughtfully crafted in architectural designs, advertisements, paintings, video games, urban planning,

26

television and film, however, not all areas that study and implement lighting design have been empirically studied for psychological impact on humans.

One challenge that keeps Communication and Psychology from studying Film is the varying vocabulary within each field. While Film production and study is considered to be in the Communication field, there is a terminology barrier. 'Structural Effects' in Communication are 'Formal Elements' in Film, and even though they are the same concept, they are not explicated the same way in each field. The disciplines of Architecture and Film have similar vocabulary taught at the collegiate level regarding lighting design and cinematography. The vocabulary was developed at the beginning of lighting revolution in the late 1800's, and is currently used commercially, in the market place, and in related fields of photography, theater, or live event lighting. The field of Psychology, however, did not use this vocabulary when conducting lighting tests on architectural lighting design, face recognition, or video games.

It is finally time for Film Lighting to be empirically tested within Communication. In this study, audience emotional response, and narrative interpretation will be evaluated based upon three basic types of lighting originally seen in the theater of High Key, Low Key, and Available Light. The experiment will isolate the three types of lighting styles from other potential formal element variables, be short in duration, and employ both qualitative and quantitative evaluation methods. The analysis should be conducted utilizing established theories and testing conclusions from different fields that support, explain, or contradict results.

Film lighting is a formal element that is used to create a mood, perception, attention,

illusion, and feeling, among many other human cognition manipulations. It is a structural

feature that as an impact on the content and creates media effects. It changes psychological

perception of people, places, and events, affecting interpretation and emotional response, just

as architectural lighting design causes varying human moods and behaviors. It is a

phenomenon that is long overdue for testing and analysis, and can help build an academic

umbrella over the fields of Communication, Film, Psychology, and Architecture.

CHAPTER III

PROCEDURES AND METHODOLOGY

Design

This experiment manipulated three levels of light styles and measured the lighting conditions' impact on the participants' perception on emotional responses and character assessment. The study contains both between and within participant measures. The stimulus presented an identically shot and edited movie with three conditions of lighting; High Key, Low Key, and Available Light. The subjects viewed one of the three conditions and responded to a questionnaire consisting of both quantitative and qualitative prompts.   .

This experiment did not jeopardize ethical values. The film shown to participants did not depict images of destruction, gore, or nudity. Subjects were not asked to watch anything that would be considered unethical under the Movie Pictures Producers Association (MPPA) ratings. Questionnaires were not extensive in order to avoid survey fatigue, which could affect results. The experiment received IRB approval (See Appendix A).

Generally this type of experiment proves to have higher internal validity, as it is completed in a controlled environment. Future studies will have to be completed several

29

more times in various ways to achieve a body of empirical knowledge to support or deny these cinematic theories. Observational studies may help to provide more external validity or this field of study but as for right now, being the only empirical study completed on this subject, the internal validity of this experiment is at least some place to start.

Participants

Undergraduate students in the School of Communication program were recruited to participate in this study. The movie was shown during their Communication 101 class and students received extra credit for their participation. Each of the three groups of participants had 54 students, resulting in 162 total participants. The age range across all three groups was 18-72 with a mean age of 23 years. There were 54% ($n = 87$) male and 46% ($n = 75$) female participants, with a racial breakdown in the four areas of 55% Caucasian, 28% African American, 5% Hispanic, and 12% other.

Stimuli

The visual stimulus for the experiment was created specifically for this lighting test. As a part of a Cinematography class, during which I studied the fundamentals and application of film lighting, I produced, directed and was director of photography for *Refuse Reclamation and Analysis*, the stimulus movie for this experiment. After researching the genres that are associated with each lighting style, I wrote a short script that converged plot points from each style as to allow the lighting to be the only factor for classifying the genre. I shot different options for editing, which included filming styles for each lighting style with the intension to keep the plot neutral. After test screenings conducted for narrative comprehension, the final stimulus piece that was used in the

experiment was a story with a film noir plot.

Plot Summary.

The narrative, only ten minutes in length, begins with a garbage man named JJ who collects items from the garbage as he works and sells them for extra cash. The movie opens with him getting caught stealing from the garbage and is fired. He looks for a job and attempts to win money at the casino as he sells off all of his collected garbage. When he hits rock bottom, his apartment is empty, he is out of cash, and he still has no job, he puts out an add on craigslist titled "Refuse Reclamation and Analysis" where he offers his detective services by analyzing people's trash. This is the end of the first segment or "time 1" and the first section of the survey was filled out at this point.

A beautiful woman named Lana knocks on his door and enters JJ's now empty studio apartment. She asks him to obtain a box for her that is in the dumpster of an apartment building of a local politician. She offers him a large sum of money to reclaim this box though her intensions are mysterious and she does not tell JJ information for her motivation. This is the end of the second segment or "time 2" and the second section of the survey was filled out at this point.

JJ digs through the politician's dumpster, and does indeed find the box, along with other strange items that would suggest foul play concerning issues involving this box. He presents the box to Lana and demands to know what is inside. Lana slides next to JJ and is about to open the box when two thugs run up on them and try to take the box. JJ decks them both and they Lana and JJ run away with the box. They run out into the streets of the city where they turn down various alleys attempting to ditch the goons. JJ sees a dumpster and helps Lana inside just in time as the thugs round the corner and run

31

by the dumpster. The thrill of the moment provides the opportunity for a romantic kiss which they proceed have right there in the dumpster.

Lana and JJ return to JJ's studio where they discover the thugs and the politician waiting for them. The politician instructs the thugs to grab the box and key. Lana and JJ struggle to keep possession of the items but fail to do so. The thugs give the politician the box and key and he opens the box while JJ and Lana stare at each wondering what will happen next. At the end of the movie, participants filled out the third section or "time 3" of the survey.

Design of Plot Elements.

The plot was designed to leave ambiguity for Lana's character, the reason the box was in the garbage, and the contents of the box. This ambiguity was crafted to provide extra narrative space for audiences' interpretation of the plot under each lighting condition. It was evaluated though open ended qualitative questions that were not included in this study.

Production of Stimuli. With the assistance of a few other filmmakers who had graduated from Cleveland State University's film program, and local actors in the Cleveland area, the exact same movie was shot under three different lighting conditions. The actors and the members of the crew were briefed on the nature of the movie and were especially careful to act out each movement in the exact same way. There was no dialogue in order to eliminate the variable of line delivery. My assistant director painstakingly kept track of every movement, every lighting set up, and every nuance of each scene with her own camera and notes. My talented gaffer emulated every lighting style to its book definition, and my camera operator mimicked every camera movement

32

and frame for each film. The following RQ code will take you to an example of one scene lit in High Key, Low Key, and then Available Light.

Figure 2: Example of the Same Scene in Each Lighting Style

Each movie is a ten minute long silent movie, with only variable between them being the lighting styles in which they were shot. Each movie was shown in a classroom auditorium on the same projector as to make sure the participants see the movie under the same external lighting conditions, with the same screen size, resolution, color, and other display settings. Each group of viewers only saw one version of the movie, and answered questions during the course of the presentation.

Measures

Independent Variable

The Independent variable in this experiment is Film Lighting. Three different lighting styles of High Key, Low Key, and Available Light were tested on audiences watching the exact same movie lit in each lighting style. Consistent with film lighting theory, the High Key movie was light in a bright fashion where the character and all the surroundings and background could be seen clearly. The Low Key movie was lit with only enough light to illuminate the characters, often using hard back lights and under-

lighting. The Available Light movie employed only the light naturally provided in the environment to light the scene. A pretest was conducted students form a 400 level capstone film class to see if they could Identify the lighting styles in which 90% of the students were able to identify differences.

Dependent Variable

The proposed dependent variables were different types of media effects. They may include emotional response such as feelings of suspense, realism, or humor or could be cognitive variables such as narrative of character interpretation. It is proposed in film literature that each variation of the independent variable will cause specific types of dependent variables. Emotional responses were adapted from film literature as the desired emotional effect for each lighting style. The perceived believability and likability of the character were also be evaluated qualitatively with the same seven digit scale. The participants' interpretation of realism was also documented with quantitative questions responses in regards to character and plot. Genre identification was also identified between three choices of Comedy, Film Noir, and Realistic Drama (Please see appendix C for the full questionnaire).

Emotional Responses

Several emotional responses were assessed. Based on film theory, three specific emotional responses were selected to correspond with the lighting styles presented in the film. They are Lightheartedness, Suspense, and Rawness.

Lightheartedness

Lightheartedness is the overall emotional response label for positive emotions hypothesized to be stimulated with High Key lighting. Ten emotions associated with

34

positive emotions were evaluated by the participants on a Likert-type scale ranging from 1 to 7 where 1 equaled "Not at All" and 7 equaled "Very Much." The participants were asked to assess their emotional at three different time points throughout the movie. The ten emotional statements were added together to create a summated Lightheartedness scale ranging from 10 to 70 (See Appendix 1). See Table 2 for reliability of the scale at each time point. The overall lightheartedness scale was created by adding the three time points together (See Table 2 for the Cronbach's alpha). .

Suspense

Suspense is the overall emotional response label for emotions hypothesized to be stimulated by Low Key lighting. Ten emotions associated with suspenseful emotions were evaluated by the participants on a Likert-type scale ranging from 1 to 7 where 1 equaled "Not at All" and 7 equaled "Very Much." The participants were asked to assess their emotional at three different time points throughout the movie. The ten emotional statements were added together to create a summated Suspense scale ranging from 10 to 70 (See Appendix 1). See Table 2 for reliability of the scale at each time point. The overall suspense scale was created by adding the three time points together (See Table 2 for the Cronbach's alpha).

Rawness

Rawness is the overall label for emotions hypothesized to be stimulated by Available Light. Ten emotions associated with raw emotions were evaluated by the participants on a Likert-type scale ranging from 1 to 7 where 1 equaled "Not at All" and 7 equaled "Very Much." The participants were asked to assess their emotional at three different time points throughout the movie. The ten emotional statements were added

35

together to create a summated Rawness scale ranging from 10 to 70 (See Appendix 1). See Table 2 for reliability of the scale at each time point. The overall rawness scale was created by adding the three time points together (See Table 2 for the Cronbach's alpha).

Table 2: Cronbach's Alpha Scores

	Lighthearted	Suspense	Rawness
Time 1	.88	.70	.88
Time 2	.90	.81	.90
Time 3	.91	.93	.91
Overall	.76	.78	.76

Self Assessment Manikin (SAM)

General emotional responses to the varying stimuli were measured using the Self-Assessment Manikin (SAM) questionnaire (Bradley & Lang p. 51). The three SAM items were ranging on a scale from 1 to 9, in terms of "Happy" to "Unhappy" "Excited" to "Calm" and "In Control" to "Out of Control" (See Appendix C)   .

Character Likability.

The measurement of character likeability was measured in a Likert-type scale ranging from 1 as "Not at All" to 7 "Very Much" for the character JJ during time one and Lana at time two directly after each characters was introduced. The viewers were asked how likable, how relatable, how believable, and how much empathy was shown for each character. The summated scale is combined and is measured on a 1-28 scale. These

measures were combined for a reliability test for each character. The Cronbach's alpha for JJ was .71 and for Lana was 79.

Believability

Believability was assessed using a Likert-type scale with participants responding to 1-7 to assess the believability of people and events in the plot with 1 being not at all like everyday life and 7 being very much like everyday life. These questions were prompted at each time point and were designed to elicit responses about whether they characters and events seemed like real life and if they people were like people the participant knew, or if the events were like something that had happened to them or a person they knew. (See Appendix C for the complete listing of items). The Cronbach's alpha was .72

Genre

Genre was evaluated by asking the participants to circle which genre they considered the movie to be. At the end of the stimuli the participants were asked what the genre of the movie was and were prompted to circle Comedy, Film Noir, or Realistic Narrative.

Procedure

Participants signed a consent form, and were notified of their rights as participants in this study. They were then given pencil and paper questionnaires and were instructed to fill out demographic information as they listen to directions. They were instructed about the general research question and encouraged to answer as honestly as they can. They were informed they would watch a silent movie and to interpret the story without dialogue or sound effects. They were not told the lighting was manipulated.

They were given instructions to begin watching the movie and to complete the questionnaire when prompted. At different parts of the film, they stopped to evaluate aspects of the film and complete parts of the questionnaire. The first two time points were selected to occur after each of the main character (JJ [time 1] and Lana [time 2]) was introduced and engaged an action that could be interpreted differently depending on the light in condition, the movie will show a title card, as some title cards will be edited in as part of the silent movie, that will pause the movie and instruct viewers to fill out the questionnaire. The third time point was after the movie is finished, the audience were instructed to complete the questionnaire, and turn it in.

Because some of the questions' responses might change if the subject knows the ending, the stops were necessary to evaluate lighting as a media effect and not the actual plot ending. The participants responded using a pencil and paper questionnaire. The viewers did not have enough time to over analyze the questions, develop survey fatigue, or mentally fall out of the flow of the movie. They answered a few short questions each of the three time point of the movie and turned them in with their release forms at the end.

The questionnaire was a mixture of Likert-type scales and open-ended I manually organized, coded, and entered data into SPSS. Open-ended questions were placed into categories that align with the defining characteristics of high key, low key, or available light. Though they were not included in the analysis portion of this thesis, they will provide a qualitative component that could not be measured through quantitative measures alone. This information will be saved for a further study on this topic.

CHAPTER IV

RESULTS

Descriptive Statistics

There were 54 participants in each conditional group. The High Key condition was comprised of 59% (*n* = 32) men and 41% females (*n* = 22) with an age range of 18-72. The Low Key condition had 61% males (*n* = 33) and 39% females (*n* = 21) with an age range of 18-70 years old, and the Available Light condition included 43% males (*n*=23) and 57% females (*n*=31) with an age range of 10-47 years old.

Hypothesis 1

Hypothesis 1 predicted that audiences would report higher levels of Lightheartedness during the viewing of the High Key stimuli. The results are significant but do not support Hypothesis 1. To test this hypothesis, an Analysis of Variance (ANOVA) was conducted with the 3 lighting styles as the independent variable and Lighthearted emotional subdimension as the dependent variable. There was a significant difference ($F = 2.98$, $df = 2$, $p = 0.05$) between the lighting styles with participants who watched the High Key light condition reporting the lowest levels of perceived Lightheartedness (*M* = 62.37, *SD* = 24.07) than those who saw Low Key (*M* = 74.35, *SD* = 22.04) or Available Light (*M* = 69.60, *SD* = 29.48). Hypothesis one is not supported with these results (See Table 3, and Figure 3).

Table 3: Source table for of Emotional Responses and Lighting Conditions Completely

Between-Subjects ANOVA

Source	SS	df	MS	F	p	eta
Lighthearted	3841.54	2	1920.77	2.98	.03	.03
Suspense	6791.71	2	3395.86	2.89	.05	.03
Rawness	5648.44	2	2824.22	3.94	.02	.04

Figure 3: Lightheartedness Emotional Response to Each Condition
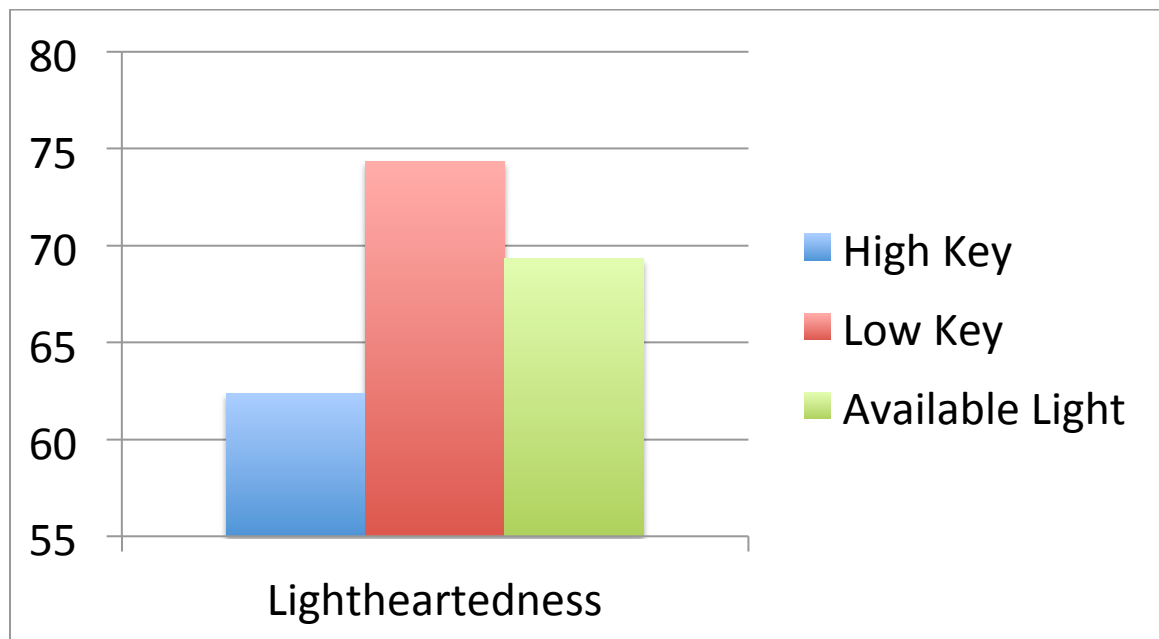
Hypothesis 2

Hypothesis 2 predicted that audiences would report higher levels of Suspense during the viewing of the Low Key stimuli. The results are significant and support hypothesis 2. To test this hypothesis, an Analysis of Variance (ANOVA) was conducted with the 3 lighting styles as the independent variable and Suspense emotional subdimension as the dependent variable. There was a significant difference ($F = 2.88$, *df* $= 2$, $p = 0.05$) between the lighting styles with participants who watched the Low Key lighting condition reporting the highest levels of perceived Suspense ($M = 95.32$, SD = 36.23) than those who saw High Key (M = 79.66, SD = 27.34) or Available Light ($M = 91.61$, SD = 38.27). Hypothesis one is supported with these results (See Table 3 and Figure 4).

Figure 4: *Suspense Emotional Response to Each Condition*
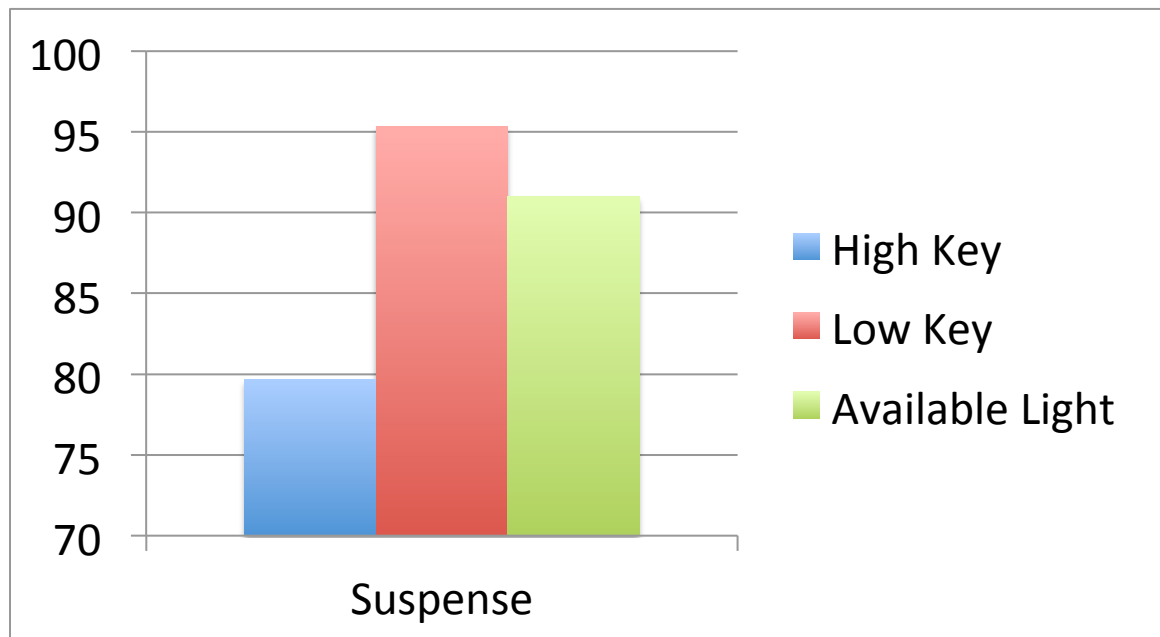
Hypothesis 3

Hypothesis 3 predicted that audiences would report higher levels of Rawness during the viewing of the Available Light stimuli. The results are significant but do not support hypothesis 3. To test this hypothesis, an Analysis of Variance (ANOVA) was conducted with the 3 lighting styles as the independent variable and Rawness emotional subdimension as the dependent variable. There was a significant difference ($F = 3.94$, *df* $= 2$, $p = 0.02$) between the lighting styles with participants who watched the Available lighting condition reporting lower levels of perceived Rawness ($M = 76.08$, $SD = 27.76$) than those who saw Low Key ($M = 84.02$, $SD = 27.88$) but higher levels than those who saw it in High Key ($M = 69.3.61$, $SD = 24.7$). Hypothesis one is not supported with these results (See Table 3, and Figure 5).

Figure 5: *Rawness Emotional Response to Each Condition*
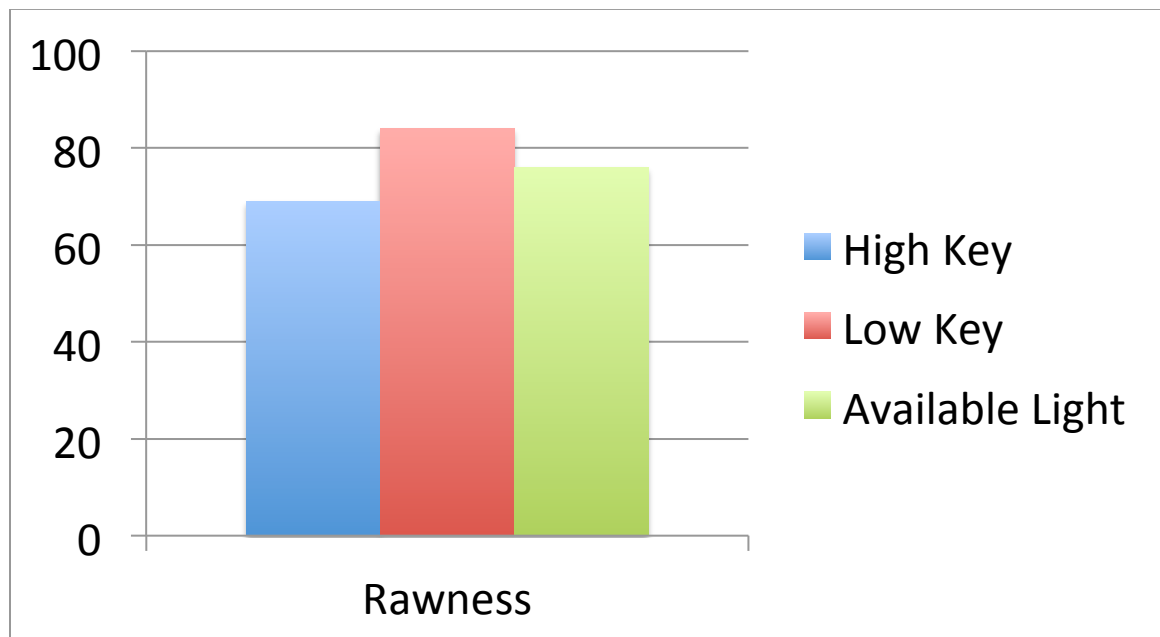
Hypothesis 4

An Analysis of Variance (ANOVA) was conducted with the 3 lighting styles as the independent variable and believability as the dependent variable to test Hypothesis 4 which predicted audience members would report higher levels of perceived believability while watching the stimulus created in the lighting style that matches the plotline, in this case Low Key. There was a significant difference ($F = 3.11$, $df = 2$, $p = 0.047$) between the lighting styles with participants who watched the Low Key light condition reporting higher levels of perceived believability ($M = 36.72$, SD = 12.60) than those who saw High Key (M = 32.07, SD = 12.15) or Available Light ($M = 31.68$, SD = 9.54). Hypothesis 4 is supported with these results (See Table 4 and Figure 6).

Table 4: *Source table for of Believability and Lighting Conditions Completely Between-Subjects ANOVA*

Source	SS	df	MS	F	p	eta
Believability	831.08	2	415.54	3.11	.047	.039

Figure 6: *Means of Believability between all three light conditions*
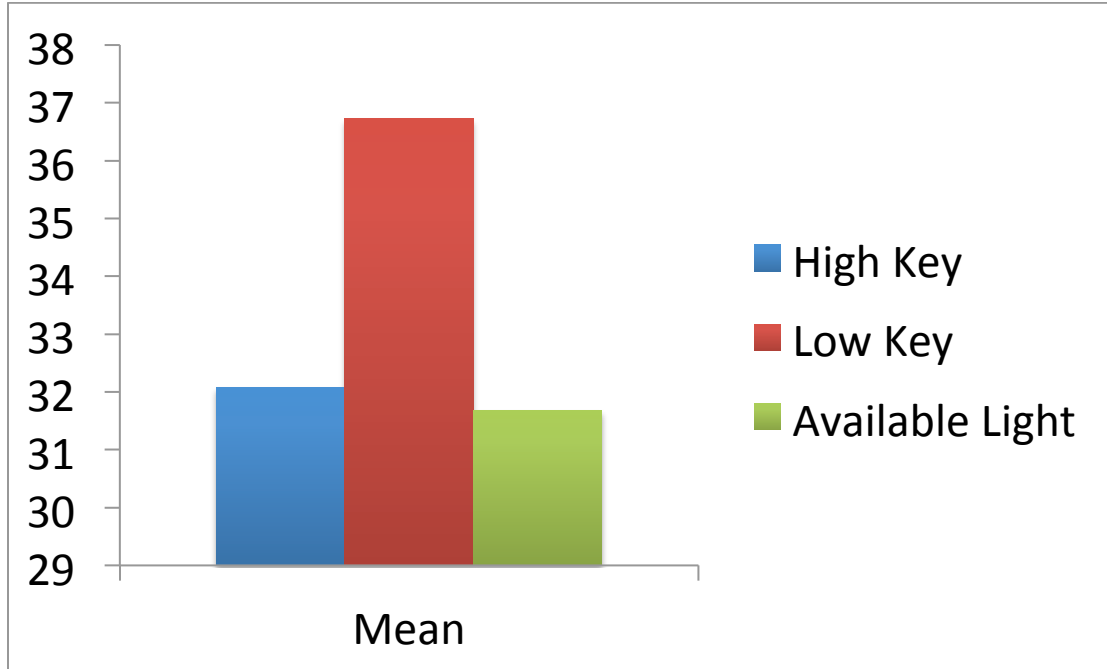
Hypothesis 5

Hypothesis 5 predicted that participants would identify the genre in accordance with the associated lighting style. A Chi-square analysis was conducted with the light condition and genres. Using a cross tab analysis, the responses of the audiences' members from each viewing group were broken down to clarify how many people were able to identify the genre from the lighting style. The Chi Square test is significant χ^2 (2, $N = 108) = 32.00$, $p = .001$. The result of this analysis demonstrates that participants were able to identify High Key as comedy and Low Key as film noir, and the hypothesis is supported. The participants were able identify the genre of the two conditions (See Table 5 and Figures 7-10). The figures demonstrate that most people were able to identify High Key as comedy and Low Key as film noir.

Table 5: CrossTab Analysis for Identification of film genre

		Genre Reported			
		comedy	film noir	realistic drama	Total
high key	Count	40_a	10_b	<5	54
	Expected Count	25.5	23.0	5.5	54.0
	% within hi key and low key lighting only	74.1%	18.5%	n<5	100.0%
	% within Genre Reported	78.4%	21.7%	n<5	50.0%
	% of Total	37.0%	9.3%	n<5	50.0%
low key	Count	11_a	36_b	7_b	54
	Expected Count	25.5	23.0	5.5	54.0
	% within hi key and low key lighting only	20.4%	66.7%	13.0%	100.0%
	% within Genre Reported	21.6%	78.3%	63.6%	50.0%
	% of Total	10.2%	33.3%	6.5%	50.0%
Total	Count	51	46	11	108
	Expected Count	51.0	46.0	11.0	108.0
	% within hi key and low key lighting only	47.2%	42.6%	10.2%	100.0%
	% within Genre Reported	100.0%	100.0%	100.0%	100.0%
	% of Total	47.2%	42.6%	10.2%	100.0%

Each subscript letter denotes a subset of Genre Reported categories whose column proportions do not differ significantly from each other at the .05 level.

Figure 7: *High Key Genre percentage*
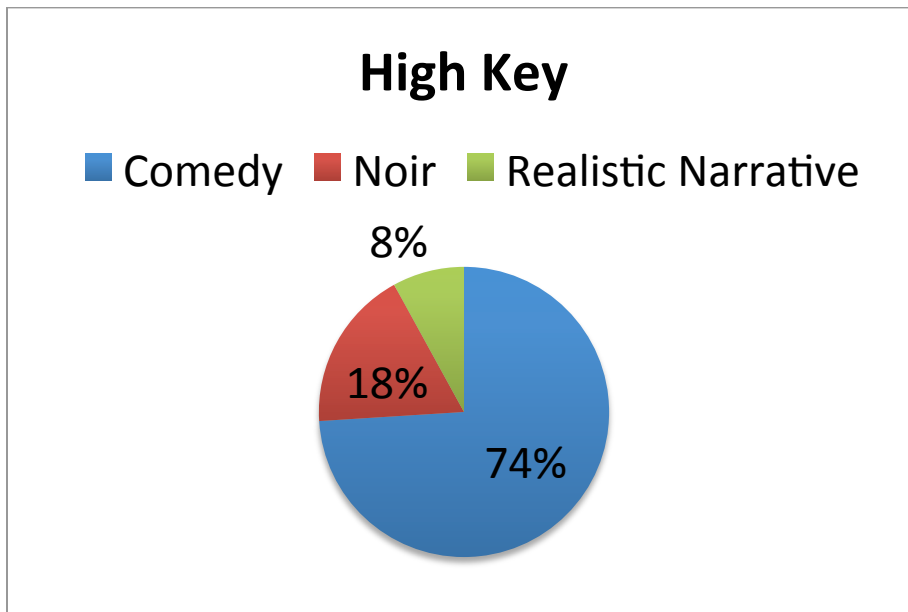
Figure 8: High Key genre respondents
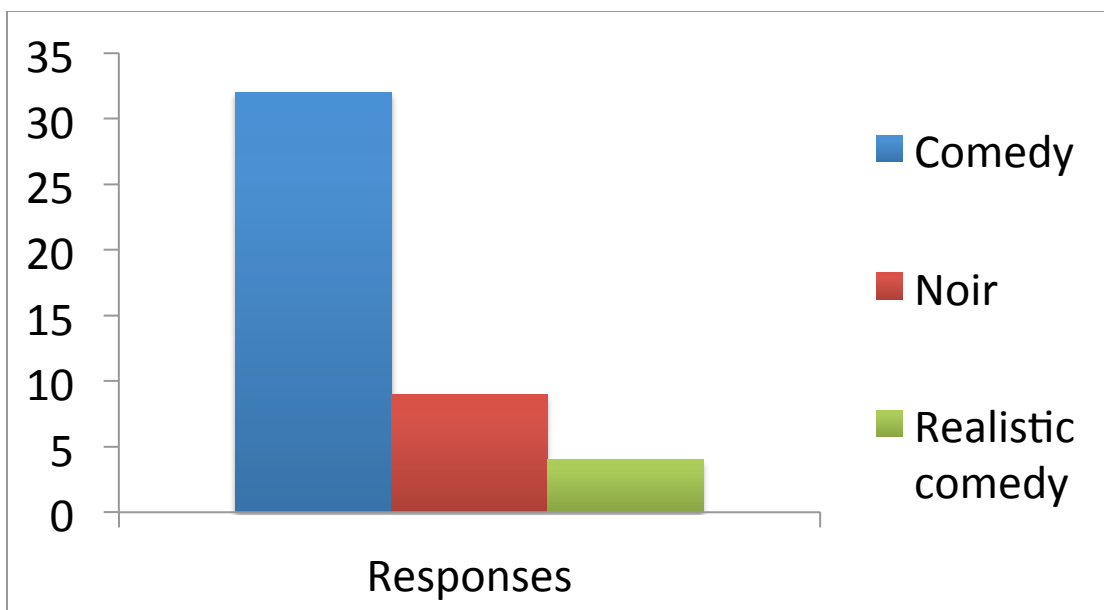
Figure 9: Low Key Genre percentages
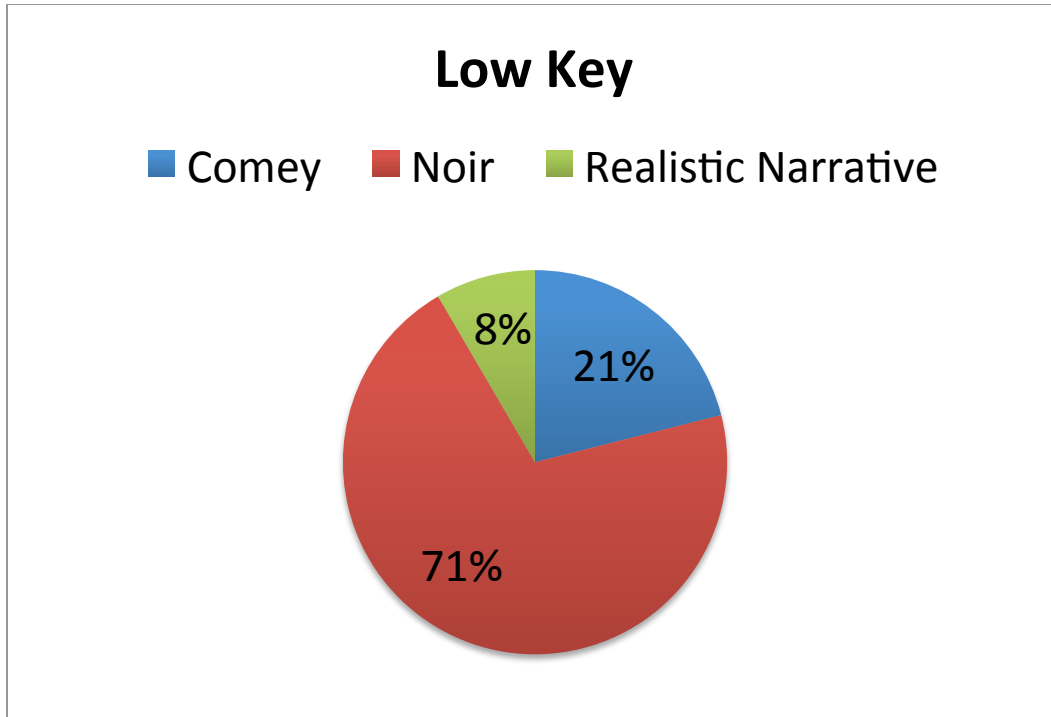
Figure 10: Low Key genre number of respondents
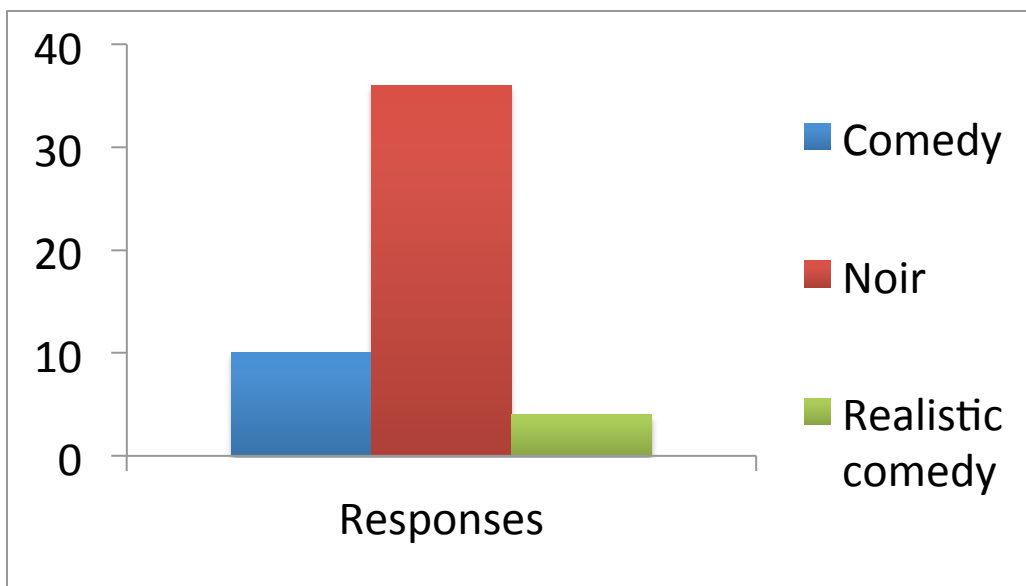
Research Question 1

An Analysis of Variance (ANOVA) was conducted with the 3 lighting styles as the independent variable and character likability as the dependent variable to test Hypothesis 6 which predicted audience members would report different levels of likability towards the characters under different lighting conditions. There was a no significant difference for the character of JJ ($F = 1.51$, $df = 2$, $p = 0.22$) between the lighting styles with participants who watched the low key light condition reporting higher levels of perceived realism ($M = 36.72$, $SD = 12.60$) than those who saw high key ($M = 32.07$, $SD = 12.15$) or available light ($M = 31.68$, $SD = 9.54$).

However, the results for Lana approached significance ($F = 2.65$, $df = 2$, $p = 0.07$) with Lana being more likeable in low key ($M = 11.09$, $SD = 4.14$) than by key ($M = 10.14$, $SD = 4.46$) or available light ($M = 9.23$, $SD = 3.74$). Hypothesis six is partially supported with these results (See Table 6 and Figure 11).

Table 6: Source table for of Believability and Lighting Conditions Completely Between-Subjects ANOVA

Source	*SS*	*df*	*MS*	*F*	*p*	*eta*
JJ	62.87	2	31.44	1.52	.222	.019
Lana	90.48	2	45.24	2.65	.074	.033

Figure 11: *Lana Likability*
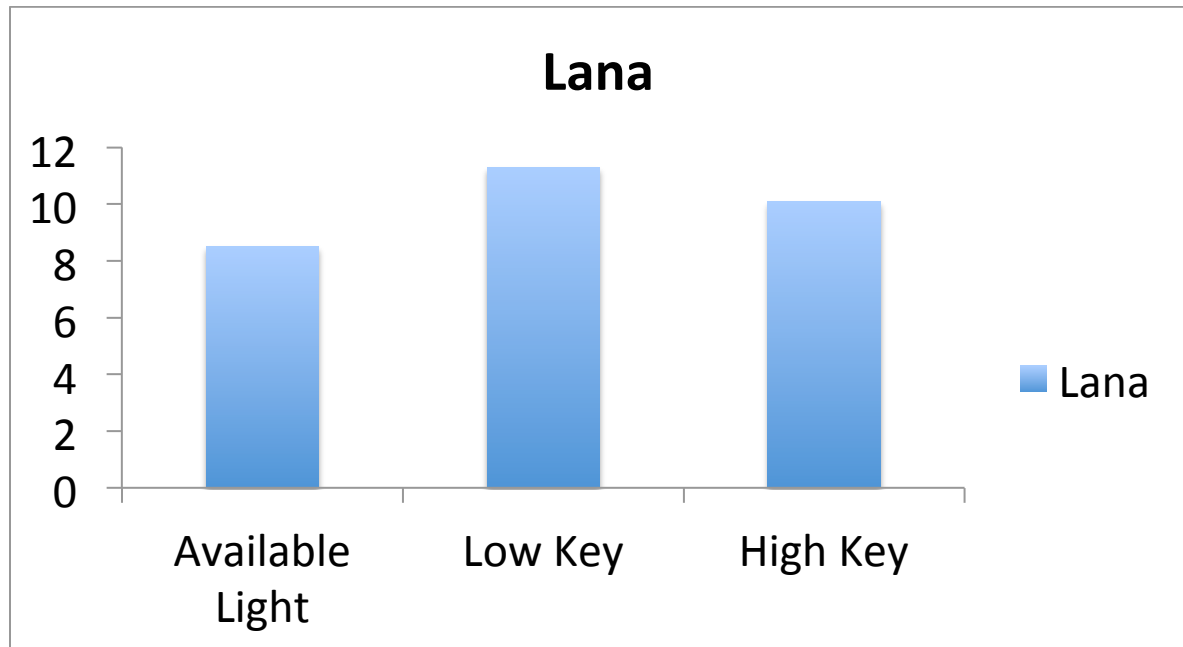
Lana

Additional Analysis

Results reflected the possibility that the plot is the driving force behind participants' emotional responses. In order to further inspect such a trend, independent samples t-Test were conducted with High-Key and Low-Key lighting as the independent variable on the emotions of suspense and lightheartedness across the three tested time points. Available light was excluded from these analyses as the results for two of the three lighting conditions were very similar to Low Key.

Lightheartedness Across Time Points

A repeated measures t-Test was conducted to test differences across the three time points. The difference between lighting styles for Lightheartedness was found to be significant, and moved similarly across the time points. Participants who saw Low Key lighting reported a sense of higher emotional response in Lightheartedness at all three time points (See Figure 12). The results demonstrate that there was a significant difference at each time point for lightheartedness. The means for Low Key are higher at every time point than High Key when evaluating emotions considered lighthearted. The result was significant t (106) = --2.55, p = 01; eta2 = .06 with participants who saw the film in Low Key reporting higher levels of lightheartedness (M = 74.35, SD=22.04) than those who saw High Key (M = 62.37, SD=22.04) (See Table 7).

Figure 12: *Lightheartedness*
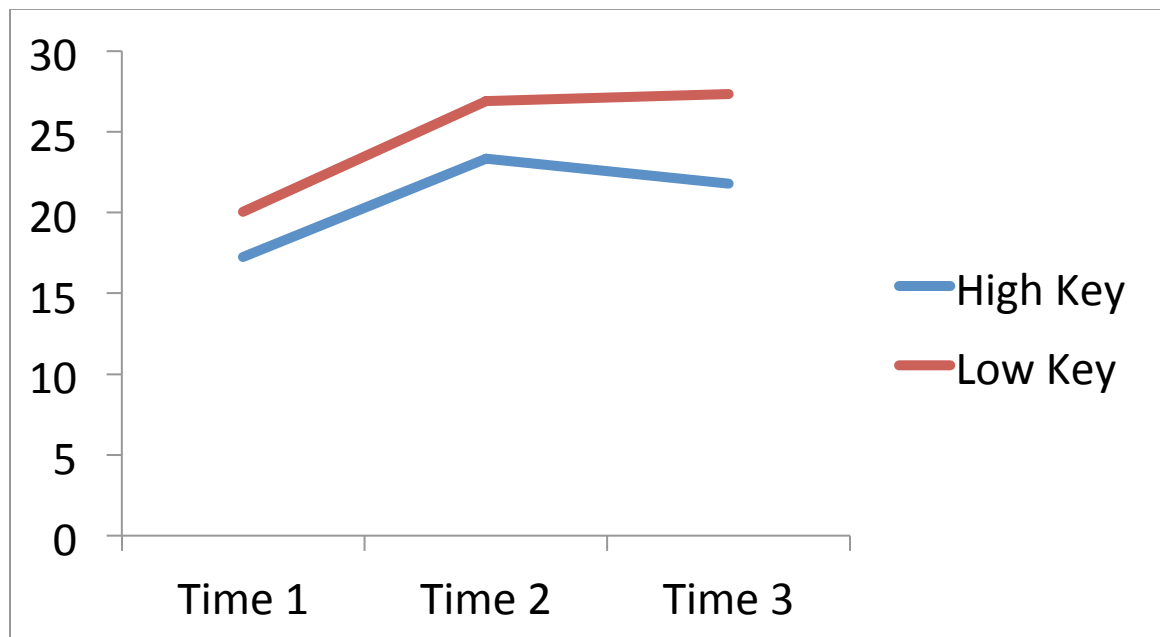
Table 7: *Means and t-Test results for High Key versus Low Key for Lighthearted*

	M	SD	n	t	eta2	p
Lighthearted						
Time 1						
HK	17.25	7.19	54	-1.97	.03	**.05**
LK	**20.04**	**7.42**	**53**			
Time 2						
HK	23.33	11.01	54	-1.73	.02	.08
LK	**26.88**	**9.99**	52			
Time 3						
HK	21.77	10.47	54	-2.55	.05	**.01**
LK	**27.33**	**11.94**	**52**			
Overall						
HK	79.66	27.34	51	-2.67	.06	.009
LK	**95.32**	**36.23**	50			

Suspense Across Time Points

A repeated measures t-Test comparing High Key and Low Key conducted across all three time points for suspense. At each time point, Low Key was rated as more suspenseful (See Table 8 for specific means). The difference between lighting styles for

Suspense was found to be significant, and moved similarly across the time points. Participants who saw Low Key lighting reported a sense of higher emotional response in Suspense at all three time points (See Figure 13).

Figure 13: *Suspense*
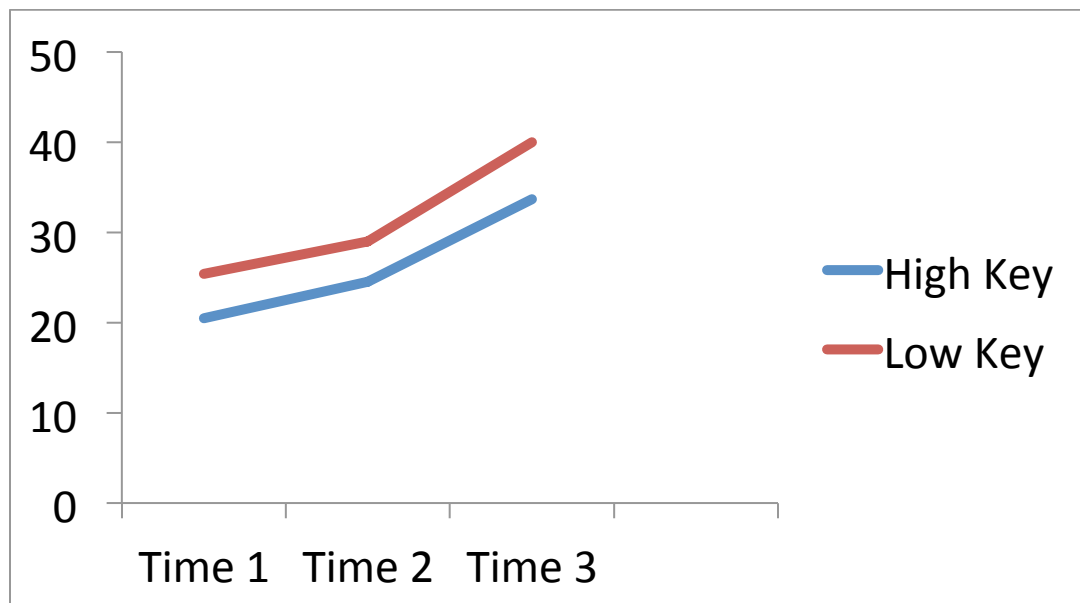
Additionally, an independent t-Test was conducted to test the overall difference between High Key and Low Key on suspense. The result was significant t (106) = --2.67, p = 01; eta2 = .06 with participants who saw the film in Low Key reporting higher levels of suspense (M = 95.32, SD=36.23) than those who saw High Key (M = 79.66, SD=27.34).

Table 8: *Means and t-Test results for High Key versus Low Key for Suspense*

	M	*SD*	*n*	*t*	*eta2*	*p*	
Suspense							
Time 1							
HK	20.45	7.99	53	-1.96	.03	**.05**	**LK**
25.41		**16.6**	**53**				
Time 2							
HK	24.49	10.67	53	-2.14	.04	**.03**	
LK		**29.02**	**11.05**	**52**			
Time 3							
HK	33.79	14.7	53	-2.31	.05	**.02**	
LK	**40.45**	**14.8**	**51**		**-2.31**		
Overall							
HK	79.66	27.34	51	-2.67		**.06**	**.01**
LK		**95.32**	**36.23**	**50**			

Rawness Across Time Points

A repeated measures t-Test comparing High Key and Low Key conducted across all three time points for Rawness. The difference between lighting styles for Rawness was found to be significant, and moved similarly across the time points. Participants who saw Low Key lighting reported a sense of higher emotional response in Rawness at all three time points (See Figure 14).

Figure 14: *Rawness*
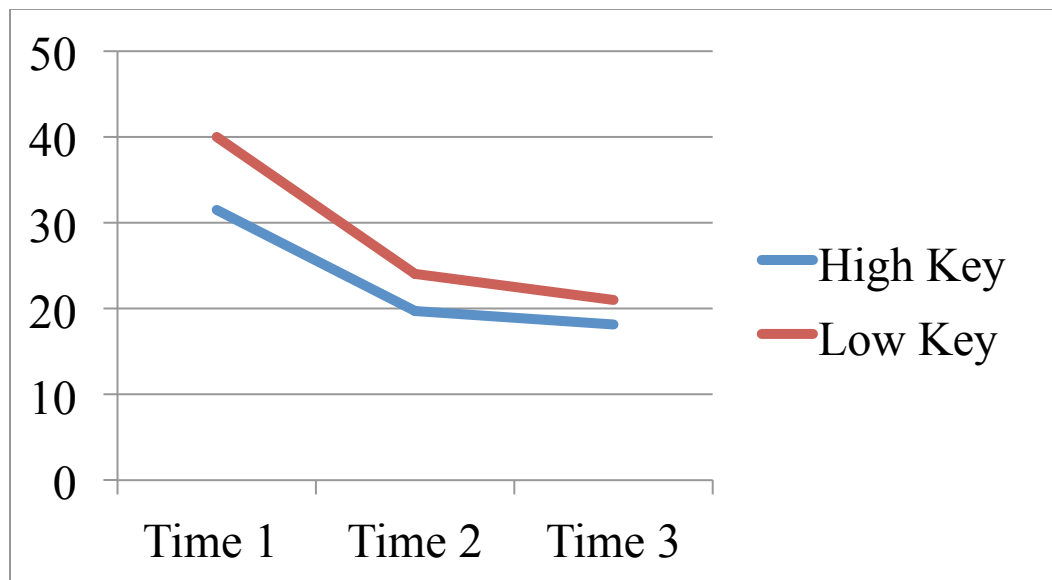
At each time point, Low Key was rated higher in rawness than High Key (See Table 1 for specific means). Additionally, an independent t-Test was conducted to test the overall difference between High Key and Low Key on suspense. The result was significant $t(106) = -2.86$, $p = 01$; eta2 = .02 with participants who saw the film in Low

Key reporting higher levels of Rawness (M = 84.02, SD=27.8) than those who saw High

Key (M = 69.35, SD=27.88) (See Table 9)

Table 9: Means and t-Test results for High Key versus Low Key for Rawness

	M	SD	n	t	eta2	p
Rawness						
Time 1						
HK	31.54	11.26	54	-3.83	.12	**.01**
LK	**39.92**	**11.64**	**53**			
Time 2						
HK	19.69	8.81	54	-1.98	.03	**.00**
LK	**23.73**	**11.99**	**51**			
Time 3						
HK	18.13	8.82	54	-1.55	.02	**.05**
LK	**21.22**	**11.72**	**53**			
Overall						
HK	69.35	24.69	54	-2.86	.02	**.01**
LK	**84.02**	**27.88**	**51**			

Control

While available light often showed similar results as Low Key responses, there were significant differences in participants' reported of feelings of control. The means show a trend that available light leaves the viewers feeling more in control, (See Figure 15), and indicate significance in time 3 at ($F = 4.09$, $df = 2$, $p = 0.01$).

Figure 15: *Self Assessment Manikin - Control*
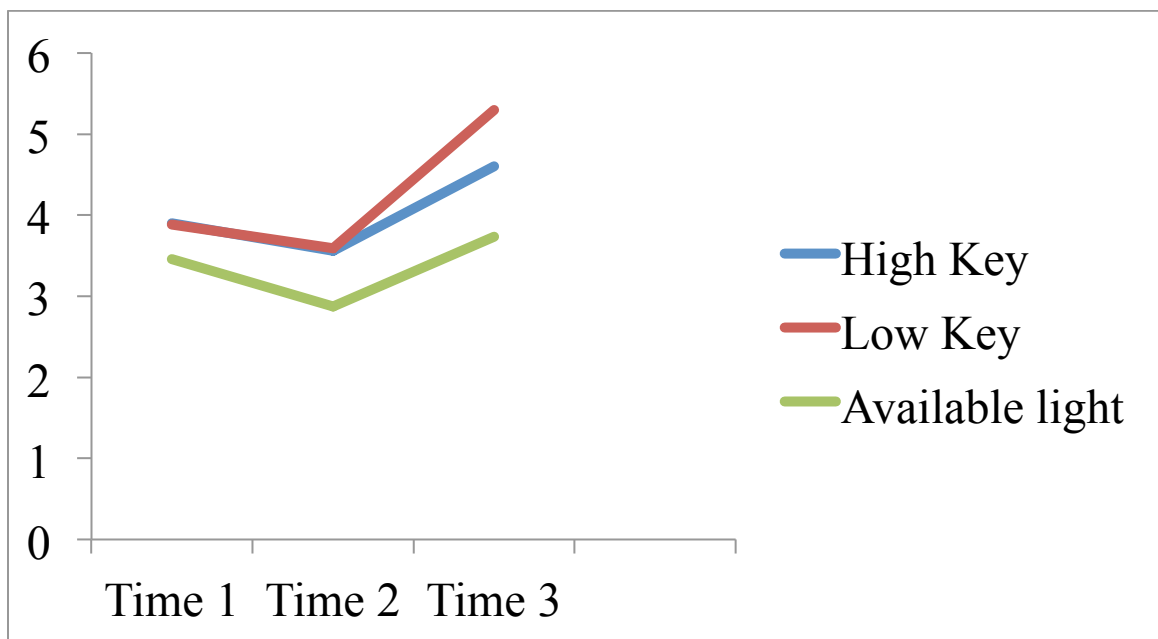
CHAPTER V

DISCUSSION

Summary of Results

      This study shows support that participants' emotional responses vary significantly to the same short film, narratively considered to have a noir plot, presented in three different lighting styles (See Table 10). This finding supports film literature and its claim that film lighting has an impact on audience emotional interpretation. This is a unique contribution to the field of film as its literature and theory are rarely empirically tested.

Emotion

      Lightheartedness, which is considered to be uplifting emotions associated and stimulated by High Key lighting and the genre of Comedy, was reported to be significantly higher from participants who were watching the film under the Low Key lighting condition. The result was significant but not in the predicted direction. The Low Key stimuli produced reports of higher Lightheartedness responses, contrary to the statements of cognitive theorists Grodal (2005) and Anderson (2005) and the cinematographers Alekan (2000) and Brown (2012) among others. It should be noted that none of these filmmakers and scholars considered the fundamental groundwork of the storyline or narrative itself. The power of the narrative may be influencing the discrepancy between hypothesis and results. The Low Key version of the movie

57

Table 10: *Summary of Results for Hypothesis*

	Hypothesis	Supported/Not Supported
H1	Participants who view High Key lighting will report higher levels of positive, lighthearted emotions than participants who view Low Key or Available Light lighting.	Significant in opposite direction
H2	Participants who view Low Key lighting will report higher levels of suspenseful emotions than participants who view High Key or Available Light lighting.	Supported
H3	Participants who view Available Light lighting will report higher levels of rawness emotions than participants who view High or Low Key lighting	Not Supported but significant for Low Key
H4	Participants will report higher levels of believability to characters and events in the plot if the lighting style thematically matches what the participant is already familiar associating with the narrative content.	Supported
H5	Participants will associate genre based on lighting style regardless of the plot.	Supported
RQ1	Will Participants report feeling differently about the likability of characters depending on the lighting styles.	Partially Supported

produced the highest emotional responses for all emotional responses. The Low Key lighting may have resonated with the noir plot, producing stronger emotional responses across the board.

Suspense, which is considered to be emotions that are tense, exciting, or mysterious, was significantly the strongest in the Low Key lighting condition, supporting hypothesis 2. Figure 4 shows that the emotional response for suspense moves in unison across the three time points between High Key and Low Key. As John Alton explains in his book *Painting with Light*, he emphasizes that there are very different lighting styles that complement different genres. By complementing the already suspenseful plot with a lighting style theorized to elicit emotional response in a suspenseful nature, audiences members reported the highest numbers of emotional response. This suggests that the plot itself provides the baseline for the prompting emotional response and the lighting condition accentuates the response from the narrative.

Rawness, which is considered to be real and gritty feelings of response, was significant but not in the predicted direction. The lighting style with the highest reported levels of rawness were in the Low Key condition, therefore not supporting hypothesis 3. Contrary to Maerez (2007) who suggests that movies shot in available light bring higher senses of reality and directness, the Low Key stimulus, again, proved to have the highest emotional response rate. The Available Light condition prompted responses numerically very close to Low Key, possibly since the setting of the narrative was naturally in dark Low Key places. Without conscientious sculpting of the lighting style, it defaulted to Low Key lighting, with the only light provided being natural light from house lamps or streetlights.

A significant difference was found for the self-assessment manikin, Control. This variable measured how much the participant felt out of control or in control. Participants reported feeling more in control when watching the Available Light condition. This may suggest that audiences are able to sense that the filmmaker has not crafted the visual lighting space prompting a feeling that what they watching is not in control by the filmmaker, therefore is not in control for the viewer. Audiences sense the subtle cues from the lighting style that effect emotional response.

Believability

Participants reported that the characters were more believable when viewed under Low Key lighting and significantly less believable under Available Light. This would again lend itself towards the notion that the plot resonated a feeling of suspense with noir plot points which calls for a Low Key lighting style to bring congruency to the completed movie. Audiences appear for feel more comfortable when the version of the story with a suspenseful driving plot is presented in Low Key lighting conditions. When the lighting style matched the plot structure, less conflicting visual information allowed for higher senses of believability and reality.

Most surprising is that Available Light significantly lowered reports of perceived believability. When the light was as real and uncrafted, audiences believed the story less. This may suggest that audiences are used to viewing movies and television with sculpted light that matches the motivation of the script. Without congruency between the lighting style that is usually connected with a suspenseful scripted narrative, audience members report less believability.

Genre

Results support hypothesis 4 that audiences were able to identify the genre in High Key and Low Key stimuli. Forty out of fifty four or 74% identified comedy as a genre for high key, and thirty six out of fifty four or 67% when watching Low Key identified the film noir as the genre that corresponds with the lighting style. This is a pretty powerful connection that most people identified the genre by the lighting style. Even when other analysis indicated that the Low Key film produced higher emotional responses in all areas and higher rates of believability, which suggests that viewers react to lighting style and plot congruency, most people identified the movie by lighting style over plot. Rosenthal and Wertenbaker (1964) state that High Key and Low Key lighting originated in the early days of theater stemming from the early two sources of light available, the sun and fire light. This could suggest that the lighting style may tap on primitive human perceptions of the world and has the ability to communicate in many subconscious and powerful ways.

Audience members reported low levels on every emotional response when shown the High Key movie and most of the people identified the genre as comedy whereas the Low Key movie was reported to have the highest levels of audience emotional response across all categories and was identified by most respondents as a film noir. The interpretation of what genre of movie the film was could have caused some expectation and effected levels of emotional response. The movie may be considered a "good film noir" or a "bad comedy" depending on how the respondent identified the genre. The lighting could have caused a misread of the genre, skewing expectations, and creating further gaps in lighting/plot congruency.

Character Likability

Participants reported different reactions to JJ and Lana's characters, partially supporting the Research Question 1. JJ's character was a solid character designed to carry the story, and participants reacted to him without significant differences between lighting styles. His character was firmly developed, and though was intended to be neutral, was not designed to be ambiguous. People reacted to him similarly in all lighting styles.

Lana's character, however, was designed to be ambiguous. Her role in the moving the plot, her intensions with JJ, her motivations for obtaining the mysterious box, were all left open for audiences interpretation. According to Braje et al. (1998) and his study on facial recognition, audiences would potentially interpret her face differently under different lighting conditions. Hill and Bruce (1996) studied facial likability and discovered a difference with different lighting styles. Lana's likability and believability was approaching significance in how participants reported responding to her character but the qualitative portion of this study was designed to better analyze the participants' reactions to the characters.

Matching Lighting and Narrative

These results indicate support for film lighting theory with some significant findings that were not hypothesized. Audiences' emotional responses were significantly impacted by the lighting, but the lighting style itself only augmented the events that were happening in the plot. The plot was the driving force behind the stimuli with the lighting style heightening or lowering emotional response from the storyline. The movie narrative naturally lent itself to suspenseful actions and mysterious characters and according to film theory should be light in Low Key lighting to augment that storyline. The audiences'

emotional responses were highest in all categories across all time points when they viewed the movie that was lit in Low Key.

This information significantly counters hypothesis 2 that audiences will report feeling more uplifting emotions when watching the movie light in High Key. However, hypothesis 5 was proven to be statistically significant which predicted that audiences would be able to identify a lighting style to its traditional genre. Since the movie was naturally suspenseful in its plotline, and audiences identify a movie to a lighting style, watching the movie in a lighting style that conflicted with the nature of the plot could have lowered emotional response across all emotions and time points. The perceived lighting to plot dissonance could have been distracting, counter to expectations, and an obstacle for the audience member to experience the desired emotional response the plotline is attempting to evoke.

This would suggest that the audience member can sense these lighting changes even if they are not aware of them. Even though the Available Light condition produced the same emotional response to light hearted, suspenseful, and realness emotion categories as Low Key, it did provide some significant results in two other tested emotional response categories. Participants of this condition reported that the movie was less believable and they felt more in control during the experience. This would suggest that audiences could sense that no lighting manipulation or crafted lighting set up was used in producing the image therefore leaving the audience member to feel he or she was not seeing a manufactured image. This could lead to feelings if being in control of what the audience member is seeing and that the filmmaker is not manipulating what the audience is seeing with light.

However, the audience also reported that they felt the story was less believable. This could suggest that the audience is conditioned to see a certain production value in order for believability to be obtained. Even though the audience reported feeling in control, they did not believe what they were seeing because they were reminded that what they were watching was not skillfully crafted with light and that there was not as much time and production value in the making of the image they were observing. When the audience feels in control, they have less mental energy attempting to regain control and more attention on the image that has not been artistically crafted to augment the design of the plot, which interferes with their ability to suspend disbelief.

Further Studies

To better evaluate audiences' emotional responses on the interaction between plot and lighting, different participants should be shown a comedy in High Key and Low Key and a drama or noir in High Key and Low Key. They should be shown each movie individually on eye tracking systems to obtain viewing information, eliminate group distraction, and see if the incongruent lighting to plot movies reduce the desired emotional effect of the lighting style. Eye tracking studies would also extend the work of Braje et al. (1998). Questions specifically addressing plot lines and narrative movement can focus on finding information that relates to the plotline and lighting interaction effect. The results can then be compared between the congruent lighting to plot films and the incongruent lighting to plot films to isolate trends.

Breaking apart different larger aspect of this study could prove beneficial. By simplifying the stimulus piece to a still image of individual characters in different settings and lighting conditions, audiences could react to just the look of the characters and spaces

and give emotional responses. This could be accomplished by utilizing eye tracking equipment so that the area of the screen that is more intensely viewed can also be evaluated for its correlation with the reported emotional response. A qualitative piece on the character could help describe trends that audiences may associate with the personality of the character in different lighting styles

For a focus on narrative interpretation, one action could be performed with a character that is isolated and out of context with an entire plotline but is in different lighting conditions. The audiences could be on an eye tracking system again for exact viewing information and the elimination of group watching distraction. Along with emotional response questions on the character and action, a qualitative section that asks the viewer to interpret who the character is, why they are doing what they are doing, and what will they do next. This will specifically address what kind narrative is associated with the lighting style of each action.

Application to the Field

Through the field of communication, this study brings together theory and experiment from different fields and the resulting information can be applied back to all of them. The results of lighting influence on audience emotional response supports existing lighting theory in the fields of film and architecture, and also can be used to enrich theories and experiments of lighting effects on mood in the field of psychology. The High Key and Low Key lighting of the physical space in a movie affected audiences' emotional response to the stimuli. This psychological phenomenon supports architectural applications as the visual representation of how rooms and environments are lit even in the removed sense of a film have an emotional effect on people.

For the field of film, evidence supports the last one hundred years of film theory. Lighting in High Key or Low Key appears to result significantly different audience emotional response. This experiment supports what film theorists believe and perpetuate in the community, and what filmmakers have been, and currently practice and apply. This also helps combat criticism that the field of film has no empirical evidence to support its theoretical claims.

In this study, audiences identified the genre of the movie in accordance with the traditional lighting style association. It also indicated that audiences experience higher levels of emotional response and sense of realism and believability when there is lighting that congruent with the storyline. This information helps directors and cinematographers conceptually develop lighting styles that will fit the design of a movie genre in which they are working. The audience response information provides some evidence that content and lighting congruency is important when conveying a desired message through visual media and incongruency between lighting and story may result in mixed narrative messages that will impact audiences' emotional response.

The fact that the Available Light condition only produced significant emotional responses of audience members feeling out of control supports the idea the audiences can sense crafted light in a scene, even if specific thought or attention is dedicated to the lighting conditions. This is an important finding because it supports the fact that audiences react to the lighting style, even if it is not crafted, and can sense the filmmaker is not in control of the image. The available light condition acted as Low Key because without additional light, the sets were naturally dark. The fact that the only place there a difference between Low Key and Available light was that the audience felt less control

should be considered by filmmakers when choosing what type of lighting they want to communicate the themes of the visuals. If natural lighting conditions do not match the desired genre, shooting without additional lightings and sculpting will result with the lighting design being at the mercy of the environment and time of day, and a viewer interpretation of less control.

As the film industry is changing and advancing with new technology, a new type of filmmaker has emerged. Because cameras are not only becoming abundantly commercially available to the masses, but also obtain high picture quality even in lower lighting conditions, novices are able to pick up cameras and shoot movies. With the internet as a distribution channel, some of these movies are able to be seen and even achieve financial success in the entertainment industry. As these films circulate through the media, so does the idea that film lighting is not a required element anymore. The information from this study would suggest otherwise. Audiences have emotional responses that are directly from different conditions of film lighting. A specific lighting style can heighten or lessen different emotional responses depending on the genre, plot, and lighting style. Hopefully this information will help combat this recent claim that lighting has no impact on films anymore.

In the field of Communication, this research identifies one specific structural element that influences audiences' emotional response, and potentially after the qualitative section is completed, there will be some information on the narrative interpretation as well. Other structural elements communication studies have been completed in large sums where many structural effects were tested at the same time. This study isolated the single effect of film lighting and produced results. Not only will the

results of the study provide data that will add to the understanding of structural effects in media, but paper this may provide a model in which to test other structural media effects in the future.

Limitations

The experiment was conducted using Cleveland State University students in low-level undergraduate communication classes. Most of the students were college aged young adults. This population pool limits the applicability of the results to the general masses and lowers the experiment's external validity.

The plot ended up being more of a suspense driven narrative as opposed than the intended neutrality in design. This affected the results in unexpected ways and changed the nature of the experiment. The movement of the plot itself was the baseline for which all of the other emotional responses originate, and likely influenced some of outcomes of the hypotheses. The stimulus piece could be simplified and modified to identify the lighting effect regardless of plot.

Watching movies in a group setting can sometimes impact audience response. For instance, a gasp or laughter can add to the viewing environment when the experiment design was to eliminate influences other than lighting. Also, when viewing in a large auditorium, the angle and distance between viewer and screen can be different. This may effect lighting shades or contrast depending on visibility. Ideally, these factors should be eliminated to achieve maximum internal validity.

Conclusion

Film lighting has a significant impact on viewers' emotional response to the narrative, which has been supported by film literature for the last 100 years. It is not a

single powerful tool, like some cinematographers claim it to be, that can independently impact viewers' emotional response to a movie and drastically away from the plot itself, but instead can intensify or mellow the emotional responses that naturally come from narrative. The results indicate a significant ability for film lighting to aid in augmenting or softening emotional responses but can not drastically change the responses into opposite feeling. There is also indication that in order for the most emotional response to occur, the film lighting style has to match what the viewer is accustomed to viewing with the narrative style. Congruency with plot and film lighting have the most powerful impact on emotional response.

References

Alton, J. (1995). *Painting with Light.* Berkley, California: University of California Press

Anderson, J. (2005). *Moving Image Theory Ecological Considerations*: Southern Illinois University, Carbondale Illinois.

Baxter P. (1975). On the History and Ideology of Film Lighting. *Screen, 16* (3), 83.

Biocca, F., & Levy, M. R. (1995). *Communication in the age of virtual reality*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Birren, F. (1969). Psychological Implications of Color and Illumination. *Illuminating Engineering Society,* 392-402.

Bradley M. B. & Lang J. P. (1995). Measuring Emotion: The self-assessment manikin and the semantic differential. *Journal of Behavior Therapy and Experimental Psychiatry*, *25* (1) 49-59.

Brown B. (1996). *Motion Picture and Video Lighting*. Burlington, MA: Elsevier Science.

Brown, B. (2012). *Cinematography Theory and Practice: Image Making Cinematographers and Directors* (second edition). Waltham, MA, Eslvier.

Bryant, J., & Zillman, D. (1986). *Perspectives on media effects*. Hilsdale, NJ: Earlbaum.

Carroll, N. (1991). *"Notes on the Sight Gag" Comedy/Cinema/Theory*. Berkeley and Los Angeles California: University of California Press Ltd.

Detenber B.H., & Reeves B. (1996). A Bio-Informational Theory of Emotion: Motion and Image Size Effects on Viewers. *Journal of Communication 46*, 66-84.

Ellis, R. J. & Simons, R. F. (2005). The Impact of Music on Subjective and Physiological Indices of Emotion While Viewing Films, *Psychomusicology 19*, 15-40.

Emmers-Sommer, T.M., & Allen, M. (1999). Surveying the effects of media effects: A meta-analytic summary of the media effects research in *Human Communication Research. Human Communication Research, 25*, 478-497.

Eveland, William P. Jr. (2003). A "Mix or Attributes: Approach to the Study of Media Effects and New Communication Technologies. *Journal of Communication*, 395-410.

Flynn, J. E., Spencer, T. J., Martyniuk, O., Hendrick, C., (1973). *Interim Study of Procedures for Investigating the Effect of Light on Impression and Behavior. EIS* 87-94.

Frost, J. B. (2009*). Cinematography for Directors*, Studio City, CA: Michael Wise Productions.

Ganslandt, R., & Hofmann H., (1992). *Handbook of Design.* ERCO Edition, Berlin, Germany.

Geuens, J-P. (2000). *Film Production Theory*, Albany, New York: State University of New York Press.

Geiger S., & Reeves B. (1993). The Effects of Scene Changes and Semantic Relatedness on Attention to Television. *Communication Research, 20,* (2) 155-175.

Ginthner, D. *Lighting: Its Effects on People and Spaces.* Implication, *2*(2). Retrieved on

 April 1, 2013 from www.informedesign.umn.edu.

Grotal, T. (2005). *"Film Lighting and Mood" Moving Image Theory.* Ecological

 Considerations: Southern Illinois University.

Hill, H., & Bruce, V., (1996). Effects of lighting on the Perception of Facial Surfaces.

 Journal of Experimental Psychology, 22, (4), 986-1004.

Holbert, L. R. & Stephenson M.T. (2003). The Importance of Indirect Effects in Media

 Effects Research: Testing for Mediation in Structural Equation Modeling, *Journal*

 of Broadcasting and Electronic Media, 47 (4), 556-572.

Hoeckner B., Wyatt E.W., Decety J., Nusbaum H., (2011). Film Music Influence how

 Viewers Relate to Movie Characters. *Psychology of Aesthetics, 5* (2), 146-153.

Huesmann, R. L. & Taylor L. D. (2006). The Role of Media Violence in Violent

 Behavior. *Annual Reviews Public Health, 27*, 393-415.

Hutchison, J., Thomas, N. A., Elias, L., (2011). Leftward lighting in advertisements

 increasing advertisement ratings and purchase intention. *Laterality, 1*6(4). 423-

 432.

Kipper, P. (1986). Television Camera Movement as a Source of Perceptual Information.

 Journal of Broadcasting and Electronic Media, 30 (3), 295-307.

Knez, I (1995). Effects on indoor lighting on mood and cognition. *Journal of*

 Environmental Psychology, 15, 39-51.

Knez, I., & Niedenthal, S., (2008). Lighting in Digital Game Worlds: Effects on Affect

 and Play Performance. *CyberPsychology & Behavior, 11* (2), 129-135.

Lang, A. (1990). Involuntary Attention and Physiological Arousal Evoked by Structural

    Features and Emotional Content in TV Commercials. *Communication Research,*

    17 (3), 275-299.

Lang, A., Bolls. P., Potter, R. F., Kawahara K., (1999). The Effects of Production Pacing

    and Arousing Content on the Information Processing of Television Messages.

    Journal of Broadcasting and Electronic Media, 43 (4), 451-475.

Lang A., Potter R. F., Bolls, P. (2000) Where Psychophysiology Meet the Media: Taking

    the Effects out of Mass Media Research. *Media Effects Advances in Theory and*

    Research Third Ed., Taylor and Frances 2008, 185-206.

Lombard & Ditton. (September 1997). "At the Heart of It All: The Concept of Presence"

    Journal of Computer Mediated Communication.

Lombard, M. Bracken, C. C., Snyder-Duch, J., Ditton, T. B., (1996). The State of the

    Medium at the End of the 20th Century: A Content Analysis of Television Form.

    Presented at the annual International Communication Association conference in

    Chicago, IL.

Maerz, M. (2007). "Mumblecore" *Rolling Stone*, (1037), 82.

Mobbs D., Hakwan C. L., Featherstone E., Dolan R. J, Frith C. D. (2006). The Kuleshov

    Effect: the influence of contextual framing on emotion attributions, *SCAN, 1,* 95-

    106.

Naremore, J. (1998). *More than Night: Film Noir in it Contexts*. Berkeley

    and Los Angeles, California: University of California Press.

Neuman, W. R. & Guggenheim L. (2011). The Evolution of Effects Theory.

    Communication Theory, 21, 169-196.

Perse, E. M. (2001). *Media Effects and Society*. Muhwah NJ: Erlbaum.

Potter, James W. (2012) *Media Effects.* Los Angeles: Sage Publications Inc.

Reeves B., Lang A., Kim E. Y., Tatar D., (1999). The Effects of Screen Size and Message Content on Attention and Arousal. *Media Psychology, 1*(1), 49-68.

Rosenthal, J., & Wertenbaker L. (1964). *The Magic of Light*. Theater Art Books, New York

Sburlea A. I. *The effects of light, priming and positive reinforcement on cognitive Performance.* RETRIEVED on 10/14 from

http://hmi.ewi.utwente.nl/verslagen/capita-selecta/RT-Sburlea-Andreea.pdf

Silver & Ward. (2010). *The Encyclopedia of Film Noir*. New York, New York: Overlook Hardcover.

Sleegers, P., Moolenaar, N., Galetzka, M., Van Der Zanden, B., (2013). Lighting affects students' concentration positively: Findings from three Dutch studies. *Lighting Research and Technology, 45*(2), 159-175.

Woodward, R.B. (2011, Mar, 17). Film: Mumblecore realism in the age of technology. *Wall Street Journal,* D.7.

Yale Film Studies (2002). Film Analysis 2.0. RETRIEVED On 10/14 from

http://classes.yale.edu/film-analysis.

Cleveland State University
engaged**learning**

Memorandum

Institutional Review Board

To: Cheryl Bracken
          Communication

From: Bernie Strong, (x3624, b.r.strong@csuohio.edu) *BrS*
          Sponsored Programs & Research Services

Date: March 3, 2014

Re: Results of IRB Review of your project number: #30013-BRA-HS
          Co-Investigators: Jennifer Poland, Student
          Title: Film Lighting and its impact on audience interpretation and emotional
          response

The IRB has reviewed and approved your application for the above named project, under the category noted below. It has been determined that the research being performed under this protocol is Exempt. This determination does not expire and does not require an annual review.

However, by accepting this decision, you agree to notify the IRB of: (1) any additions to or changes in procedures for your study that modify the subjects' risk in any way; and (2) any events that affect that safety or well-being of subjects. Notify the IRB of any revisions to the protocol, including the addition of researchers, prior to implementation.

Thank you for your efforts to maintain compliance with the federal regulations for the protection of human subjects.

Approval Category: **Approval Date:**   February 19, 2014

  _X_   Exempt (b2)

cc: Project file

APPENDIX B

Questionnaire

Please identify your row and set number. Your row letter is identified on the outside of row. Each seat has a unique number which is listed on a small tag.

ROW _____
SEAT _____

Have you seen this movie before? _____ If yes, when?_____

You will be watching a film and then answering a series of questions in this questionnaire.

There are no right or wrong answers; please simply give your first impressions and answer all of the questions as accurately as possible.

Please wait until you are instructed to answer the questionnaire. You will be instructed when to start the questionnaire, when to continue, and when to stop.

DO NOT OPEN THIS QUESTIONNAIRE UNTIL YOU ARE INSTRUCTED TO DO SO

Please answer the following questions about how you feel.

Please rate your emotional response to the story you just saw on the following pictorial scale.
Remember you can put an X on a box, or between boxes.

Continue to next page

Please respond to the following as instinctually as you can. Circle the number that relates to the feeling you have from the stimulus: 1 = "not at all" to 7 ="very much"

	NOT AT ALL							VERY MUCH
	1	2	3	4	5	6	7	

1.   Suspense
2.   Mystery
3.   Tension
4.   Fear
5.   Malice
6.   Intrigue
7.   Drama
8.   Mischievous
9.   Dangerous
10. Evil
11. Happiness
12. Joy
13. Lighthearted
14. Hopefulness
15. Humor
16. Opportunistic
17. Uplifting
18. Optimistic
19. Comfortable
20. Enjoyable
21. Real
22. Raw
23. Gritty
24. Truth
25. Factual
26. Believable
27. Normal
28. True to life
29. Depression
30. Despair

The people were *not*   The people were
like people I know.   like people I know.

        1   2   3   4   5   6   7

The events were *not*   The events were
like real life.   like real life.

        1   2   3   4   5   6   7

The people were ***not at all***
like people in real life.

The people were just
like people in real life.

    1   2   3   4   5   6   7

Nothing like this has happened to
someone close to me

Something like this has happened to me or
me or someone close to me

    1   2   3   4   5   6   7

Please write a short answer to the following questions as specifically as you can.

What are your impressions of the JJ, the male lead?
_____
_____
_____

How does he feel at this point in the movie?
_____
_____
_____

What are his motivations and intensions?
_____
_____
_____

What are your predictions for JJ and the plot?
_____
_____
_____

	NOT AT ALL						VERY MUCH
How likeable is JJ?	1	2	3	4	5	6	7
Do you relate to JJ?	1	2	3	4	5	6	7
How believable is his character?	1	2	3	4	5	6	7
Do you feel empathy for JJ?	1	2	3	4	5	6	7

ADDITIONAL THOUGHTS OR COMMENTS**:**

_____
_____
_____
_____

*************STOP AND WAIT FOR INSTRUCTIONS ******

Please answer the following questions about how you feel.

Please rate your emotional response to the story you just saw on the following pictorial scale.
Remember you can put an X on a box, or between boxes.

Continue to next page

Please respond to the following as instinctually as you can. Circle the number that relates to the feeling you have from the stimulus: 1 = "not at all" to 7 ="very much"

NOT AT ALL   VERY MUCH
       1   2   3   4   5   6   7

1.   Suspense
2.   Mystery
3.   Tension
4.   Fear
5.   Malice
6.   Intrigue
7.   Drama
8.   Mischievous
9.   Dangerous
10.   Evil
11.   Happiness
12.   Joy
13.   Lighthearted
14.   Hopefulness
15.   Humor
16.   Opportunistic
17.   Uplifting
18.   Optimistic
19.   Comfortable
20.   Enjoyable
21.   Real
22.   Raw
23.   Gritty
24.   Truth
25.   Factual
26.   Believable
27.   Normal
28.   True to life
29.   Depression
30.   Despair

The people were ***not***   The people were
like people I know.   like people I know.

              1   2   3   4   5   6   7
The events were ***not***   The events were
like real life.   like real life.

              1   2   3   4   5   6   7

The people were **not at all**   The people were just
like people in real life.   like people in real life.

             1   2   3   4   5   6   7

Nothing like this has happened   Something like this has happened to me or
someone close to me   me or someone close to me

             1   2   3   4   5   6   7

What are your impressions of the Lana, the female lead?

_____
_____
_____

How does she feel at this point in the movie?

_____
_____
_____

What are her motivations and intensions?

_____
_____
_____

What are your predictions for Lana and the plot?

_____
_____

	NOT AT ALL						VERY MUCH

How likeable is Lana? 1   2   3   4   5   6   7

Do you relate to Lana? 1   2   3   4   5   6   7

How believable is
her character?   1   2   3   4   5   6   7

Do you feel empathy
for Lana?   1   2   3   4   5   6   7

ADDITIONAL THOUGHTS OR COMMENTS**:**

_____
_____
_____
_____

****************STOP AND WAIT FOR INSTRUCTIONS **********

Please answer the following questions about how you feel.

Please rate your emotional response to the story you just saw on the following pictorial scale.
Remember you can put an X on a box, or between boxes.
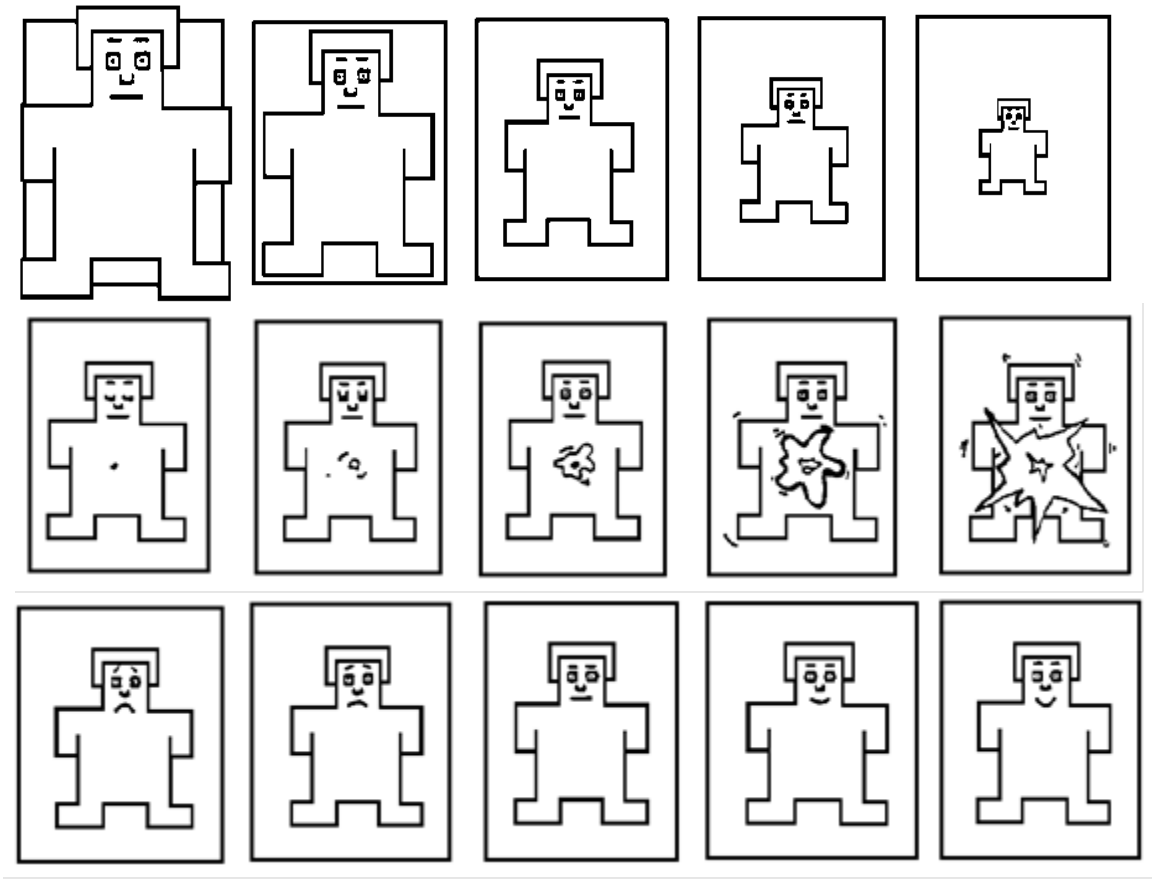
<u>Continue to next page</u>

Please respond to the following as instinctually as you can. Circle the number that relates to the feeling you have from the stimulus: 1 = "not at all" to 7 ="very much"

	NOT AT ALL						VERY MUCH
	1	2	3	4	5	6	7

31.   Suspense
32.   Mystery
33.   Tension
34.   Fear
35.   Malice
36.   Intrigue
37.   Drama
38.   Mischievous
39.   Dangerous
40.   Evil
41.   Happiness
42.   Joy
43.   Lighthearted
44.   Hopefulness
45.   Humor
46.   Opportunistic
47.   Uplifting
48.   Optimistic
49.   Comfortable
50.   Enjoyable
51.   Real
52.   Raw
53.   Gritty
54.   Truth
55.   Factual
56.   Believable
57.   Normal
58.   True to life
59.   Depression
60.   Despair

The people were *not*
like people I know.

The people were
like people I know.

1   2   3   4   5   6   7

The events were *not*
like real life.

The events were
like real life.

1   2   3   4   5   6   7

The people were **not at all**
like people in real life.

The people were just
like people in real life.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Nothing like this has happened
someone close to me

Something like this has happened to me or
or someone close to me

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

PLEASE CIRCLE THE CLOSEST ANSWER:

The Genre of this movie was: COMEDY   FILM NOIR   REALISTIC NARRATIVE

Describe JJ's Character
_____
_____
_____

Describe Lana's Character
_____
_____
_____

What is the nature of the relationship between JJ and Lana?
_____
_____
_____

What happens between JJ and Lana next?
_____
_____
_____

What is in the box?
_____
_____
_____

How does this story end?
_____
_____
_____

ADDITIONAL THOUGHTS OR COMMENTS:

_____
_____
_____
_____
_____
_____

What is your age? _____

What is your sex? (Circle one)
Male   Female

How do you describe yourself? (Please check the one option that best describes you)

___ American Indian or Alaska Native
___ Hawaiian or Other Pacific Islander
___ Asian or Asian American
___ Black or African American
___ Hispanic or Latino
___ Non-Hispanic White
___ OTHER _____

What is your major? _____

THANK YOU!
PLEASE RETURN YOUR QUESTIONNAIRE TO THE RESEARCHER

APPENDIX C

Tables of Means Time Point 1

lighting condition		contrl1	calm1	sad1
high key	Mean	3.8958	2.8333	4.4255
	N	48	48	47
	Std. Deviation	2.22404	1.74226	1.49992
low key	Mean	3.8846	3.4706	3.9811
	N	52	51	53
	Std. Deviation	2.49434	1.96319	1.55032
available light	Mean	3.4600	4.7451	4.6735
	N	50	51	49
	Std. Deviation	2.53313	13.88790	1.86400
Total	Mean	3.7467	3.7000	4.3490
	N	150	150	149
	Std. Deviation	2.41691	8.22237	1.66005

lighting condition		happiness1	joy1	lighthearted1	hopefulness1	humor1
high key	Mean	1.6296	1.4717	1.8519	2.1667	3.0370
	N	54	53	54	54	54
	Std. Deviation	.87516	.74946	1.26502	1.39744	1.72619
low key	Mean	1.6852	1.5741	2.0741	2.7037	3.1481
	N	54	54	54	54	54
	Std. Deviation	.90750	.79151	1.11341	1.40926	1.55900
available light	Mean	1.9615	2.0000	2.3077	2.6154	3.5769
	N	52	52	52	52	52
	Std. Deviation	1.26741	1.41421	1.37966	1.45729	1.75283
Total	Mean	1.7563	1.6792	2.0750	2.4938	3.2500
	N	160	159	160	160	160
	Std. Deviation	1.03247	1.04531	1.26168	1.43188	1.68605

lighting condition		opportunistic 1	uplifting1	optimistic1	comfortable1	enjoyable1
high key	Mean	2.2222	1.4444	1.8704	2.3148	2.3519
	N	54	54	54	54	54
	Std. Deviation	1.52547	.81650	1.21386	1.46434	1.41631
low key	Mean	2.5926	1.6792	2.4444	2.5556	2.9074
	N	54	53	54	54	54
	Std. Deviation	1.33909	.93590	1.38273	1.14376	1.59325
available light	Mean	2.6538	1.8462	2.4423	2.6538	2.9615
	N	52	52	52	52	52
	Std. Deviation	1.51961	1.22690	1.63795	1.38457	1.38566
Total	Mean	2.4875	1.6541	2.2500	2.5063	2.7375
	N	160	159	160	160	160
	Std. Deviation	1.46656	1.01250	1.43628	1.33646	1.48573

lighting condition		Suspense1	mystery1	tension1	fear1	malice1
high key	Mean	2.2407	2.4074	2.6667	1.6415	1.5741
	N	54	54	54	53	54
	Std. Deviation	1.31659	1.44742	1.50471	.98243	1.28271
low key	Mean	3.9259	2.4815	3.2222	2.2593	1.8113
	N	54	54	54	54	53
	Std. Deviation	10.20886	1.32808	1.58610	1.61579	1.17762
available light	Mean	2.8462	2.5769	2.6538	1.9038	1.8269
	N	52	52	52	52	52
	Std. Deviation	1.60128	1.56363	1.61955	1.58745	1.11533
Total	Mean	3.0063	2.4875	2.8500	1.9371	1.7358
	N	160	160	160	159	159
	Std. Deviation	6.05270	1.44060	1.58293	1.43943	1.19309

lighting condition		intrigue1	Drama1	mischievous1	dangerous1	evil1
high key	Mean	2.7407	2.8333	1.7037	1.3519	1.1852
	N	54	54	54	54	54
	Std. Deviation	1.41668	1.61070	1.07510	.95478	.47876
low key	Mean	3.0741	3.0370	2.4074	1.7963	1.3333
	N	54	54	54	54	54
	Std. Deviation	1.49024	1.52913	1.66562	1.40591	.70040
available light	Mean	2.9808	2.9231	2.5385	1.8846	1.5385
	N	52	52	52	52	52
	Std. Deviation	1.66263	1.56989	1.58994	1.35261	.99925
Total	Mean	2.9313	2.9312	2.2125	1.6750	1.3500
	N	160	160	160	160	160
	Std. Deviation	1.52184	1.56262	1.50215	1.26665	.76232

lighting condition		realistic1	raw1	gritty1	truthful1	factual1
high key	Mean	3.4074	2.4074	1.778	3.0185	2.7778
	N	54	54	54	54	54
	Std. Deviation	1.78588	1.65425	1.2079	1.59588	1.52547
low key	Mean	4.7222	3.4074	2.453	4.1667	3.9074
	N	54	54	53	54	54
	Std. Deviation	1.69813	1.74311	1.5263	1.62237	1.60505
available light	Mean	3.6538	2.6538	2.154	3.3846	3.5962
	N	52	52	52	52	52
	Std. Deviation	1.73640	1.71367	1.3916	1.93172	1.82853
Total	Mean	3.9313	2.8250	2.126	3.5250	3.4250
	N	160	160	159	160	160
	Std. Deviation	1.82271	1.74669	1.3996	1.77668	1.71398

lighting condition		believable1	normal1	truetolife1	depression1	despair1
high key	Mean	3.9444	3.6111	3.9815	3.4444	3.1667
	N	54	54	54	54	54
	Std. Deviation	1.87754	1.61849	1.69895	1.93933	1.89089
low key	Mean	4.9444	4.0556	4.7963	3.9630	3.6296
	N	54	54	54	54	54
	Std. Deviation	1.55911	1.61849	1.49691	1.87298	1.86625
available light	Mean	4.1538	3.8654	3.9423	3.3654	2.8846
	N	52	52	52	52	52
	Std. Deviation	1.81912	1.70385	1.91397	2.14228	2.00640
Total	Mean	4.3500	3.8438	4.2438	3.5937	3.2313
	N	160	160	160	160	160
	Std. Deviation	1.79867	1.64660	1.74380	1.99148	1.93356

lighting condition		likewhoiknow1	eventslikereallife1	peoplelikereallife1	happenedtome1
high key	Mean	3.3148	4.7593	4.2963	3.2264
	N	54	54	54	53
	Std. Deviation	1.89163	1.60112	1.71155	2.06287
low key	Mean	3.8519	5.2407	4.7778	4.2037
	N	54	54	54	54
	Std. Deviation	1.73104	1.57738	1.86999	2.00358
available light	Mean	3.3077	5.2500	5.0577	3.1569
	N	52	52	52	51
	Std. Deviation	1.74377	1.41248	1.60163	1.94291
Total	Mean	3.4938	5.0813	4.7063	3.5380
	N	160	160	160	158
	Std. Deviation	1.79796	1.54175	1.75046	2.04919

lighting condition		likable1	relate1	believecharacter1	empathyforcharacter1
high key	Mean	2.9259	2.3148	4.0370	3.5000
	N	54	54	54	54
	Std. Deviation	1.41224	1.52741	1.69308	1.80931
low key	Mean	3.1509	2.6981	4.7115	3.5577
	N	53	53	52	52
	Std. Deviation	1.30673	1.55149	1.51252	1.71971
available light	Mean	3.0980	1.9608	4.5686	3.0980
	N	51	51	51	51
	Std. Deviation	1.33049	1.32606	1.50007	1.73499
Total	Mean	3.0570	2.3291	4.4331	3.3885
	N	158	158	157	157
	Std. Deviation	1.34611	1.49497	1.59033	1.75649

APPENDIX D

Tables of Means Time Point 2

lighting condition		control2	calm2	sad2
high key	Mean	3.5660	3.3077	5.5490
	N	53	52	51
	Std. Deviation	2.24901	2.06311	1.73567
low key	Mean	3.5962	3.4694	5.3673
	N	52	49	49
	Std. Deviation	2.06046	2.08269	1.64182
available light	Mean	2.8750	3.1277	5.4043
	N	48	47	47
	Std. Deviation	2.32127	2.21278	1.31314
Total	Mean	3.3595	3.3041	5.4422
	N	153	148	147
	Std. Deviation	2.22017	2.10816	1.57084

lighting condition		happiness2	joy2	lighthearted2	hopefulness2	humor2
high key	Mean	2.3148	2.1481	1.7963	2.8889	2.0556
	N	54	54	54	54	54
	Std. Deviation	1.64631	1.45897	1.30860	1.55001	1.47196
low key	Mean	2.3585	2.2115	2.0000	3.6415	1.9423
	N	53	52	53	53	52
	Std. Deviation	1.44241	1.39096	1.00000	1.60641	.99830
available light	Mean	2.4423	2.2692	2.1538	2.6154	2.2308
	N	52	52	52	52	52
	Std. Deviation	1.58935	1.44325	1.75326	1.52308	1.49004
Total	Mean	2.3711	2.2089	1.9811	3.0503	2.0759
	N	159	158	159	159	158
	Std. Deviation	1.55308	1.42343	1.38469	1.61009	1.33805

lighting condition		opportunistic 2	uplifting2	optimistic2	comfortable2	enjoyable2
high key	Mean	2.8333	2.0556	2.5556	2.2963	2.3889
	N	54	54	54	54	54
	Std. Deviation	1.65689	1.27999	1.59795	1.54955	1.54696
low key	Mean	3.7736	2.6038	3.1509	2.5660	2.6981
	N	53	53	53	53	53
	Std. Deviation	1.76114	1.53597	1.52412	1.21702	1.26468
available light	Mean	2.9808	2.1346	2.3269	2.2692	2.4808
	N	52	52	52	52	52
	Std. Deviation	1.59029	1.46901	1.47822	1.41581	1.42100
Total	Mean	3.1950	2.2642	2.6792	2.3774	2.5220
	N	159	159	159	159	159
	Std. Deviation	1.71175	1.44280	1.56432	1.39927	1.41348

93

lighting condition		suspense2	mystery2	tension2	fear2	malice2
high key	Mean	2.9815	3.4259	2.4340	1.6667	1.5556
	N	54	54	53	54	54
	Std. Deviation	1.71002	1.74401	1.58732	1.24385	1.00314
low key	Mean	3.0566	4.0566	2.7885	1.9057	1.8269
	N	53	53	52	53	52
	Std. Deviation	1.47303	1.59826	1.48636	1.19718	1.27911
available light	Mean	3.6346	3.9231	2.8077	1.9808	2.7115
	N	52	52	52	52	52
	Std. Deviation	1.73803	1.56989	1.65729	1.29085	7.31996
Total	Mean	3.2201	3.7987	2.6752	1.8491	2.0253
	N	159	159	157	159	158
	Std. Deviation	1.65983	1.65269	1.57796	1.24366	4.30368

lighting condition		intrigue2	drama2	mischievious2	danger2	evil2
high key	Mean	3.1481	2.9444	2.3889	2.1852	1.6852
	N	54	54	54	54	54
	Std. Deviation	1.72011	1.60679	1.63010	1.46756	1.37119
low key	Mean	4.0000	3.6981	3.0189	2.8302	1.9057
	N	53	53	53	53	53
	Std. Deviation	1.64083	1.60030	1.77038	1.64943	1.40417
available light	Mean	3.4231	2.9808	3.0000	3.4038	1.8077
	N	52	52	52	52	52
	Std. Deviation	1.69597	1.89416	1.88908	6.02368	1.18881
Total	Mean	3.5220	3.2075	2.7987	2.7987	1.7987
	N	159	159	159	159	159
	Std. Deviation	1.71308	1.72867	1.77814	3.68504	1.32062

lighting condition		real2	raw2	gritty2	truth2	factual2
high key	Mean	2.2963	1.7037	1.6111	2.1296	1.9815
	N	54	54	54	54	54
	Std. Deviation	1.42259	1.05740	.97935	1.30379	1.20519
low key	Mean	2.9245	2.4717	2.4151	2.7308	2.3654
	N	53	53	53	52	52
	Std. Deviation	1.45244	1.56406	1.56198	1.62234	1.53430
available light	Mean	2.9231	1.9808	1.9615	2.3654	2.3654
	N	52	52	52	52	52
	Std. Deviation	3.07964	1.39313	1.35707	1.46901	1.37240
Total	Mean	2.7107	2.0503	1.9937	2.4051	2.2342
	N	159	159	159	158	158
	Std. Deviation	2.12682	1.38161	1.35243	1.48039	1.37849

lighting condition		believable2	normal2	truetolife2	depression2	despair2
high key	Mean	2.4444	2.0370	2.0000	1.7593	1.7222
	N	54	54	54	54	54
	Std. Deviation	1.48790	1.28801	1.09888	1.09777	1.13962
low key	Mean	2.6981	2.1154	2.4717	2.0566	2.0943
	N	53	52	53	53	53
	Std. Deviation	1.60030	1.39542	1.63617	1.49891	1.43130
available light	Mean	2.4423	2.1923	2.3269	1.7500	1.9423
	N	52	52	52	52	52
	Std. Deviation	1.27439	1.34366	1.42418	1.18611	1.39204
Total	Mean	2.5283	2.1139	2.2642	1.8553	1.9182
	N	159	158	159	159	159
	Std. Deviation	1.45746	1.33533	1.40727	1.27208	1.32631

lighting condition		likepeolpeiknow2	likeeventsiknow2	peoplelikereallife2	happenedtome2
high key	Mean	2.1667	2.5185	3.0185	1.7925
	N	54	54	54	53
	Std. Deviation	1.48895	1.61059	1.74281	1.36380
low key	Mean	2.6852	2.9444	3.3333	1.9815
	N	54	54	54	54
	Std. Deviation	1.64631	1.76354	1.81191	1.56000
available light	Mean	1.7885	2.5192	2.6923	1.4808
	N	52	52	52	52
	Std. Deviation	1.31859	1.48839	1.55347	1.03829
Total	Mean	2.2188	2.6625	3.0188	1.7547
	N	160	160	160	159
	Std. Deviation	1.52823	1.62870	1.71736	1.34878

lighting condition		likable2	relate2	believecharacter2	empathyforcharacter2
high key	Mean	3.1111	1.8148	2.9444	2.2778
	N	54	54	54	54
	Std. Deviation	1.48790	1.15046	1.52237	1.32347
low key	Mean	3.5000	1.7885	3.1154	2.6923
	N	52	52	52	52
	Std. Deviation	1.44846	1.05415	1.51662	1.50214
available light	Mean	2.9615	1.6154	2.8269	1.8269
	N	52	52	52	52
	Std. Deviation	1.23608	1.05075	1.43788	1.06128
Total	Mean	3.1899	1.7405	2.9620	2.2658
	N	158	158	158	158
	Std. Deviation	1.40587	1.08364	1.48832	1.34694

APPENDIX E

Table of Means Time Point 3

lighting condition		control3	calm3	sad3
high key	Mean	4.6000	4.9000	5.0200
	N	50	50	50
	Std. Deviation	2.83563	2.41804	1.92184
low key	Mean	5.3077	4.9184	4.8824
	N	52	49	51
	Std. Deviation	2.87340	2.47350	2.10378
available light	Mean	3.7347	4.4082	5.2766
	N	49	49	47
	Std. Deviation	2.56398	2.66081	1.70297
Total	Mean	4.5629	4.7432	5.0541
	N	151	148	148
	Std. Deviation	2.82035	2.51288	1.91586

lighting condition		happiness3	joy3	lighthearted3	hopefulness3	humor3
high key	Mean	2.0370	1.7407	1.7593	2.0185	3.1111
	N	54	54	54	54	54
	Std. Deviation	1.19690	1.10206	1.19646	1.25127	1.82918
low key	Mean	2.6038	2.1887	2.2264	2.6038	4.3019
	N	53	53	53	53	53
	Std. Deviation	1.62125	1.48138	1.40933	1.45892	2.08091
available light	Mean	2.5385	2.3462	2.0000	2.1923	3.1923
	N	52	52	52	52	52
	Std. Deviation	1.75412	1.64358	1.26801	1.29915	2.05835
Total	Mean	2.3899	2.0881	1.9937	2.2704	3.5346
	N	159	159	159	159	159
	Std. Deviation	1.55047	1.43811	1.29994	1.35332	2.05241

lighting condition		opportunistic3	uplifting3	optimistic3	comfortable3	enjoyable3
high key	Mean	2.2407	1.7593	1.9259	2.3148	2.8704
	N	54	54	54	54	54
	Std. Deviation	1.50390	1.22759	1.32966	1.47717	1.96235
low key	Mean	2.9231	2.3019	2.5472	2.3774	3.2453
	N	52	53	53	53	53
	Std. Deviation	1.61908	1.42214	1.60007	1.33339	1.55546
available light	Mean	2.5000	2.0385	2.1923	2.3846	3.0000
	N	52	52	52	52	52
	Std. Deviation	1.54031	1.41368	1.59704	1.62280	1.68034
Total	Mean	2.5506	2.0314	2.2201	2.3585	3.0377
	N	158	159	159	159	159
	Std. Deviation	1.57021	1.36605	1.52468	1.47246	1.73893

lighting condition		suspense3	mystery3	tension3	fear3	malice3
high key	Mean	4.0926	4.3019	4.0556	2.9815	2.2963
	N	54	53	54	54	54
	Std. Deviation	1.76195	1.96689	1.95628	1.92786	1.59752
low key	Mean	4.3774	4.8491	4.3585	3.3396	2.9057
	N	53	53	53	53	53
	Std. Deviation	1.74561	1.91549	1.92248	1.95077	1.55988
available light	Mean	4.8462	4.9808	4.1923	3.2115	2.4615
	N	52	52	52	52	52
	Std. Deviation	1.68482	1.66263	1.68078	1.89257	1.52703
Total	Mean	4.4340	4.7089	4.2013	3.1761	2.5535
	N	159	158	159	159	159
	Std. Deviation	1.74852	1.86590	1.85138	1.91772	1.57371

lighting condition		intigue3	drama3	mischievious 3	dangerous3	evil3
high key	Mean	3.5926	3.9074	2.9444	3.2778	2.5741
	N	54	54	54	54	54
	Std. Deviation	2.01427	1.83538	1.87754	1.89753	1.73316
low key	Mean	4.5472	4.6078	3.8846	4.0755	3.0566
	N	53	51	52	53	53
	Std. Deviation	1.69349	1.76724	1.91643	2.07410	1.98470
available light	Mean	3.8462	4.3654	3.9038	3.5962	2.8654
	N	52	52	52	52	52
	Std. Deviation	2.06164	1.87897	1.92262	2.09817	1.92026
Total	Mean	3.9937	4.2866	3.5696	3.6478	2.8302
	N	159	157	158	159	159
	Std. Deviation	1.96003	1.83991	1.94631	2.03805	1.87997

lighting condition		real3	raw3	gritty3	truth3	factual3
high key	Mean	2.0185	1.8704	1.7222	1.8148	1.7778
	N	54	54	54	54	54
	Std. Deviation	1.20519	1.27452	1.05360	1.15046	1.29828
low key	Mean	2.3585	2.4151	2.5849	2.0755	1.9057
	N	53	53	53	53	53
	Std. Deviation	1.66519	1.65755	1.85466	1.39848	1.18101
available light	Mean	2.5769	1.9615	2.1538	2.0000	1.9423
	N	52	52	52	52	52
	Std. Deviation	1.84014	1.28279	1.88268	1.34310	1.27439
Total	Mean	2.3145	2.0818	2.1509	1.9623	1.8742
	N	159	159	159	159	159
	Std. Deviation	1.59564	1.42744	1.66570	1.29696	1.24647

lighting condition		beliabeable3	normal3	truetolife3	depression3	despair3
high key	Mean	2.0000	1.6667	1.5741	1.7593	1.9259
	N	54	54	54	54	54
	Std. Deviation	1.42749	1.06399	.96352	1.22759	1.45176
low key	Mean	2.0943	1.6792	2.0189	1.8679	2.2264
	N	53	53	53	53	53
	Std. Deviation	1.47106	1.01477	1.46091	1.41473	1.58892
available light	Mean	2.1538	1.8269	1.8269	1.6538	2.0769
	N	52	52	52	52	52
	Std. Deviation	1.37747	1.04264	1.18357	1.11820	1.42590
Total	Mean	2.0818	1.7233	1.8050	1.7610	2.0755
	N	159	159	159	159	159
	Std. Deviation	1.41854	1.03674	1.22463	1.25516	1.48642

lighting condition		likepeopleiknow3	likerealevents3	likerealpeople3	happenedtome3	Genreofmovie3
high key	Mean	1.7037	1.8333	2.0556	1.2593	1.3333
	N	54	54	54	54	54
	Std. Deviation	1.14314	1.20924	1.35168	.52071	.61430
low key	Mean	1.7593	2.1667	2.3889	1.3889	1.9259
	N	54	54	54	54	54
	Std. Deviation	1.08045	1.58709	1.59500	.87775	.57796
available light	Mean	1.4615	1.7885	1.8235	1.3529	2.0392
	N	52	52	51	51	51
	Std. Deviation	.82751	1.17718	1.17823	.71620	.69169
Total	Mean	1.6438	1.9313	2.0943	1.3333	1.7610
	N	160	160	159	159	159
	Std. Deviation	1.03003	1.34174	1.39979	.71747	.69773

98